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Transitioning to a Post-Carbon Society

Degrowth, Austerity and Wellbeing

Edited by Ernest Garcia,
Mercedes Martinez-Iglesias and Peadar Kirby

International Political Economy Series

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Degrowth, Austerity and Wellbeing

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Chapters 2, 3 and 6 have been translated from the Spanish by James C. Kelly. Chapter 1 has been translated from the French and Chaps. 10, 11 and 12 from the Spanish, all of them by WordsFactory.

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Introduction

> The extent of the transformation ahead of us can barely be overestimated. In terms of profound impact, it is comparable to the two fundamental transformations in the world's history: the Neolithic Revolution, i.e., the invention and spreading of farming and animal husbandry, and the Industrial Revolution, which Karl Polanyi (1944) called the "Great Transformation", meaning the transition from agricultural to industrialized society. "German Advisory Council" on Global Change (WBGU) (2011, 5)

> Keeping emissions on the path needed to limit the median expected increase to the recommended 2 degrees—and then delivering—would require a revolution. "Martin Wolf" (2015)

This opening quote from the high-level German Advisory Council that reports directly to the German Chancellor reminds us of the enormous transition that faces human society if it is to move to a low-carbon or post-carbon society. For, as the UNDP's 2011 Human Development Report puts it, "our development model is bumping up against concrete limits" (UNDP 2011, 15). Yet, while growing scientific evidence shows how our patterns of development are environmentally unsustainable, most recently highlighted in the Fifth Assessment report of the Intergovernmental Panel on Climate Change (IPCC 2013, 2014), dominant policy paradigms in countries around the world are based upon a return to economic growth within a neoliberal consumption-driven economy. The stark contradiction

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between what needs to be done to keep warming to less than 2°C according to the scientific evidence, and now given legal backing in the Paris Accord, and what is actually happening, is increasingly being noted, even by mainstream commentators such as Martin Wolf of the *Financial Times*. While recognizing that effective action on climate change would require a revolution, he acknowledges that "on the path we are now on, we have a significant chance of transforming the world into something not seen for tens of millions of years, with uncertain, but potentially devastating consequences". He concludes: "Humanity is unwilling, possibly simply unable, to overcome the political, economic and social obstacles to collective action" (Wolf 2015).

This stark choice confronts humanity with what is perhaps the greatest dilemma it has ever faced in its history: can we try to mobilize our resources in the most unprecedented ways over a short time span of no more than half a century to avoid the worst of the devastating scenarios outlined in the IPCC report or do we continue to give priority to economic growth and its principal mechanism, the extension of a consumer society throughout the world, seeking at best to modify or "green" it? At its heart, this is a dilemma about the contradictions between what our science is telling us and what our deeply entrenched belief systems are telling us about how we organize our economy and society; indeed, its roots go deep into what we believe constitutes the good life. Our future rests on which of these we choose to follow, the evidence or our beliefs. Yet, few see the challenge in these terms. Many believe that science and technology will permit us to maintain our current consumer lifestyles while simultaneously reducing our greenhouse gas emissions by up to 95% by 2050 and replacing our dependence on fossil fuels by renewable sources of energy. The opening quote above from the German Chancellor's expert group draws our attention instead to the fundamental changes required to the ways we organize our economy and society. But the debate on climate change has focused much less on these issues, placing its faith in scientific and technological breakthroughs while advising minimal changes to lifestyles and behaviour such as recycling waste, using public transport, buying low-emission cars and retrofitting our housing stock.

Mapping the Challenges

The transition to a post-carbon society is therefore not a more or less speculative guess about the future but, rather, an inescapable horizon that conditions the possible pathways of social change. Yet, debates about the nature and implications of this transition for our economies, societies, consumption patterns and lifestyles has been far from rigorous and comprehensive and these are dominated by perspectives drawn from science, engineering and technology and much less informed by sociological, philosophical or anthropological approaches. This edited volume is the outcome of a transnational research project on these issues, connecting the issues of post-carbon transition to discussions about setting limits to consumption and the need to examine the necessary conditions for a positive reconstruction of austerity. It is divided into three sections: transitions, rethinking austerity and case studies.

The first part on transitions includes analyses of various aspects of the nature of the transition to a post-carbon society and what it will involve by way of changes to social practices. While some see it as being possible within the contours of a growth economy and, indeed, as contributing to such growth, others challenge this view and see it as necessarily involving not only technological and political changes but also a profound transformation in lifestyles, consumer patterns and urbanization models, as well as many other aspects of social organization. This latter view is argued by various contributors to this volume.

The second part introduces critical discussion of the meaning of austerity. For decades, the scientific study of human pressure on ecosystems has reminded us that we are living beyond our means, as the planet is asked to deliver more than it can actually offer. While this point is often made, there has been less rigorous examination of the implications for society of living within the limits of the ecosystems on which we all depend. It is paradoxical that recently, amid deep economic turmoil, the existing powers—governments and corporations—have came up with an apparently similar message and used it to legitimize cutbacks in salaries, services and rights. It is therefore pertinent to explore the possibility of "different austerities" as a necessary contribution to discussion of the transition to a post-carbon society. Does austerity inevitably mean cutting down on welfare and unsustainable ecological impacts or, on the contrary, can it be socially reconstructed so as to make it compatible with the maintenance of well-being and reducing pressure on what the planet can bear?

Contributors seek to identify the possibilities, opportunities, conditions and social contexts of a hypothetical "better with less" situation, understanding that this expression refers both to an ethical principle and also to the results of social experiences involving social initiatives, lifestyle adjustments, economic and land planning, and the development of services.

The final part contains a range of case studies of social projects and experiments that are elements of the transition to a post-carbon society. Those included in this book include examination of the discourse of Spanish employers and trade unions of how they conceive of achieving a low-carbon society, Cloughjordan ecovillage in Ireland, landfill culture and practices in Valencia, an offshore wind farm project on Baie de la Seine in France, and low-carbon practices in a neighbourhood of Barcelona.

The set of texts in this book is therefore articulated around two axes: (a) the sociology and anthropology of post-carbon society, towards a new metabolism; and (b) revisiting austerity to overcome the crisis without destroying the planet. Combining theoretical approaches with empirical examination of existing social practices and discourses, the book fills a gap in the social science literature on the transitions to a post-carbon society.

Post-Carbon Research Project

Most of the chapters in this book are the outcomes of research undertaken as part of a multinational research project "Transitions to a Post-Carbon Society". Developed since 2007, it involved three groups: the Structure of Interdisciplinary Research on Sustainability Studies (ERI Sostenibilitat) of the University of Valencia, the Department of Sociological Theory (which recently changed its name to Department of Sociology) at the University of Barcelona, and the Centre for Studies of Techniques, Knowledge and Practices (CETCOPRA lab) in the University of Paris 1 (Panthéon-Sorbonne). The chapters are based on papers given at a symposium entitled "Better with less: Degrowth, austerity and well-being", held in Valencia (Spain) in October 2014. This meeting, among others, laid the foundation for a dialogue among social scientists with shared concerns in various parts of the world. Some are involved in similar research initiatives, such as the Post-Carbon Pathways programme being carried out at the University of Melbourne and the GinTRANS2 group (Group Transdisciplinary Research on Socio-Ecological Transitions) at the Autonomous University of Madrid. Other researchers worked on issues such as the reconceptualization of an historical experience of austerity in the UK, or modelling

the transition to a low-carbon society at local level in Ireland. This book therefore illustrates the current state of research on these issues.

The general outline of the post-carbon research programme emerged in 2007 in response to the first funding call from the European Union for research on the transition to a post-carbon society (Directorate-General for Research and Innovation, European Commission 2007). Its initial design was the result of a collaboration between CETCOPRA and ERI Sostenibilitat, under the lead of Alain Gras and Ernest Garcia. In its most recent phase, its work has been supported by the Spanish National R&D Programme of the Ministry of Science and Innovation, under grant number CSO2011-24275.

Various issues have been examined within this research programme. Working from a definition that tries to avoid value judgements and be compatible with various possible social trajectories, a post-carbon society is understood as a society in which the supply of fossil fuels decreases each year. And the work is informed by four basic convictions:

- The transition to such a society is determined by the need to fight climate change or by oil and gas depletion (or by complex combinations of both causes).
- This transition does not only imply technological and political changes; it cannot be achieved by an increase in energy efficiency alone or by changing government policies, but it will also require significant (and probably deep) transformation of lifestyles, consumption patterns and forms of urbanization, as well as many other aspects of social organization.
- Social trajectories in that direction will depend on the history of each place or country, cultural contexts and other particular aspects. Because of that, different transitions to different post-carbon societies must be expected. Transformation pathways are undoubtedly influenced by the individual history and culture of each society, which mean that idiosyncrasies and peculiarities should be detected and taken into account.
- The reduction in fossil fuels consumption will eventually have redistributive impacts, whose social scope should be assessed. The analysis of the relationship between social stratification and the environmental impact of different ways of life must be incorporated into the description and the explanation of the transition process.

Several social research techniques have been combined, both quantitative (surveys, secondary sources, and other existing statistical data analysis) and qualitative (in-depth interviews, sociological involvement, documentary analysis, case studies, foresight methods). In addition to social empirical research, methods of hermeneutic-philosophical interpretation have been applied in order to highlight the cultural dimensions of the transition processes.

The idea that the transition to a "post-carbon" society becomes unavoidable can be seen, above all, as a consequence of the growing scientific evidence concerning anthropogenic climate change (the artificial intensification of the greenhouse effect) as well as the political recognition that, if this change is not controlled in time, the costs could become unbearable. This was strongly reinforced by the ambitious targets set at the Paris climate conference in December 2015 and included in the Paris Accord. This idea can also be linked to other evidence indicating that the scale of humanity's physical impact has already surpassed the levels that the planet can sustain (for evidence see, for example, the *Living Planet Report* (WWF 2014)). As part of the global overshoot, the production and supply of fossil fuels is also entering a phase of scarcity and rigidity—both because of supply constraints and increasingly because of political decisions to curb dependence on them—which will entail finding alternatives that in themselves can be reasons for profound changes. It is not surprising, then, that much attention is being given to technological alternatives, in both the development of non-fossil energy sources and a more efficient use of energy as a whole in production and consumption activities. It is also logical that emphasis is given to governmental measures and decisions (top-down) that could be necessary in this context, such as fiscal measures, incentives, and increasingly stringent regulations.

However, even though at first glance the idea of a technological solution and policy regulation for environmental problems appears to be attractive, it is clearly insufficient. The introduction of new technologies is not independent of the social context in which they are implemented. Government measures in democratic societies are only viable if they have the comprehension and support of a more or less active population. For this reason, a post-carbon society cannot simply be defined through its technologies and policies, but will also be defined by specific forms of organization and social action, of lifestyles and value systems. Much less research has been undertaken on the socio-cultural dimensions of the transition to a post-carbon society than on the technological and scientific

dimensions. This book is a contribution to addressing this lack, raising neglected questions and highlighting urgent issues.

Outline of the Book

The first section of the book contains four chapters that in different ways address aspects of the socio-cultural challenges raised by the need to transition to a post-carbon society. Alan Gras's opening chapter sets these challenges in the context of what he calls the "deadlock of thermo-industrial civilization", focusing on the historical social anthropology of technology in the industrial age. The chapter outlines three theses concerning transition and degrowth in the social anthropology of technology. The first one, which the author rejects, is the evolutionist view about the history of technology which maintains that there is only one relationship with our environment, that of efficacy with regard to an objectified nature. From this perspective, the destiny of technology is predation. However, Gras argues that other worldviews also regard technology as mediation, just like art. He secondly introduces the concept of thermo-industrial society, implying that a new technical system is also a way of thinking about the world. The train, together with the railway and telegraph network, takes us to a thermo-industrial society, one based on the power of fire. But all that develops in parallel with a new imaginary of time and space, as one of the forms of the energy mega-machine. Finally, in introducing his third thesis, Gras argues that the current transition is just a third phase following that of coal and oil, as it is mainly based on electricity—second-degree energy which always relies on other heat-based power sources. Electricity does not change anything in the imaginary of predation and it enslaves us further in this view of the world and the mega-machine. The technology that supports electricity, such as ICTs, smart grids, and cyber-culture, extends the same socio-historical trajectory of growth. It is therefore a dangerous "phenomenon", as it appears to be a way to prevent us from choosing our own pathways of degrowth and "limited" comfort based on a new understanding of nature and a pacified relationship with it.

Long-term visions of social change "beyond carbon" have often been detached from a comprehensive knowledge of existing experiences, being principally hypothetical and speculative. In particular, there is little information about the compatibility between existing normative discourses on ways of low-carbon life and the perceptions, predispositions, and current practices of the general public in this respect. The idea of a post-carbon

transition has, therefore, to be developed as a dialectic movement between the present and the future, between the innovations and the resistances that can be identified in the present and the normative principles of a future culture of sufficiency. This dialectic, at the end, should be rooted in concrete social contexts that impose boundaries, partiality or particularity. If a turnabout towards greater sustainability does ever occur in human societies, then what will flourish will not be just one culture of sufficiency, but several. This pluralist postulate stems from the belief that the cultural matrix in each society, its tradition and continuous re-elaborations must be meaningful when formulating sustainability-targeted behaviour rules. This aspect of the issue is analysed in the chapters by Sempere and by Garcia and Martinez-Iglesias, the first primarily with a theoretical focus, and the second incorporating empirical research.

The vast majority of people cannot accept that affluent living is coming to an end. They do not admit they will be obliged to implement some type of austerity. Sempere's chapter examines the psychosocial mechanisms and structural and mental inertias that prevent individuals from becoming aware of these realities. The cultural and behavioural legacy of the era of consumer abundance is linked to individualist views of the role of private and collective consumption that need to be overcome for everybody's needs to be fulfilled on the basis of solidarity. The chapter puts forward a number of proposals for the construction of a cultural and moral project of alternative and supportive austerity.

Based on the situation in Spain, Garcia and Martinez-Iglesias analyse whether the current conditions, which date back to the crisis that began in 2007, favour a benign and smooth transition or, on the contrary, make the transition more difficult and more prone to conflict. Macro-structural data obtained from secondary sources point to a link between decarbonisation, economic recession and the erosion of social cohesion. However, a comparative international analysis suggests this may not be the case, at least during the initial phases of the transition. The results of focus groups on how people imagine the future indicate that immediate anxieties tend to cancel out any concern for ecological problems, and hence that the crisis is conducive not to transformative dreams but to regressive ones. Information on the environmental impact, or carbon footprint, of lifestyles and patterns of consumption shows the reduction in consumption induced by the crisis has shackled large swathes of the population to unsustainable ways of life in a new wave of poverty that is often characterized

by high environmental costs. Finally, the chapter discusses the relationship between the post-carbon transition, overshoot and degrowth, examining the cultural features associated with a positive reconstruction of austerity.

These more anthropological and sociological contributions to the conceptualization of the post-carbon transition are complemented by Wiseman and Alexander using an approach inspired by political economy. Their chapter points out that in recent years the concept of a "carbon budget" has entered the lexicon of climate science. This concept refers to the maximum amount of carbon emissions that can be released into the atmosphere if the world is to keep within the "2 degree" temperature rise that was agreed at the 2009 Copenhagen climate change conference. The authors quote the climate scientist Kevin Anderson, who has argued that if the world is going to keep to its carbon budget, the most developed (Annex 1) nations need to reduce emissions by 8–10% a year over the coming decades. They argue that these levels of reduction cannot be met solely from a "supply side" solution of scaling up renewable energy. While this is necessary, such deep and rapid emissions' reductions will need to be supported by reducing emissions from the "demand side" too. These assumptions, they add, have radical implications: economic orthodoxy holds that economic growth is incompatible with emissions reductions of more than 3 or 4% a year, from which it would follow that avoiding runaway climate change requires degrowth in the Annex 1 nations. Wiseman and Alexander examine these assumptions and explore some of their socio-economic and political implications, outlining various "power-down" policies for deep and rapid decarbonization.

As a concept from political philosophy, "austerity" should be defined as relinquishing the superfluous to guarantee the maintenance of the necessary. However, current use of the term "austerity" in politics and economics is almost exclusively reserved for referring to the cuts imposed by governments (reductions in wages, increasing taxes and reducing the provision or increasing the cost of conditions of access to services such as education, health, disability support, public transport, security, civil protection, and access to the legal system). The fact that this is being referred to as austerity, when it could more accurately be described as the deliberate destruction of the welfare state, is giving this word all sorts of negative connotations. In fact, in the current context austerity appears to turn its ideal definition on its head, suppressing the necessary (such as education and healthcare) often to maintain the superfluous. *A sensu contrario*

several of the contributions to this book claim that austerity may express values that play a positive role in averting a catastrophic collapse. This is the subject of the book's second section. As the post-carbon transition implies austerity (in other words it requires us to accept that the land of luxury will never exist and virtual wealth and debts that never need to be paid back are illusions), it is worth recalling that certain variants may have gratifying or desirable aspects, and worth exploring the hidden connection between austerity and well-being. This opens up a range of issues for examination. Austerity can therefore be seen, not as a return to living in caves but as the defence of the refinement of civilized life in the face of the excesses by which it is threatened. Austerity is not about accepting unnecessary privations as inevitable, it is not about smiling in the face of punishment from an abusive power, but it is about recognizing that, regardless of whether we have been deceived or not, we have been living beyond our means. This is the stance taken by many ecological philosophers and thinkers: less is more, voluntary simplicity, small is beautiful, objections to growth.

In Chapter 5, Rebecca Bramall addresses the question through looking at the lessons to be drawn from an historical precedent. She maintains that, since the financial crisis of 2007–2008, the mobilization of the historical era of "austerity Britain" as an analogy for the current conjuncture has both opened up and closed down possibilities for social change. A wide range of social actors in the UK—from policy institutes and cultural organizations to artists and community projects—have drawn upon the 1940s to imagine and describe alternative and often more sustainable ways of living. Wartime slogans such as "dig for victory" and "make do and mend" have informed this imaginary, as has an iconography of bunting, ration books, spades and muddy carrots. As the implications of the UK government's spending cuts play out, emergent meanings of austerity have made it harder to make the environmental case for "less is more", and a vociferous critique has emerged of "austerity nostalgia", "poverty voyeurism", and the (classed) politics of thrift. Her chapter reviews the factors that have constrained the articulation for progressive social change of austerity past to austerity present, and considers the possibilities for alternative future-making that this comparison may yet hold.

Riechmann examines the topic through an optic of moral philosophy. He states that one of the big issues that requires reflection (and possibly correction) by many people on the left is how human subjectivities have

changed shape as a result of capitalist social relations—particularly in the last stage of capitalism, usually referred to as neoliberal capitalism. The author reminds us what Christians espouse: namely that, in order to be good people, in most cases we need to break down and then reconstruct ourselves, and they call it conversion. He adds that left-wing militants should not ignore something which is so basic. And so, in the context of the transition, new calls arise for a New Man and a New Woman, from the standpoint of (personal and collective) *political-moral self-construction*. Riechmann examines how we can conceive now of such a conversion, in this Malthusian "Century of the Great Trial".

In the final chapter in this section, Alexander discusses the question: How would an ordinary middle-class citizen deal with a lifestyle of radical simplicity? Radical simplicity, he states, does not mean poverty, which is involuntary and full of suffering and anxiety, and thus universally undesirable. Rather, it means a very low but biophysically sufficient material standard of living. His chapter directly addresses the issue of the "two types of austerity", arguing that lifestyles of reduced consumption can be desirable if we negotiate the degrowth transition wisely, both as individuals and as communities. Indeed, it suggests that radical simplicity is exactly what consumer cultures need to shake themselves awake from their comfortable slumber, and that radical simplicity would be in our own, immediate, self-interest.

One of the necessary aspects to move us towards the objective of connecting visions of the future with the conditions of the present is to study practical, concrete, already existing experiences oriented towards a low-carbon way of life. These are observed in citizens' initiatives and intellectual or social movements oriented towards relocalization or reduction, in eco-efficient urban design, and in experiments with alternative energies. The seeds for the future may be found and interpreted in real processes that at present may affect only small numbers of people but that can hold, *in nuce*, traits which can be generalized. The underlying idea is that such initiatives can be considered to be so-called real-word experiments for social evolution towards a post-carbon society. The concept of real-world experiments is a framework for understanding environmental design projects in real-life conditions; in this way society itself is the laboratory for innovative practices. This book includes two texts from this perspective: the study of Cloughjordan ecovillage, Ireland, and that of the

Transition movement in the neighbourhood of Sant Martí-La Verneda in Barcelona (Catalonia).

Kirby's chapter discusses how Cloughjordan ecovillage attempts to model the transition towards a low-carbon society and to disseminate the lessons learned in this process. Starting with a description of the ecovillage and its origins, it then analyses the various elements that support the attempts to model a low-carbon society, including power, farming and food, transport, water, the building of homes, livelihood styles and community life. The chapter also includes a presentation of the ecovillage governance model, and describes the educational activities through which the lessons learned are disseminated. Finally, it shows how this has helped achieve an ecological footprint of 2 global hectares, the lowest ever measured in Ireland.

Vicens's chapter examines the process taking place in a neighbourhood of Barcelona which situates itself within the Transition Towns movement. He maintains that the success of such a process depends on the capacity of the community to generate knowledge-creation processes and innovative initiatives. It is assumed that transition actions are based on experiential knowledge creation, that they arise in the midst of crises derived from unsustainable production and consumption processes, leading citizens to reject conventional strategies and experiment with alternatives. It is also assumed that experiential knowledge is in a continual process of change, refining optimum responses that empower people. The transition process includes initiatives like the participative energy programme, community urban agriculture, the change market, co-operatives, and fab labs, among others, reflecting an experiential knowledge-creation process, based on supporting innovation in social actions through people's formal and informal interactions.

Research concerning the post-carbon transition has been directed to, in the first instance, technological changes: the substitution of fossil fuels for other sources of energy and the increase of eco-efficiency in the processes of production and consumption as a whole. Much attention has also been given to the economic policy responses: eco-taxes, incentives to save energy or replacing fossil fuels with alternative energies, and market reforms. Less attention has been paid, however, to investigating technical developments in their social-cultural contexts. The contributions by Laurence Raineau, on the offshore wind energy mega-projects in Basse Normandie (France), and by Ignasi Lerma, on the waste management

systems in the autonomous community of Valencia (Spain) are first steps aiming at filling this gap.

To meet the requirements of European policy on energy transition (the 20/20/20 targets), France is developing a number of major offshore wind farm projects. Based on the study of one of them (off the coast of Caen), Raineau analyses the challenges and issues raised by these projects for the development of renewable energies. In particular, his chapter explores how they provide evidence of the limitations of the "think global" approach, as wind power is only seen as an alternative energy source rather than as a local community resource. Interpreting a technical project from the point of view of its social implications, the Sorbonne specialist shows that the logic of substituting energy technologies as an autonomous evolutionary process is far from being rooted in the dynamics of the local community.

To some extent, waste is just one more sign of the unsustainability of growth. Hence, the importance of reduction, minimization, reuse and recycling is directly linked to sustainability and degrowth and, consequently to the future of the planet and the human species. Lerma's chapter examines the outcomes of the Spanish national programmes of waste management, discussing them from the perspective of a post-carbon transition. It concludes that the current situation shows the lack of efficient intervention/regulation by public authorities in putting mechanisms of interaction in place, via public debate and social and economic commitment among all stakeholders (producers, manufacturers, distributors, services, users-consumers, and the administration itself).

Victor Climent Sanjuán investigates how the post-carbon transition is conceived of in the speeches and expectations of socio-economic actors (employers and trade unions) in Spain. The chapter looks at the perceptions and future projections of the energy transition among these social agents. According to Victor Climent Sanjuán research, these agents, especially employers, are committed to moving away from an energy model based on the exploitation and consumption of fossil fuels, even though they predict a slow evolution (between 30 and 40 years) towards an energy framework based exclusively on clean and renewable energy.

In summary, this book integrates partial elements derived from four fields of research: (a) empirical case studies examining initiatives of civil society, (b) descriptive data about the attitudes and practices of the general population, (c) data about the relationship between carbon footprints and the social-economic situation; and (d) scenarios and perspectives on

social change in a post-carbon era. There are many descriptive studies of concrete experiences that do not connect to long-term social changes. There is also much information about opinions and attitudes on the environment that are not contextualized within the need for reducing substantially the use of fossil fuels. There is a wealth of data on the ecological footprints of countries or cities, but not so much on their social distribution and the redistributive impacts of modifying them. There are some formulations about future contexts "beyond oil" or "beyond growth", but these are characteristically disconnected from studies concerning existing social practices. Compiling a range of research outputs that integrates these four lines of research and specifically explores the interactions between them is, from our point of view, the principal contribution that this book makes towards advancing knowledge on the urgent issue of how the transition to a post-carbon society may be brought about.

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References

Directorate-General for Research and Innovation, European Commission. (2007). *Towards a "post-carbon society": European research on economic incentives and social behaviour*. Luxembourg: Office for Official Publications of the European Communities.

IPCC. (2014). *Climate Change 2014: Synthesis Report*. Geneva: IPCC.

UNDP. (2011). *Human Development Report 2011: Sustainability and equity*. New York: Palgrave Macmillan.

WBGU. (2011). *World in transition: A social contract for sustainability*. Berlin: WBGU Secretariat.

Wolf, M. (2015, June 9). Climate uncertainty justifies action. *The Financial Times*.

WWF. (2014). *Living Planet Report 2014: Species and spaces, people and places*. Gland: WWF.

PART I

Transition

CHAPTER 1

The Deadlock of the Thermo-Industrial Civilization: The (Impossible?) Energy Transition in the Anthropocene

Alain Gras

Translated from the French by WordsFactory.

Foreword: Nature and the Concept of Historical Trajectory

When reference is made to the energy transition, the background—the noun "transition"—is usually overlooked, and we tend to forget the very complex implications of the qualifier, "energy".

I would like to give a context, from an historical, anthropological and even metaphysical viewpoint, to the notion of energy transition, often reduced to a technical problem in its economic and political dimensions.[1] And I would like to do so because we also live in a fantasy world, a world created by thinkers, philosophers, poets, artists… but also by ourselves in response to the ideas that we have proposed. This imaginary dimension of the world is totally neglected by scientists and to a great extent by academic history, at least as far as technology and science are concerned.[2] Indeed, the well-known programme SCOT [social construction

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of technology] has reintroduced the social dimension, though in the form of immediate data and with little interest in symbolic aspects (Bijker et al. 1987). But the imaginary—the dreamed part of the world—structures reality through symbolic and conceptual intermediaries, establishing it, to quote the words of Cornelius Castoriadis (Castoriadis 1976). The way in which Weber turns Protestant ethics into the moral basis of the system of thought and action, that capitalism is all about, is a celebrated illustration. I will come back to this analysis to show that it goes beyond the economy.

It is therefore in this imaginary framework that I would like to reinsert modernity—now called the "Anthropocene"—before dealing with the social phenomenon of "energy transition". The background of this transition is none other than the relationship between human and nature that technoscience conceives of as a relationship between subject and object. Thus, dominant thought puts aside the basic problem of knowledge, one that can be summed up in the question *how can we know the truth of the description of reality that modern reason supports as "the only and universal truth"*? This question is answered by the French anthropologist Philippe Descola by distinguishing four worldviews, all equally reasonable in his account (2005, 176). I would like to emphasize that he is not a "rebel of thought" but the second successor of Claude Levi-Strauss as chair of the *Collège de France*, the highest academic institution in the country.

These ontological options can be portrayed as shown in Fig. 1.1.

As Levi-Strauss's heretical disciple, Descola distinguishes four forms of identification that he also calls "ontologies"; they shape the perceived reality of the relationship of human beings with the world around them. There is no need to delve into the details of this post Levi-Straussian anthropology

	Similar in interiority ***(monoculturalism)***	*Dissimilar in interiority* ***(multiculturalism)***
Similar in physicality ***(mononaturalism)***	**Totemism**	**Naturalism**
Dissimilar in physicality ***(multinaturalism)***	**Animism**	**Analogism**
(Adapted from Descola 2005, 2006, 2009)		

Fig. 1.1 Four identification modes according to Philippe Descola.

to find that "naturalism"—the moment at which reason posits the existence of nature as an objective reality outside our consciousness—is radically different from the other…

Let us listen to Descola (2005, 225):

> Even if concepts such as 'society', 'nature', 'history', 'economy', 'religion' or 'subject' played a significant part in reflexive thinking in Europe, in bringing modernity into being and thus in creating an actual space within which humanities and social sciences could develop, these concepts nevertheless relate to ways of objectifying the phenomena characteristic of a *historical trajectory* that other peoples have not followed. They must therefore be treated not as universals, but as local expressions of a *particular form of composing the elements of the world*.[3]

In other words, the anthropologist cannot conceive of a universal history, the expression of a general trend that considers only one kind of human evolution, whose idea of progress is the ultimate weapon to exclude other forms of thought. On the contrary, for the social anthropologist there are but specific trajectories. In this case, capitalism, technology, science and reason, built in the West on the basis of the subject/object and nature/nurture division, so cherished by Levi-Strauss, are nothing but provisional expressions of an "ontology", a particular representation of the essence of humanity. And this trajectory can come across other older trajectories that appear as excluded from the process of progress and are therefore declared "irrational".

What happens for example in Indian America, in the former Spanish colonies that preserved their original culture, is also very interesting. Indigenous protest movements against the creation of a mine, for example, are not intended to directly prevent pollution or plundering, but to prevent the mine from questioning the integrity of an element of what constitutes their natural environment—a lake, a forest, a river—but for the communities involved it is considered an integral part of the collective; and anything that affects a member of the group also affects the rest of the group. This is an original form of political action, because it is not based on the defence of people or the protection of the environment, but on the fact that environmental elements are integrated into the human community to form a socio-cosmic aggregate, in which it becomes difficult to separate human interests from environmental ones.

However, this cosmogony is not only typical of Indians; ours, before the advent of industrial mechanization, shared a great many symbolic elements

with it. In the Middle Ages, astronomy was "analogistic"—and so were Renaissance astrology and philosophy (from Campanella to the last "magician", Giordano Bruno). Technological innovation, however, was part of that world but it was rendered visible beyond functional efficiency. For example, in the military field, one is amazed by the elegance of warships and the aesthetic quality of firearms, muskets and cannons, which were signed by foundries as if they were works of art. This technical efficiency was also symbolic and evoked a transcendental power, detached from the actual needs of the immediate reality of war.

Royal warship Wasa is a fascinating example. The ship foundered and sank on 10 August 1628 after leaving the Bay of Stockholm, and was salvaged intact in the 1960s. She is now on display, all splendid. There are no less than 500 magnificent sculptures from prow to stern! And yet this happened to the Lutherans, little inclined to aesthetic and emotional exaggeration (Fig. 1.2).

Our natural history was built late, with the emergence of philosophical reason in the seventeenth century. It then settled down with all its symbolic power in the philosophy of the Enlightenment, from which the picture of progress emerged. This philosophy is based on another representation, so obvious in everyday life that we ignore its arbitrariness, that of continuous and linear time. The social anthropology of technology cannot disregard a striking dimension of technological development—i.e. the evidence of its discontinuity, a consequence of its reality as a social fact; a dimension completely neglected by academic history, easily seduced by a progressivism[4] based on the representation of the autonomy of technical evolution that transforms it into a real subject,[5] obsessed with efficiency (Ellul 1967; Winner 1978). I think it is necessary to begin with a few quick illustrations to place the "energy transition" within a broader phenomenological framework, like the one drawn by Hans Jonas (Jonas 1993, 296):

> it is about breaking away from the idea of "prehistory" in which we would have been the end while we would be again a means to a final end… it is even more important to understand that each present of human beings is their own end, and that this was so in any past time.

According to this principle—applied to our field—the technical present of every human being is its own end; the technological future has no purpose other than in the present.

Wasa skeppet

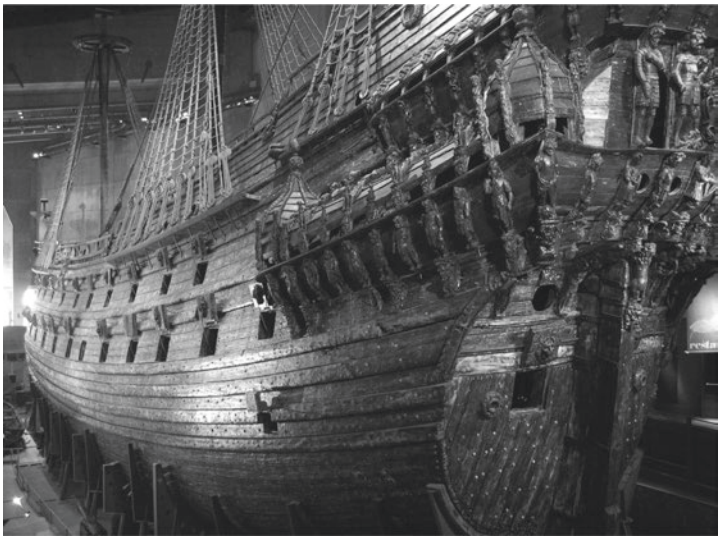

Fig. 1.2 *Wasa skeppet*. Royal warship (Gustavus II), *Wasa skeppet*, sank in Stockholm harbour on 10 August 1628. Salvaged intact, she was raised in 1961 and, following a long wood treatment process, she is now housed in the museum built around her in Stockholm.

Let me illustrate this epistemological principle with some examples from the past, the first one from very remote prehistory, the Palaeolithic Age. Most textbooks claim that the art of representation follows a linear trend, first with rudimentary features similar to those of a child in the Aurignacian culture, more than 30,000 years ago, followed by slow improvements during the Magdalenian up to Altamira in Spain and Lascaux in France. Abbe Henri Breuil, the great palaeontologist, was the first to describe them, enthusiastically considering them the "Sistine Chapel" of the Palaeolithic. These two sets of wall paintings date back to about 10,000–12,000 years BC. However, Chauvet Cave, discovered 20 years ago, was dated between 33,000 and 40,000 years before our era, that is, the beginning of Europe's modern man. Its walls are covered with beautiful paintings in which animals, in addition to their fine lines, have what might be described as a soul

or innerness (Clottes 2003, 2010).[6] The technique of the painters shows subtlety and extraordinary precision, finer than that of their successors 22,000 years later! (Fig. 1.3)

Similarly, despite very precise knowledge on Chinese inventions thanks to Joseph Needham, no consequences seem to have been drawn to try to understand differently the way in which we have "socialized" our inventions. For example, the Chinese are said to have invented the cannon back in the fourteenth century. It had nothing to envy European cannons. Two hundred years later, when the Jesuits landed in China, the cannons were still there but… they were all rusty. Likewise, missiles were used at that time for war but their military use disappeared in favour of fireworks (Needham and Temple 1986, 215–241; Crosby 2002). The strange thing is that while the cannon used in Europe followed a steady evolution, the missile was forgotten and did not return until the rise of V1 and V2 rockets, devised by German laboratories following the failure of the Luftwaffe in the Battle of Britain (Figs. 1.4 and 1.5).

Fig. 1.3 Chauvet Cave horses (France)—30–40,000 years old. Panneau des chevaux-detail© Patrick Aventurier.

Bronze cannon circa 1350 and two-stage missile circa 1550

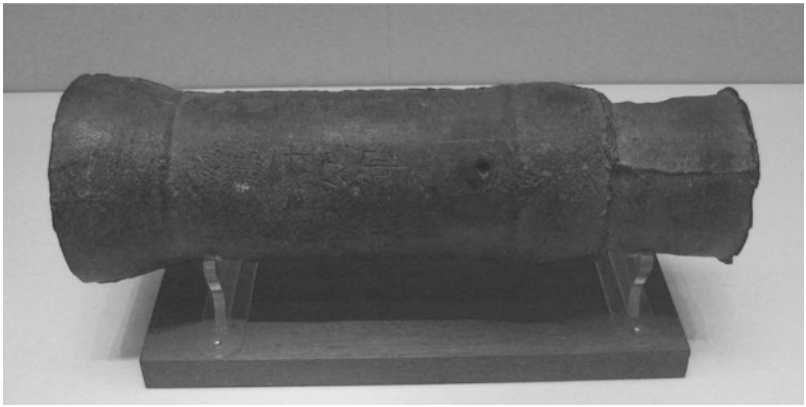

Fig. 1.4 Bronze cannon circa 1350, Yuan dynasty (1206–1368).

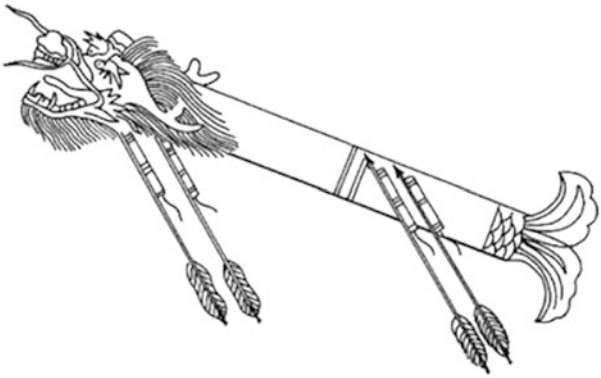

Fig. 1.5 Two-stage missile "Fire dragon out of the water". Ming dynasty (1368–1644).

I shall not focus on this subject here (Gras 2013), suffice it to recall that a technical object is always part of a technical system; "the system must be first", says historian Tom Hughes about Edison and technical innovation in the early twentieth century in the United States (Hughes 1989), but this is true for all times, as shown by French historian Bertrand Gille (Gille 1967, 1978; Hughes 1983; Basalla 2002). Here is another example: we now know that the Aztecs, Mayas, Incas and probably all Indian tribes were familiar with the wheel. Many objects with wheels have been discovered, toys in general. But the socio-technical system was based on the use by human carriers of small mountain trails, well maintained, all provided with an effective environmental infrastructure (food supplies, resting areas, etc. without forgetting coca). We may think that the wheel was once considered socially useless. And the Indian case can be found again in many other civilizations. I shall now stop talking about these considerations; they are enough to understand that the energy transition is part of a context that is far from being merely technical (Basalla 2002, Hornborg & Crumley 2006).

Technology as a European Pre-Industrial Social Fact

A new history, however, questions the dominant perspective. François Jarrige (2014, 41) writes: "Before the industrial era technical artefacts were inserted into imaginaries and socio-economic logics other than those developed in the (modern) West. Resistance remained low because it was basically useless, *as technology itself was associated with group beliefs and needs.*" Please note that the last sentence says it all: all societies have incorporated technology into their culture as a social fact; it is the imaginary of progress that empowers it. Thus, the modern representation of the machine is, at least in part, incommensurable with that of other epochs or civilizations (Feyerabend 1975).

This obviously applies to remote civilizations, time or space-wise, like Greece, India, China, but also, I repeat, to our Middle Ages. While this perspective is today boosted thanks to the American Indians of "Pachamama" and "Terra Madre" peasants, it already existed in the past of the West.[7] Make no mistake: that does not imply the absence of improvements or inventions in specific trades (the spinning wheel, for example, that transforms linear motion into rotary motion). Our ancestors were not stu-

pid and they also sought to increase the effectiveness of tools but within reasonable limits, and adapting them to the social time (White 1966). *They were familiar with the precautionary principle and did not need to invent a word for the obvious.*

Therefore, the concept or, rather, the notion of "reflexivity" must be queried. To a greater extent than other authors, the German sociologist Ulrich Beck placed it at the very centre of his major work on risks (Beck 1992; Giddens 1990). By reflexivity, he means to say that contemporary society has measured risk and is capable of reflecting about its future. In my short presentation, I cannot possibly refer to all the nineteenth century authors that denounced the reign of the machine; many did. I shall only mention one of the most virulent, Samuel Butler. In his novel *Erewhon* (Butler 1872), he describes the fierce struggle between the "machinists" and the "anti-machinists", eventually won by the latter with an almost total ban on machines! In 1872, he had already anticipated what Günther Anders called "Obsolescence of the Human" a century later (Anders 1985).

> In any case, the prophets of the digital have not invented anything, their repeated assertion that computers must replace humans was defended by the advocates of progress from the beginning of the Anthropocene; those opposed to this vision were described as "romantics" to discredit them.

And talking about a rebellious past, I cannot resist asking a metaphysical question: *Can we ask ourselves* what *strange deadly fly has bitten the* "*developing*" *portion of the world for it to feel real pleasure and an urge to be taken over by machines*?

So far I have found no answers to this question which is both sociological and philosophical and even psychoanalytical. In any case, the fly seems to have nested in the representation of a time in which the technological future is nothing but an extension of a ghostly present which reveals a desire for total power, *a divine vertigo for the creation of a man-made artefact world*.

In this context, a relatively recent definition of the period which saw the emergence of the use and development of thermal machines must be examined. Indeed, the declared purpose of this new term "Anthropocene" is to lead us to the recognition of the danger that threatens us in the form of pollution from carbon dioxide and to the conclusion that energy transition is an absolute necessity. This general framework in which energy transition is

thought of should be first examined from a socio-anthropological perspective, and that obviously requires a critique of the theoretical framework.

A Brief Socio-Anthropological Approach to the Anthropocene: A Positivist Metaphysics of Nature

The term Anthropocene was coined by Paul J. Crutzen, the winner of the Nobel Prize in Chemistry, in 2000 in an article that made history (Crutzen & Stoermer 2000).[8] With this term, Crutzen implied that we had entered a new geological *era*, one that began shortly before 1800 with the Watt steam engine. This new era would be marked by the change in geology (soil erosion, global warming…) and biology (loss of biodiversity, loss of fertility…). It follows the Holocene, a supposedly stable geological period that began after the last glaciations 10,000 years ago. The novelty stems from the fact that these changes are *attributed* to human activity (hence the prefix *an-thropos*) and *unfolds with unprecedented speed* in the history of life.

The use of Anthropocene therefore seems quite convenient—possibly too convenient—to describe the fossil fuel era. I shall make some quick critical comments on this later. In fact this period is characterized by a sudden increase in greenhouse gas concentrations as of the 1850s, and by the explosive growth of these concentrations after World War II, the fateful moment in time in the all-oil transition. Thus, the Anthropocene is very recent. It not only marks an acceleration in history, a term which does not make much sense,[9] but rather a bifurcation in the history of the world towards a new path which began in the nineteenth century with the massive use of coal (Bonneuil and Fressoz 2013).

But Watt's machine is not to be blamed, as in 1800 there were only 2,000 pumps and they were just in the UK. *It was Stephenson and his locomotive in 1829 that changed the scene*, *in the strict sense of the term*, *both in reality and in the imaginary*: ways became iron webs, hills were flattened to make room for trains, mountains were tunnelled and we learned to always want to go faster (Schivelbusch 1990; Gras 2003). The scene changed in two areas: the transport of materials and instant communication, as the telegraph is contemporary to the expansion of the train (1840–1850), and the expansion of telecommunications is parallel to that of transport in modern history. The internet stems from that, potentially.

The Anthropocene therefore rests on a symbolic tripod based on the use of fossil energy, which gives way to power excesses, what Heidegger calls the *gestell*, which can be translated as an injunction to nature by

technoscientific reason to procure us its power. Thus, nature undergoes a metaphysical reduction in its status by becoming a fund—i.e. a sheer resource for Descartes, Bacon, Hobbes—and guides philosophical reason, except for Spinoza, leading to Diderot's judgement *res nullius*, something that belongs to no one, something that is offered to all (Fig. 1.6).

But the arrival of fossil fuels further perverts this metaphysical reduction because it potentially opens another level of excess, a much higher one, in our relationship with nature.

From this moment the energy extracted is materialized into a substance in which power is stored, and which is used at will when required. To use a buzzword, the thermal machine "relocates" that power. The ultimate example is none other than the atomic bomb delivered via a missile!

Naturalism, as defined by Descola, combined with the power of coal, will not only make *hubris* possible but also legitimate. It will uproot all the constraints previously imposed by nature via the use of the four elements: water, earth, wind and fire. It has become impossible to think of the world based on these four elements (Gras 2003, 2007; Adams 2008; Mc Neill 2001). That is also what incommensurability means.

This new Anthropocenic society that relies on the power of heat in machines is nothing but a *thermo-industrial civilization*. So we are witness to a real upheaval in the representation of the relationship of humans with the world around them (*umwelt*), Western humanity taking on *a new historical* trajectory oriented to what the French philosopher Dominique Janicaud, following Martin Heidegger, calls the *powers of the rational* (Janicaud 1994; Heidegger 1982). Note, however, that the power of

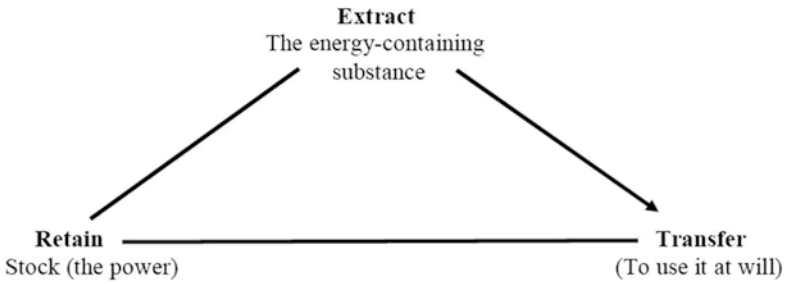

Fig. 1.6 The imaginary tripod, the paradigm of energy in modern times (Source: Gras 2003, 36)

renewable energy, basically hydraulic, was only surpassed by that of fossil energy in the early 1900s (Fig. 1.7). The Industrial Revolution is a term that was coined in the late 1870s by economists marked by the memory of the 1789 Revolution to describe transformations in the English economy, but it is also a myth that emphasizes the role of revolutionary techniques (steam), the "genius" of a few inventors (James Watt) and the speed of the process, although historians later showed us that the process was slow and gradual, highly variable, and that automated industrial work was first widely supported and for a very long time by water-powered factories which initially guaranteed generous profits (Gras 2007; Malm 2016). Malm insists on the fact that "the process of growth proceeds through upsetting contradictions – not through an even, incremental addition of output – which impel the expansion and renew the momentum again and

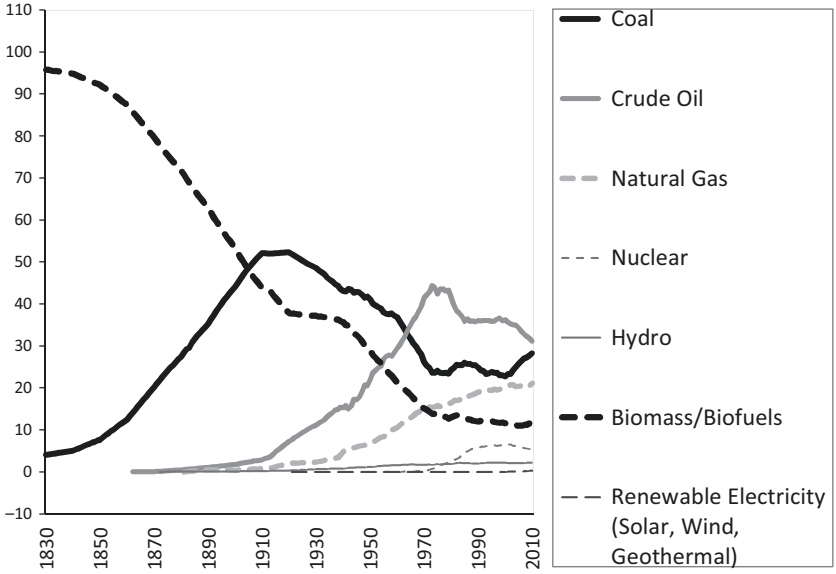

Fig. 1.7. Relative participation of different sources in the total energy supply (%). World, 1830–2010. (Source: The Oil Drum, http://www.theoildrum.com. Adapted from the database at Koppelaar 2012)*.

* Please note that the installed power capacity of heat engines only outweighs that of renewable energy by 1900. Since 2000, coal has risen back to the level of oil. The victory of the heat engine has not been as rapid as is generally believed.

again, and it might be these contradictions and the convulsions they generate that do most to produce and reproduce the fossil economy. The dents in the curve may hold the secrets to its direction".[10]

I shall finish this foreword here, as I just wanted to shape the historical and mental—or imaginary, I would say—framework of the Anthropocene before moving on to the second part, in which I intend to address the energy issue more directly, in relation to what has come to be known as the Late Anthropocene, but I would first like to warn against the excessive use of the term.

The Dark Side of the Term Anthropocene

Indeed, using the copy-paste function of geological ages to diagnose a human fact seems to be an intellectually suspect process. Thus, the Anthropocene has a "dark side". By dark side, I do not mean to say that the arrival of coal was an evil for the working classes; rather I make reference to the symbolism behind the term.

The dark side of the Anthropocene is, in fact, the result of the simplicity of the word. The concept is too convenient, even if it has the advantage of emphasizing the danger that we run and the fact that we need to change course. It is important to grasp its limitations now.

1. First, it overlooks everything that belongs to the realm of domination and exploitation, capitalism seems not to be responsible whatsoever, and the effects on the imaginary of power, due to the choice of fossil fuels, are largely ignored, or underestimated, by Crutzen.
2. The establishment of the new civilization seems obvious and knows nothing about the protest that accompanied the implementation of industrial mechanics and the automation of labour. Let me just remind you of the Luddite revolt in England, in the Midlands, against automated looms in 1812, that of Captain Swing in 1830 against machinery in agriculture, and the Canut Revolt of the silk workers in 1832 in Lyon (Jarrige 2009). Every time, it was the army—not "reason"—that subjected refractory individuals to progress; in the Midlands 14,000 soldiers were deployed, twice as many as in Wellington's battle against the French in Portugal and Spain.
3. The geological age that defines this new era makes us think of misfortune, the misfortune of progress. While Crutzen shows the disastrous effects, his choice of the geological term implies some sort of "staging" of a historical need. Apart from that, Crutzen is a keen follower of the technological forward flight that geo-engineering entails (Hamilton 2014).

4. The contradiction between the inclusion of *anthropos* right at the centre and simultaneously the status of natural factor included in the term is embarrassing. The Holocene, the previous era, began with the melting of the ice, a climate event. And a climate event—warming—though induced by humans, defines the new period.

By making the socio-anthropological boundaries of the Anthropocene more specific, I hope to have sharpened the reader's critical eye to be able to freely discuss the energy issue in this period, which is the one we still live in.

Work and Energy: The Conceptual Victory of the "Thermo-Industry"

It would be easy to make fun of the expression "energy transition"—pretentious and vague at the same time—as if there were just one. In this phrase, one term makes reference to a historical movement, the transition, but isn't history nothing but a perpetual transition? As for the qualifier, it alludes to a scientific concept—energy—of which neither the origin nor its scope are properly measured. So before returning to the transition, I would like to delve into the term "energy", as it gives meaning to the phrase. And I would argue that if we were to break down the history of modernity into phases, the current one would be a *third* transition in the trajectory of the Anthropocene.

The Time of Transition: Trajectory Versus Trend

I shall start with a brief remark on the noun: transition. The same image of linear, continuous, oriented time always looms behind this word. The energy transition notion includes a metaphysical part with an apparently philosophically neutral form, although it is made up of temporality, which I just analysed. Instead of appearing as *a trajectory with a beginning and an end*, thermo-industrial modernity is given as a *tendency* when it calls itself progress, a movement without an origin or without boundaries.

Work and Energy, Strange Conceptual Inventions

(a) Work

Work and energy, connected by science, gave way to the new thermal trajectory of the mechanical future (Stengers 1997). Indeed, the concept

of work was invented in the nineteenth century by emerging thermodynamic physics as a result of its social construction in those "dark satanic mills", in the words of the great English poet William Blake, when he saw Albion Mills,[11] the outset of the transition towards fossil fuels. The scientific definition of the concept of "work" transfers on to the machine the socio-economic phenomenon in the heart of nascent industrial capitalism, but the term refers to the social phenomenon *work*. The relationship with the immediate reality being lived, that of productive action on the environment, is still present.

In a way, salaried work becomes a scientific concept and a physical quantity in the simplest formula

$T = Mg.h$

where T expresses the work provided by a water mass Mg falling from a height h.

(b) Energy

This clarification was very important in the nineteenth century, as industrialization was based on the motive power of water mills. Conversely, the definition of *energy* is obscure: "What a system has, if it is capable of producing work."

And although energy is related to the properties of matter, it is found in various mathematical formulas, depending on the type of energy. However, it remains elusive in its phenomenological reality, as it is secondary in relation to work (in mathematical language, a derivative). For example, the algebraic integration of the kinetic energy derivative is $e = ½mv^2$, where m = mass and v = velocity.

In any case, the work notion implies reciprocity between objects and subjects: the tool is humanized, man mechanized. Work as a social reality becomes a scientific concept: but it was first necessary for the English industry to build it as a cultural fact.

Yet, this does not hold true for the scientific concept "energy", which followed the opposite trajectory.

In Greek *δυναμική* and *ενέργεια* refer to an internal action and an active force at the same time. The term energy emerged from the notion of force of Newtonian mechanics, and was first used by Thomas Young in 1807,

but it remains unclear. When the fundamental equation of energy conservation was defined by Helmholtz in 1859, it still used the term *Kraft*, force, but shortly afterwards this force was defined as energy. The word only appeared in the language of science in 1875.

It took some 50 years, after the publication by Sadi Carnot in 1822 of the founding principles of the thermo-industry "Reflections on the Motive Power of Fire", for the concept to take shape. But this was done on the basis of the equivalence between work and heat which, from the viewpoint of the symbolism of the new industrial society, was extremely significant. Robert Prescott Joule established that the fall of a weight on a calorimeter heats water thanks to the friction of the wheel. There is, consequently, proportionality between work provided and amount of heat. Energy defined as "magnitude that a mechanical system has when it is able to produce work" (Larousse, Grande Encyclopédie) is thus definitely placed at the centre of the production system, and the energy conservation formula

$W + Q = 0$ where W = work and Q = amount of heat establishes this situation in which work is transformed into heat or vice versa.

I understand that these explanations may seem a little complicated, but I wanted to show you that in the formulation of the energy concept we can *also find the origin of the greed that characterizes our civilization in its search for fossil substances, the only ones that can provide it with Q, amount of heat in Joules, to transform it into active power on the environment.*

The elusive status of energy as a phenomenon is comparable to many other scientific concepts, but the difference comes from the fact that it is now presented as evidence. A common place that is present in all conversations, both those of everyday life and learned ones on the future of the world and its origin (Big Bang). Astrophysicists and the public at large apparently share the same ambiguous knowledge about energy "what a system has, if it is capable of producing work".

The symbolism of the thermo-industrial world is thus found in the series "production, work, heat, system" (Gras 2007; Mumford 1965; Rist 2009). Returning to the energy question in order to describe its recent history therefore requires to distinguish not one but three transition phases as from the thermo-industrial period, socio-technical phases that have nothing to do with those that economic growth theory likes to identify, for example the famous "Schumpeter's cycles".

The Three Phenomenological Phases of the Thermo-Industry

The First Transition Phase: Viscous Mobility and Network Design

In the eighteenth century the natural elements that contributed an amount of potential work were put to the service of time and space, whether biomass which requires a relatively long time to be effective, water that we can only keep prisoner in certain places, or air in wind form and its random changes. Conversely, fossil energy is a concentrate of all the natural elements gathered together into a substance whose extraction seems simple thanks to mining technology, extensively developed in the eighteenth century in Britain.

In the nineteenth century and the first half of the twentieth century, the autonomy afforded by the use of coal is deeply linked to a fragmented landscape. Coal is taken from the mine to the factory, to boilers; it is not a mobility vector except for the case of the railway, which combines the two essential ingredients of modernity at the time: the steam engine, which drags heavy metal tanks, and the telegraph which opens an avenue to instant communication. The train distributes, throughout the territory, goods, people and the energy concentrated in fossil matter. Networks are set up but they remain within relatively confined borders. Certainly, the world economy already existed, the English navy helped put it in place much earlier, in the eighteenth century but the network was frail and the flows poorly regulated, except for the railway.

According to historian Timothy Mitchell, it is also during this period that democracy was strengthened and that social protection became a political project, because workers—gathered in specific places—were still little mobile and, particularly in the mine, they invented new forms of solidarity (Mitchell 2013). This phase could be called "the phase of viscous mobility", but the transition to fossil fuels during this period constitutes an anthropological rupture. A rupture that caused the question of the inevitability of technological evolution to bounce back. The technology of the steam engine was indeed British; a recent history paper has even called this period the *Anglocene* (Bonneuil and Fressoz 2013). There were no steam engines in the continent at the dawn of the nineteenth century, only 2,000 Watt machines—mostly pumps—were installed in Great Britain, and we do not know how many actually worked.[12] The Protestant Ethic, to use Max Weber's concept, was particularly open to these technical innovations and especially to their commercial use. Jacques Neirynck

refers to "the eighth day of creation" (Neirynck 1986; Lasch 1991; Noble 1997) to characterize the attitude that gives man the power to continue the works of God, and even replace him. In my opinion, the puritan ethic placed by Max Weber at the foundation of capitalism and Robert Merton's famous considerations on science and technology in seventeenth century England (1936, 1938) legitimize Ricardo Duchesne's thesis:

> Britain's engine culture was not a lucky, unforeseen accident; it was an ethos, a mentality, an outlook on life and by the eighteenth century had spread and penetrated deeply into British civil society, the schools and textbooks, the academies and journals, the coffee houses and printer's shops.…Puritanism, more than any other religious current within Christianity, endowed scientific knowledge with millenarian importance. (Duchesne 2005)[13]

It is therefore not unreasonable to ask, in a historical fiction, what would have happened in the continental area of the "steam" technology of capitalism if Napoleon had won the war, at least in Europe. At the time, Europe was a little more developed than India or China (Alvarez 1980; Pomeranz 2001), and not much attention needs to be paid to human freedom to be certain that the thermo-industrial trajectory and the "choice of fire" were inevitable.[14] That is why it must be made clear to readers that if the interpretation of the three phases that I suggest underlines the energy base, this technological dimension is certainly a central element but not a decisive factor in this trajectory of the West. According to Hobsbawm (1962, 45), we shift from one cosmogony to another, "from an advanced organic economy to a mineral-based fossil fuel economy, with production increasingly taking place in factories with the aid of machines and with an ever more prominent role for technology and science".

The Second Transition Phase: Oil and Liquid Mobility, the Implementation of Technical Macro-Systems

Emerging from World War I, the second transition became fully fledged after World War II. The importation of a neoliberal model took place on the basis of an energy model which evolved from coal to oil, from a solid substance to a liquid one. Electricity was present from the beginning, though it did not play a fundamental role.

In this new stage of capitalism, a model was imposed in which the structuring figure had been given more than a century before by the first really systemic machine (on a smaller scale, in the nineteenth century, though):

the railway. In fact, the train inaugurated a potential *structuring model*: it opened an avenue into a future where the mobility of trains would be regulated from a central point and decisions delocalized from the actor. The post-war saw very rapid development, on the basis of this model, of devices for the management of flows that were decentralized and connected to each other.

A new world emerged in the form of a new socio-technical mode, that of technical macro-systems of great complexity in which the railway network was the original model followed by the electrical network (Hughes 1983; Gras 1996; Summerton 1994). For example, a plane needs a huge infrastructure to fly safely; electricity—unable to store its energy—chose high voltage, which allows it to play with the "grids", transferring power from one place to another; whereas the automobile, technically much simpler, can only work based on a network of oil pipelines, ships, tanks, and drained, paved and continuously maintained roads with high costs, etc. and the presence of the US army on oil wells! Let us compare it to the previous situation, that is, the diligence and travelling with an "animal" engine, with the example of Frederick II of Prussia preparing to invade Silesia, when he answered a question by his general staff concerning supplies: "if the feed runs out, the horses of our hussars will be able to eat the grass along the way".

This modern "high tech" is also a "very large tech" which is based on the excessive use of fossil fuels. In its race towards omnipotence, it generated today's globalization but the model was potentially in place in the nineteenth century: factories were moved to the country where labour was cheaper or, conversely, poor peasants were taken to urban centres. This model, railway-focused at the beginning, is none other than the one that impregnates all of our twenty-first century modernity and its globalization. Extremely complicated networks overlap with each other without anyone knowing exactly where decisions are made or what the objectives are. This complicated structure is often simplified by making reference to the "mega-machine", a term coined by Lewis Mumford (Mumford 1965; Latouche 2004, 2010). The current financial system is the best example, but the network of high-speed trains has renewed the rail system, and it continues growing despite strong contestation about its purpose. At the same time, the panoptic model, which Foucault had borrowed from Jeremy Bentham to describe how control materializes in our societies (Foucault 1975) in perfect harmony with this infrastructure, acquires, through telecommunications and electricity, a frightening dimension,

after Orwell, and results in a frenzy of surveillance and centralized control that was unimaginable only 20 years ago.

The choice of heat as a single vector of power thus emerges as a true deal with the devil, made in the nineteenth century, in which one of the modalities holds a central and unexpected position, electricity.

The Third Phase of the Energy Transition and the New Stage of the Thermo-Industrial Way: The Obsession with Immediacy and the Absolute Flow of Electricity

In the language of the neoliberal supporters of sustainable development and political power, the historic moment to come in the social history of energy is the only one that qualifies as "energy transition". Wrong, as I just showed. Environmentalists involved in local-level resilience, like Tim Jackson (2011) and Rob Hopkins (2008, 2014), obviously support a different approach but the most common energy transition, the one backed by power, rests on a global vision of energy production transformation. *But this apparent change is not at all a break with the past, but rather a continuation of the trajectory*, because the promoters of the energy transition do not question any of the structural and psychological elements that have accompanied the development of society for two centuries. The "basic personality", to use an old word from social psychology, remains unchanged, being overlooked in this transition which is fully defined within a technological dimension.

Furthermore, in terms of the structure of the organization of energy exchanges, the transition is conceived along the lines of a technical macrosystem, in other words, of the mega-machine which, on one hand, requires a lot of energy just to work maintaining the connections between its various elements and, on the other, feeds citizens' disengagement (Dobré & Flipo 2013).

Moreover, and this is not quite clear, the energy transition is in fact a transition towards electricity.[15] In sum, three varieties of renewable energy *production* (thermal insulation put aside) can be identified on a global level:

1. Biomass, mainly biofuels, sentenced to a short life after being defined as a disgrace.
2. Geothermal power, very local, it will remain incidental.
3. Capture of natural flows: water, wind, solar radiation.

4. To this, we should add the dreams about a technological flight forward, geo-engineering, nuclear fission, but they are only experimental devices that as yet have not become a reality (Huesemann & Joyce 2011). And they are not likely to either, not even in the mid term. Geo-engineering can be summed up in the words of Ernest Garcia (Garcia 1999) as: "The dominant idea is that disease can be treated with higher doses of the remedy which caused them".

However, renewables do not seem to be profitable from the perspective of classical economics and even new fossil fuels, such as gas shale or tar sands, do not either; only coal and oil remain very profitable in energy terms under some conditions (Fig. 1.8). It is clear from these data about EROI (energy return on energy investment, barrel of oil equivalent), that few energy resources provide more energy than what it takes to produce them. Indeed, if we take into account the costs of delivery to the site where it is used, the minimum is ten barrels. The lighter parts indicate uncertain data or varying conditions.

And a finding is worth all the reasoning: at world level, coal has become the first fossil fuel again, though it belongs to the viscous phase of the Anthropocene, because it provides energy for electricity production in the contemporary phase; there you go: the thermo-industrial serpent biting its tail!

The third variety, the *capture of flows*, is fundamental in the transition, but it leads to the production of just one type of renewable energy: electricity.

But storing this energy is impossible or at least very problematic as regards the use of heavy and inefficient batteries. As has happened since high voltage was chosen, the substitute of storage is none other than the network, immense grids that allow exchanges to be made over very long distances, compensating the inability to save that energy to meet different demands. In fact, a strong symbolic correspondence takes place between a technical system and consumers, who sort of become interconnected electrons in communication networks. The individual consumer model ends up being reinforced, because we cannot interact with the structural model upon which this technology is built. Therefore, it cannot be democratically controlled, and the privileged interaction is then that of interpersonal distance communication over the web (McChesney 2013).

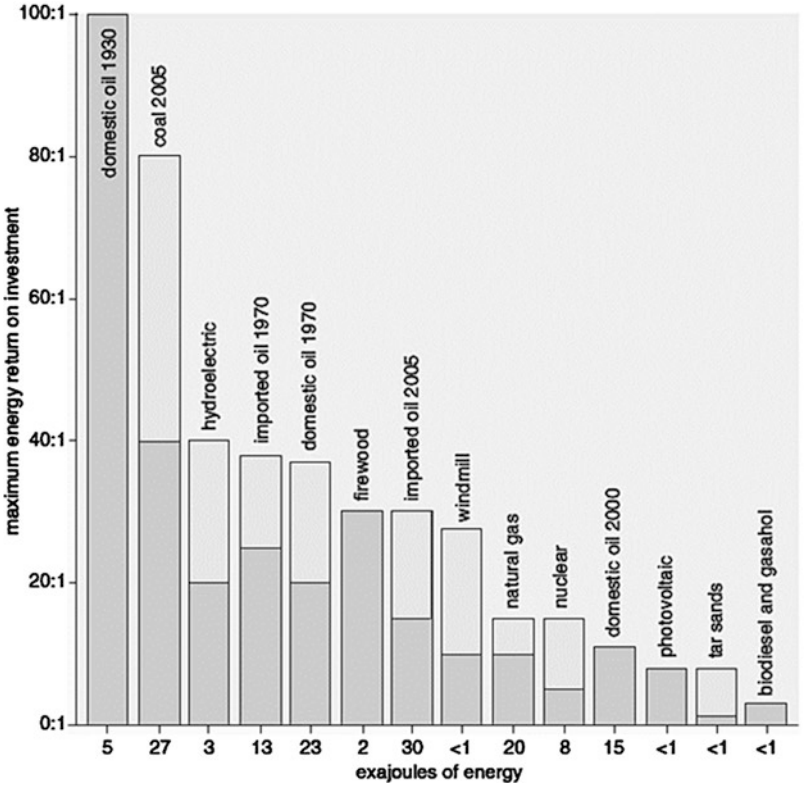

Fig. 1.8 Renewable/fossil energies: energy return on energy investment—EROEI/EROI. (Source: Hall and Day 2009, 237)

The Issue of Energy Cannibalism in the Transition to Electricity and the German Dilemma

Discussed in the ecological literature to a reduced extent only, another aspect of electricity as renewable energy must be taken into account based on the notion of "net energy", and the "emergy" concept proposed by

Odum (Odum 1996, Odum & Odum 1976, Brown & Ulgiati 2004) that J.H. Pearce extended in his *energy cannibalism* principle (Pearce 2008a, b). I shall try to simplify these theses, as their mathematical formulation is rather complicated: in order to make a profit out of the use of a new energy, an investment in energy is first required at the beginning, incurring a temporary deficit to then obtain more than what is received; that is net energy. Thus, the starting investment gives way to "energy cannibalism", as the existing energy is needed to promote an alternative energy source.

In Pearce's model, the principal greenhouse gas emissions emitted in order to provide for the power plant divided by the emissions offset every year, must be equal to one over the growth rate of type of power to break even.

Coal, which at the beginning used animal energy for its extraction, quickly found the return of the investment in the form of an energy surplus. And the same happened with conventional oil, which had a 100 or higher EROI (1 barrel spent to extract 100 barrels). These energy systems were therefore autopoietic (Luhmann 1986; Maturana & Varela 1980), i.e. *they produced the conditions for their reproduction*.

In the case we are dealing with, a solar panel or a wind turbine does not pay off the energy used in production until 5, 6 or 7 years have elapsed. But let's be optimistic; let's say it takes 5 years. In Pearce's model, this means that the growth rate of renewable energy should not exceed 20 % per year. If the process is speeded up to a rate of 35 % (global current rate for photovoltaic energy), the consumption of fossil energy will surpass by far what is obtained from the electricity generated; and pollution will increase as a result! And due to equipment obsolescence—currently estimated as 20 years—the process may even lead to acceleration, since the energy of the solar panels installed will not be enough to obtain an autopoietic electrical system.

This cannibalism of renewable energy is not often referred to, neither is "emergy", but it is a major risk in the transition to electricity. Pearce highlights this problem, which serves as an argument for nuclear power. The net energy of a conventional nuclear power plant, which is a kind of enormous steam engine, is very important and varies based on its lifespan, which can be extended up to 60 or even 100 years. Obviously, this argument does not take into account the dreadful possibility of an immediate radioactive disaster, or waste in the long run. But the question of energy cannibalism needs to be asked because it will become a nuisance for renewable energy when the time comes for fossil energy degrowth. And

the way Germany, not seeking to reduce its consumption, deals with the shutdown of nuclear power plants and the transition to renewable energy, seems to confirm the energy cannibalism thesis. One could even talk about the German dilemma, or the rebound effect, as this bad example may provide nuclear supporters with a practical argument.

At a socio-anthropological and ethical level, the reign of electricity can also be challenged.

The advocates of sustainable development—counsellors to princes—want us to believe that this transition will also result in a reduction of carbon emissions and in future freedom. But in fact we are locking ourselves into an electronic world, where people's isolation entirely fulfils the needs of neoliberalism. Let alone the fact that the consumption of electricity-based objects and operations of Google-like data-transfer macro-systems increase the energy demand, offsetting any gains potentially made with the use of renewable energies. In France, more than 12% of the electricity is used to power IT tools, that is, the production of three nuclear power plants.

Instead of strengthening ties with their things, with everyday life artefacts, contemporary humans wander about in a dark and foreign world filled with black boxes. The proponents of the good cause—this (third) energy transition which is supposed to protect us from global warming—transform us into interfaces, a term that points to the superficial nature of the relationship, to the lack of connection with this fleshly world of ours (Rey 2003).

And what is worse, as predicted by Hanna Arendt in the late 1950s (Arendt 1998), with this electronic technology, the public sphere increasingly covers the private sphere in a more insidious way than an old-style totalitarian regime would have been able to do. Democracy turns out to be the false pretence of a power hidden behind the technical object. Recent examples abound!

The Temporality of Evolution and Technological Evolutionism

Is Another Transition Way Possible?

Ernest Garcia has emphasized that the major obstacle to a trajectory change has to do with the fact that environmentally sustainable options are less desirable because of the constraints they impose in the short term (Garcia 2005, 328). At the same time, based on the analyses of the already

old "new" NEP (New Ecological Paradigm, Catton and Dunlap 1978) in particular, he showed us that the awareness of natural constraints was very much present. A classic "double bind" situation but at a global level. We know that for Gregory Bateson the solution is to go beyond, to drop the language within which communication is enclosed (Bateson 1972), to treat the power imposed by this paradoxical injunction with derision and to move on to creative deviance. Which, in this case, would mean taking the energy transition for what it is, a "fake" change in real continuity, and creating the conditions for both a technological and ethical rupture that would be accompanied by a mental revolution in the imaginary of progress.

We must therefore return to the fundamental anthropological question posed at the beginning of this chapter. If technology is a social fact, it must have a meaning for the future outside "technicality". This meaning is well present; it is delivered by multinational companies and essentially results in the oxymoron of sustainable development and the staging of a fictitious progress at the theatre of growth. The energy transition of the state power of multinational institutions is actually a third transition and brings no new element into the thermo-industrial panorama. State and international institutions work as the driving belt of unchanged morality. Disguised in good intentions, these scientific bodies, such as the IPCC [Intergovernmental Panel on Climate Change], never question our way of acting upon nature. Ontology according to Descola, metaphysics for Schumacher at the start of the ecological contestation, remain exactly the same.

Electricity does nothing but increase the destructive potential of the *umwelt*, the world around us, via the new territorial focus of predation—the digging activity—it gives rise to. Lithium for batteries will wipe out Salar de Uyuni in Bolivia, cobalt and coltan are destroying the Congo (Kivu, Katanga), and different rare materials for wind turbines (neodymium, which replaces copper), as well as all those rare materials needed by the sophisticated tools of the pseudo "energy transition" render a totally illusory green transition. It has been said that power consumption related to electronic high tech already accounts for 12–15% of all the electricity generated, and the abandonment of nuclear energy does not change anything as far as the basic problem is concerned. The case of Germany and Denmark is typical. While they have invested heavily in solar energy and especially in wind power—offshore in Denmark—they also rank first as European polluters (9.1 t/h and 8.3 t/h of coal, respectively) for a simple

reason: coal contributes to maintaining production levels when it is not windy or sunny. Coal actually comes in when power discontinuities need to be overcome. An interim solution, they say, but a solution imposed everywhere regardless of the industrialization way chosen. And the fact is that coal has maintained a very high EROEI while even conventional oil has seen its profitability index fall to half or a third of its starting level.

But it is indeed scientific reason that must be challenged here, when it embodies a morally "skinny" progress, a progress reduced to GDP growth. A technically transparent future is only intelligible in the language of the power that creates the double bind, that of nanotechnologists, transhumanists, etc. all imbued with faith in technological progress as a driver of social change… which modifies nothing in our contribution to the *umwelt*.

The case of Jeremy Rifkin, presented with great advertising fanfare as a critical thinker of a pacified future, is exemplary in this regard: smart grids, essential elements in Rifkin's device, are tools that optimize energy consumption by regulating our electrical appliances right from our homes. Yet, on the one hand, these "smarts grids" are connected to technical systems over which we have no power whatsoever and, on the other, they discourage us from saving energy because it is the machine that is "smart", not us. As for hydrogen, which will produce electricity—the factor for liberation and simplicity according to our prophet—it will only be produced by large companies, in general from gas, which takes us back to finite resources, with very complicated technical means, which will further reinforce the role of high tech. Rifkin's "third industrial revolution" (Rifkin 2013) is only a mystification about the stale subject of the liberating nature of scientific progress.

Conclusion: Rupture Beyond Transition

This is obviously not how we will get over the "double bind" and the excess that, in their own way, "deep ecology" and the Gaia hypothesis had challenged before being excluded from the well-guarded field of ordinary science.

What will then become of Planet Earth? Barbara Wood, in the biography of her father Ernst Schumacher, cites Goebbels's hair-raising words, which could be applied to the way multinational capitalism conceives globalization: "if our greed for power should fail, let's leave behind us at least a legacy which also destroys those who come after us" (Wood 2011, 158).

Totalitarian power is no longer Nazi but the strength of its economic violence follows a technologic. It goes deeper and deeper into our everyday life via all the artefacts that it delivers, to satiate the consumerism that it created to further enslave us.

To put it bluntly, the real change will not come from any transition because the financial lobbies of neoliberalism are the masters of the future as far as this way is concerned. The time of growth is however mentally finished, you do not need to be a bright economist to grasp that emerging countries are just catching up. "Global" power feels threatened, and the only solution that it finds is to strengthen the belief that gives it legitimacy. This is why the conceptual revolution that would accompany a real change by making us get out of the "double bind" should be opting for degrowth, a vague word but one that requires us to reflect about the consumption of goods, about what is necessary and what is superfluous—a distinction that has completely vanished from today's common discourse (Sempere 2008)—and more generally about existence as a quality of the self. Would it be possible to go back to basics as far as nature goes, that is, accept that the wind may not blow some days, that rivers carry less water at certain times of the year, that clouds conceal the sun? The Transition Town movement goes in this direction but, sometimes violently, another type of youth—not content with a future contained inside a videogame—asserts their determination to regain control of their destiny in resistance movements against major projects and the attacks on the environment. These resistances are based on non-economic values and thus cannot be recovered by the system. This is why it is time to put an end to the naivety of the slogan "act local, think global": no rational argument can be raised within the framework of this global thinking which remains subservient to liberal economic theory and to progress as defined by institutional technoscience. The green transition will not take place: that is the only certainty; however the clouds on the horizon suggest a rupture in the trajectory. Ancient Greeks used to say that the gods were watching us, and Jorge Luis Borges put it in his own way, with his surreal humour: "The future is inevitable, but it may not occur.[16]"

Notes

1. The first work to become a milestone in the area of anthropology of technology is that by General Pitt Rivers, marked by strong evolutionism: he defines the hydraulic hammer of the 1900s as the natural successor to the Stone Age hammer.
2. I have simplified the terms used by the author; interiority refers to self-consciousness, mind, soul, and physicality refers to the body and action (2005, 174–176).
3. There is a wide gap between the manner in which Philippe Descola and Bruno Latour, especially in his latest book (Latour 2013), consider the problem of the Anthropocene. Watch for example the debate "Approaches to the Anthropocene—a Conversation with Philippe Descola and Bruno Latour" http://www.ikebarberlearningcentre.ubc.ca/latour/
4. Pitt Rivers of course or Usher (1929); in France, Maurice Daumas (1969).
5. Jacques Ellul was the most accurate as far as the issue is concerned but we also find him in the questioning of instrumental reason by Marcuse, Feyerabend and the Frankfurt School.
6. The great German film maker Werner Herzog produced a fantastic 3-D documentary feature on this subject, "Cave of forgotten dreams". According to Jean Clottes, a specialist in this cave, and David Lewis-Williams, it would be the expression of prehistoric shamanism (Clottes & Lewis-Williams 1998).
7. Just compare two consecutive ways of thinking about technology in the Mediterranean basin, also immeasurable: Greek thought and the art of Roman engineers.
8. But C. Hamilton and J. Grinevald (2015) raise the question "Was the Anthropocene anticipated ?". Moreover thresholds are always debatable. Very recently the debate over the beginning of the Anthropocene has grown. Simon Lewis and Mark Maslin (2015) support the thesis that the new era begins in 1610. Others (Zalasiewicz et al. 2015) claim the opposite: the post second World War which saw the birth of nuclear energy. For my part I am inclined to favor the first Crutzen's solution, but taking into account that this is not the Watt pump as such but its rolling machine form, the locomotive, that changed everything in the years 1830.
9. The arrogance of modern man is measured here by the words he uses, even in good intentions, giving meaning to the two centuries of his short history. The historian of Indian descent Dipesh Chakrabarty reminds us vehemently: "The Climate of History: Four Theses". In *Ecocriticism*: *The Essential Reader*. Edited by Ken Hiltner. New York: Routledge, 2015.
10. Malm thesis, 2014, p. 43. Malm (2016) recently produced an absolutely original paper on the thermo-industrial revolution, *Fossil Capital*. Malm's

thesis is essential to understanding the rise of thermo-industry. But, centred on the cotton industry, the author neglects what I call the imaginary part of this new trajectory: he underestimates the pragmatic role of the railway as the first Large Technical System and its symbolic efficiency in the construction of the new *weltanschauung*.

11. Boulton had attempted to replace the water-powered gristmill by a steam mill, of which only the second copy worked properly as from 1789 but only for two years, and not without resistance. The fire that destroyed it on 2 March 1791 is likely to have been wilful. There were no further experiences of this type for a long time and water mills took over and remained in operation. When he saw this factory, right from the beginning then, William Blake expressed his disgust at the "transition" to the steam engine in his famous poem, *Jerusalem*, which became an anthem.
12. I have already referred to Albion Mills and the horror expressed by William Blake as regards the civilization that was emerging. The only steam engine attempts are those on the water of the rivers with boats, but they are anecdotal.
13. See also Duchesne 2011: 201–203.
14. This historical fiction is not useless in understanding the concept of trajectory as opposed to that of trend. See, for example, Goldstone 2006. I would like to remind readers that the American inventor Fulton had offered his steamer to invade England, which Napoleon refused outright as he did not believe in it at all.
15. Zygmunt Bauman, from whom I borrowed the notion of "liquid", describes a liquid society, not a form of mobility, and so he does not envisage a third more "liquid" phase, that of electricity (Bauman 2006).
16. "The future is inevitable, but it may not occur". The full quotation is "The future is inevitable and precise, but it may not occur". And he adds: "Dios acecha en los intervalos—God lurks in the gaps". (Jorge Luis Borges 1973, 651).

References

Adams, R. M. (2008). *Paths of fire: An anthropologist inquiry into western technology*. Princeton: Princeton University Press.

Alvarez, C. (1980). *Homo faber: Technology and culture in India, China and the West from 1500 to the present day*. The Hague: M. Nijhoff.

Anders, G. (1985). *Die Antiquiertheit des Menschen*. München: C.H. Beck.

Arendt, H. (1998). *The human condition* (1st ed., 1957). Chicago: University of Chicago Press.

Basalla, G. (2002). *The evolution of technology*. Cambridge: Cambridge University Press.

Bateson, G. (1972). *Steps to an ecology of mind*. London, Jason Aronson.
Bauman, Z. (2006). *Liquid times: Living in an age of uncertainty*. Cambridge: Polity.
Beck, U. (1992). *Risk society: Towards a new modernity*. London/Newbury: Sage.
Bijker, W. E., Hughes, T. P., & Pinch, T. J. (1987). *The social construction of technology*. Cambridge/London: MIT Press.
Bonneuil, C., & Fressoz, J.-B. (2013). *L'événement Anthropocène. La Terre, l'histoire et nous*. Paris: Seuil.
Borges, J. L. (1973). La creación y P. H. Gosse. In *Obras Completas*. Buenos Aires: Emecé.
Brown, M. T., & Ulgiati, S. (2004). Energy quality, emergy, and transformity: H.T. Odum's contributions to quantifying and understanding systems. *Ecological Modelling, 178*(1–2), 201–213.
Butler, S. (1872). Erewhon, or over the range. London: Trubner & Co.
Castoriadis, C. (1976). *L'institution imaginaire de la société*. Paris: Seuil, (The imaginary institution of society, Cambridge, 1987).
Catton, W. R., & Dunlap, R. E. (1978). Environmental sociology. A new paradigm. *American Sociologist, 13*, 41–49.
Clottes, J. (2003). *The art of earliest time*. Salt Lake City: University of Utah Press.
Clottes, J. (2010). *La grotte Chauvet à Vallon-Pont-d'Arc*. Paris: Seuil.
Clottes, J., & Lewis-Williams, D. (1998). *The shamans of prehistory*. New York: Harry N. Abrams.
Crosby, A. W. (2002). *Throwing fire: projectile technology through history*. Cambridge: Cambridge University Press.
Crutzen, P. J., & Stoermer, E. F. (2000). The 'Anthropocene'. *Global Change Newsletter, 41*, 17–18. [International Geosphere-Biosphere Program].
Daumas, M. (1969). *A history of technology and invention; progress through the ages*. New York: Crown Publishers.
Descola, P. (2005). *Par delà nature et culture*. Paris: Gallimard, (*Beyond nature and culture*. University of Chicago Press, 2013).
Dobré, M., & Flipo, P. (2013). *La face cachée du numérique-L'impact environnemental des nouvelles technologies*. Paris: L'échappée.
Duchesne, R. (2005). Peer Vries, the Great Divergence, and the California School: Who's in and who's out? *World History Connected 2*(2) May, http://worldhistoryconnected.press.illinois.edu/2.2/duchesne.html
Duchesne, R. (2011). *The uniqueness of Western civilization*. Leiden: Koninklijke Brill NV.
Ellul, J. (1967). *The technological society*. New York: Vintage Books.
Feyerabend, P. K.. (1989). *Against method: Toward an anarchistic theory of knowledge*. London: Verso. (1st edition 1975).
Foucault, M. (1975). *Surveiller et punir, naissance de la prison*. Paris: Gallimard, (*Discipline and punish: The birth of the prison*. Vintage Book, 1995).

Garcia, E. (1999). *El trampolín fáustico: ciencia, mito y poder en el desarrollo sostenible*. Valencia: Tilde ed.

Garcia, E. (2005). *Medio ambiente y sociedad: La civilización industrial y los límites del planeta*. Madrid: Alianza.

Giddens, A. (1990). *The consequences of modernity*. Cambridge: Polity Press.

Gille, B. (1967). *Les Ingénieurs de la Renaissance*. Paris: Herman. (*Engineers of the Renaissance*, MIT Press, 1966).

Gille, B. (1978). *Histoire des techniques: Technique et civilisations, technique et sciences*. Paris: Gallimard.

Goldstone, J. (2006). Europe's peculiar path: Would the world be 'modern' if William III's invasion of England in 1688 had failed? Pages 168–196 in *Unmaking the West: 'What-if?' scenarios that rewrite world history*, edited by P. E. Tetlock, R. N. Lebow, and G. Parker. Ann Arbor: University of Michigan Press.

Gras, A. (1996). *Les macro-systèmes techniques*. Paris: PUF.

Gras, A. (2003). *Fragilité de la puissance: Se libérer de l'emprise technologique*. Paris: Fayard.

Gras, A. (2007). *Le choix du feu*. Paris: Fayard.

Gras, A. (2013). *L'imaginaire de l'innovation technique*. Paris: Manucius.

Hall, C. A. S., & Day, J. W. (2009). Revisiting the limits to growth – After the peak oil. *American Scientist* 97 (May–June), 230–237.

Hamilton, C. (2014). *Earthmasters: The dawn of the age of climate engineering*. Yale University Press.

Hamilton, C., & Grinevald, J. (2015). Was the anthropocene anticipated? *The Anthropocene Review, 2*(1), 59–72.

Heidegger, M. (1982). *The question concerning technology, and other essays*. New York: Harper Torchbooks. (*Die Frage nach der technik*, 1st ed. 1953).

Hobsbawm, E. (1962). *The age of revolution, 1789–1848*. London: Weidenfeld & Nicolson.

Hopkins, R. (2008). *The transition handbook*, *from oil dependency to local resilience*. Green Book/UIT Cambridge 2014.

Hornborg, A. (2001). *The power of the machine: Global inequalities of economy, technology, and environment*. Lanham: AltaMira Press.

Hornborg, A., & Crumley, C. (Ed.). (2006). *The World System and the Earth System: Global socioenvironmental change and sustainability since the Neolithic*. Walnut Creek: Left Coast Press.

Huesemann, M., & Huesemann, J. (2011). *Techno-fix: Why technology won't save us or the environment*. Gabriola Island: New Society.

Hughes, T. P. (1983). *Networks of power-electrification in Western societies*. Baltumore: John Hopkins.

Hughes, T. P. (1989). *American genesis*. New York: Viking Press.

Jackson, T. (2011). *Prosperity without growth: Economics for a finite planet*. Routledge.

Janicaud, D. (1994). *Powers of the rational: Science, technology, and the future of thought*. Bloomington: Indiana University Press.
Jarrige, F. (2009). *Face au monstre mécanique, une histoire des résistances à la technique*. Paris: Immho/Radicaux libres.
Jarrige, F. (2014). *Techno-Technocritiques: Du refus des machines à la contestation des technosciences*. Paris: La Découverte.
Jonas, H. (1993). *Le principe responsabilité*: *une éthique pour la civilisation technologique*. Paris: Ed. du Cerf. (*The imperative of responsibility*: *In search of an ethics for the technological age*. University of Chicago Press, 1985).
Koppelaar, R. (2012). World energy consumption – Beyond 500 exajoules. Posted to *The Oil Drum*: http://www.theoildrum.com/node/8936 [accesed 6 November 2015].
Lasch, C. (1991). *The true and only heaven*: *Progress and its critics*. New York: W. W. Norton.
Latouche, S. (2004). *La mégamachine*, Paris, La Découverte.
Latouche, S. (2010). *Farewell to growth*. Cambridge: Polity.
Latour, B. (2013). *An inquiry into modes of existence: An anthropology of the moderns*. Cambridge, MA: Harvard University Press.
Lewis, S., & Maslin, M. (2015). Defining the anthropocene. *Nature, 519*(12 March), 171–180.
Luhmann, N. (1986). The autopoiesis of social systems. pp. 172–192 in *Sociocybernetic paradoxes*: *Observation*, *control and evolution of self-steering systems*, eds. F. Geyer and J. Van d. Zeuwen. London: Sage.
Malm, A. (2016). *Fossil capital: The rise of steam-power and the roots of global warming*. London: Verso. (Thesis printed, Lund University, 2014).
Maturana, H., & Varela, F. (1980) *Autopoiesis and cognition: The realization of the living*. Boston: Reidel.
McChesney, R. M. (2013). *Digital disconnect: How capitalism is turning the internet against democracy*. New York: New Press.
McNeill, J. R. (2001). *Something new under the sun-An environmental history of the twentieth century world*. New York: Norton.
Merton, R. K. (1938), Science, technology and society in seventeenth century England. Pages 362–632 in *OSIRIS: Studies on the history and philosophy of science and on the history of learning and culture*, edited by G. Sarton. Bruges, Belgium: The St. Catherine Press.
Merton, R. K. (1936). Puritanism, pietism and science. *The Sociological Review, 28*, 1–30.
Mitchell, T. (2013). *Carbon democracy: Political power in the age of oil*. London: Verso.
Mumford, L. (1965). *Technics and civilization*. New York: Brace and World.
Needham, J., & Temple, R. (1986). *The genius of China*. London: Prion Books.
Neirynck, J. (1986). *Le huitième jour de la création*. Lausanne: PU Romandes.

Noble, D. (1997). *The religion of technology: The divinity of man and the spirit of invention*. New York: A. A. Knopf.
Odum, H. T. (1996). *Environmental accounting: Emergy and environmental decision making*. New York: Wiley.
Odum, H. T. & Odum, E. C. (1976). *Energy basis for man and nature*. New York: Mc Graw Hill.
Pearce, J. M. (2008a). Limitations of greenhouse gas mitigation technologies set by rapid growth and energy Cannibalism. *Klima, 2008*. https://archive.is/XkZv9
Pearce, J. M. (2008b). Thermodynamic limitations to nuclear energy deployment as a greenhouse gas mitigation technology. *International Journal of Nuclear Governance, Economy and Ecology, 2*(1), 113–130.
Pomeranz, K. (2001). *The great divergence: China, Europe, and the making of the modern world economy* (reprint ed.). Princeton, NJ: Princeton University Press.
Rey, O. (2003). *Itinéraire de l'égarement: Du rôle de la science dans l'absurdité contemporaine*. Paris: Seuil.
Rifkin, J. (2013). *La troisième revolution industrielle* Paris: Actes Sud.
Rist, G. (2009). *The history of development: From western origins to global faith*. London: Zed Books.
Schivelbusch, W. (1990). *Histoire des voyages en train* (*Geschichte der Eisenbahnreise*) Paris: le Promeneur. *The railway journey*: *The industrialization of time and space in the nineteenth century*. University of California Press, 2014).
Sempere, J. (2008). *Mejor con menos: Necesidades, explosión consumista y crisis ecológica*, Barcelona: Crítica.
Stengers, I. (1997). *Thermodynamique: la réalité physique en crise-Cosmopolitiques III*. Paris: La Découverte (*Cosmopolitics 1*, University of Minnesota Press, 2010).
Summerton, J. (Ed.) (1994). *Changing large technical systems*. San Francisco: Westview Press.
Usher, A. P. (1988). *A history of mechanical inventions*. New York: Dover. (1st edition, Harvard University Press, 1929).
White, L. (1966). *Medieval technology and social change*. Oxford: Oxford University Press.
Winner, L. (1978). *Autonomous technology: Technics-out-of-control as a theme in political thought*. Cambridge, MA: MIT Press.
Wood, B. (2011). *Alias Papa: A life of Fritz Schumacher*. Cambridge: Green Books.
Zalasiewicz, J. et al. (2015). When did the anthropocene begin? A mid-twentieth century boundary level is stratigraphically optimal *Quaternary International, 383* (5 October), 196–203.

CHAPTER 2

Uncertainties, Inertia and Cognitive and Psychosocial Obstacles to a Smooth Transition

Joaquim Sempere

Introduction

The post-carbon transition (PCT) requires changes in economic policies whose orchestration depends not only on the habits, values and interests involved but also the dominant perceptions of our situation and its unsustainability. These perceptions are not always correct and the social context does not always favour an adequate perception of reality. This paper begins by discussing the obstacles to such a perception of the ecological crisis before going on to consider how they might be counteracted.

Obstacles to Adequate Perception

Exponential Growth

The growth rate during the final stages of exponential growth is considerably higher than at the start. Since many forecasting habits are formed during the initial, slower, prolonged phases, forecasting capabilities struggle to

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adapt to the new growth rate that characterizes the sudden accelerations during the final phases, meaning dangers are not anticipated with due flexibility and speed, and reactions are subject to a potentially lethal time lag. When it is difficult to *understand* an imminent lethal acceleration, it is also difficult to *accept* this acceleration and *react* in time. This is an important point since many variables of the socio-metabolic reality, such as population, the extraction of resources, production and consumption, are subject to exponential changes (Meadows et al. 2004).

The Tyranny of Small Decisions or the Isolation Paradox

In everyday life, we often use the method of *trial and error* to adjust our decisions based on the results of carrying out an action. When it comes to individual actions, comparing the intermediate results with our aim and making the necessary corrections is relatively straightforward. On the other hand, for actions involving many individuals and whose results must be added together, it is harder to determine the relationship between action and result since each individual action is an infinitesimal component of the aggregate action. By means of example, if, like millions of other people, I drive my car every day, I contribute to increasing carbon emissions into the atmosphere. Aware of this fact, and concerned about the greenhouse effect, I can argue that as an individual, abstaining from using my car will have no noticeable effects and hence there is no point in foregoing the comfort of using my vehicle to reduce the greenhouse effect. Everyone who drives their car on a daily basis can make the same argument and the result of these distributed individual decisions is their aggregate effect, in this case, the greenhouse effect. This gap between *isolated* individual decisions and *aggregate* collective results produces an unwanted collective effect, referred to as the *isolation paradox* or the *tyranny of small decisions* (Martínez Alier & Roca Jusmet 2000, 277–279). If a smoker contrasts the *individual* pleasure they obtain from smoking with the harmful *individual* effects on their health, there is a proportionality between perception and effects. For aggregate actions, however, there is no such proportionality, making it harder to prevent the harmful effects (Sempere 2002).

The Mythification of Progress

Measures taken to combat unsustainability sometimes come up against illusory visions of technological progress. Taking the successful technological evolution of the last two centuries as a precedent, people frequently appeal

to the hope that "we'll always find a solution" to any given problem. The scarcity of energy and materials is not immune from this phenomenon.

Paradoxically, when it comes to energy, renewable energies are partly responsible for the illusion. It goes without saying that these are the solution of the future: fossil fuels will be exhausted in the short term, together with uranium (this is to say nothing of the dangers involved and the mounting financial costs). Yet while renewable energies may be inexhaustible, this does not mean they are infinite: they too are bounded, most notably by limits on the use of space and materials to manufacture and install capture devices. Attempts have recently been made to calculate these limitations, suggesting that while a 100% renewable-based system would allow modern societies to function, this would come at the cost of *a substantial reduction in the scale of human activity due to the scarcity of the required metallic minerals in the Earth's crust.*

As we approach the physical limits of the planet, we must calculate the possible dimensions of a civilized human society and adapt to them. No technological process will ever allow us to build something that goes beyond these limits, and certainly not the colonization of other planets, the *non plus ultra* of technophilic fantasies, which—in addition to implying a horrible human coldness—often ignore the enormous energy requirements of such a colonization. In short: trusting blindly in progress is bad counsel when it comes to evaluating the imperatives imposed on us by the limited and finite nature of the resources at our disposal.

Intentional Manipulation of Consciousness

As if the false perceptions mentioned above were not enough, there are groups of society with private interests whose future is bound to the capitalist socio-economic model, which is expansive by nature and linked to economic growth. These groups do not want people to be aware of the limits of the planet, preferring instead for them to continue to cherish the illusion of indefinite growth and thus support their socio-economic model, a model that provides them with abundance and which, it must also be noted, only a quarter or fifth of humanity have been able to enjoy. These privileged groups seek to prolong a system of living, production and consumption that gives them immense power, beyond the wildest dreams of the tyrants of days gone by.

Energy, chemical, pharmaceutical, mechanical, electronics, transport and food companies, alongside many others, have linked their existence to the current social order and use immoral methods to prolong it as long as they can. They use a wide range of techniques to manipulate the

market and consciousness, most notably by lobbying the elected representatives of the people in parliaments and other public institutions, inciting corruption and controlling the media by paying mercenary journalists to spread untruths or half-truths. Thus, they have been able to postpone consciousness of climate change ("deniers" being a case in point) and "peak oil". Furthermore, they have placed obstacles not only in the way of the dissemination of scientific achievements but also in the way of scientific research that has the potential to curtail the harmful industrial exploitation of certain discoveries (a case in point being research into the effects of genetically modified plants on the human body exemplified by the Séralini affair).

The enormous forces exercised on politics by the plutocracy help delay our awareness of the need for major changes.

The Physical Limits of the Planet and Their Consequences: The Need for a Systemic or Holistic Vision

Kenneth Boulding (1966) formulated the double metaphor of the "cowboy economy" and "spaceship Earth". The human species has always lived in a world tainted by infinity. If a piece of land or an ecosystem ceased to provide the basis for supporting a human community, there were always other earths or ecosystems we could move to in order to continue living. Boulding used the North American cowboy as an example: cowboys had seemingly infinite expanses that were always available and there was no need to worry about preserving the ecosystem they occupied at a given point in time. If it became exhausted or its capacity for regeneration was destroyed, the cowboy could simply move to another ecosystem that was still intact. Today, however, on a highly populated—perhaps overpopulated—planet, humanity's socio-natural metabolism is more akin to that of a spaceship, travelling through interstellar space with no more than the materials contained on board, albeit with a permanent and indefinite source of energy provided by the sun. The astronauts can only survive if they learn how to recycle the essential materials they use or consume: they must recover oxygen from carbon dioxide, potable water from urine and organic matter for food production from organic waste.

The cognitive implications of such a radical change are formidable and there has been limited reflection on the matter, best summarized by the

shift from a fragmentary to holistic vision. Let us consider some examples. Analysed in a fragmentary manner, the problem of fossil fuels, which are intrinsically prone to exhaustion, can be solved by using bio- or agrofuels, which do not increase the greenhouse effect and can be reproduced indefinitely using solar energy and photosynthesis. As such, the replacement of fuels obtained from oil and gas, which are non-renewable, by indefinitely renewable photosynthetic fuels would appear to provide a solution to the problem. However, does this conclusion, which holds in the laboratory, also hold in the real world? To answer this question, we must consider as many variables as possible, together with their interaction in the finite framework in which they arise: the human population, the land available for photosynthesis, the ratio of the production of food and biofuels, transport requirements and other activities that consume exosomatic energy, the different purchasing powers of different human communities, desirable biodiversity, and so on. In other words, the fragmentary/analytic approach is no use: *we need a holistic approach.* The holistic approach allows us to see that photosynthesis cannot provide the fuel needed to replace the current consumption of fossil fuels, largely because the use of arable land to obtain energy would enter into competition with its use for food, and if we wished to have the same amount of fuel we currently consume, there would not be enough space on the planet. Hence, the fragmentary or analytic argument is completely abstract (in the Hegelian sense of "abstraction" as isolation or separation with respect to the whole) and useless for understanding the real world, where all the variables mentioned have reached extremely high levels that bring us close to the limits of the Earth.

Another example is the human population. The rhetoric about the need to increase populations to achieve a balanced demographic pyramid to support an ageing population and an extremely high life expectancy also typifies a fragmentary way of thinking. If we consider the limits of the Earth, it is clear the human population cannot grow indefinitely and that the problems of an ageing population must be solved by taking these levels into account, not by failing to face up to the problem and permitting unlimited demographic growth to ensure we always have the "correct" demographic pyramid. In this case, a holistic approach is also necessary.

The problem can be formulated in more general theoretical terms. Imagine a local ecosystem ($E\lambda$) made up of *elements* (humans, other animals, plants and physiochemical matter) inserted in a space much larger

than the one occupied by the ecosystem itself. Living beings use resources and expel waste inside the space, although they always have the possibility of using the exterior space for resources and waste. Let us now imagine a global ecosystem ($E\gamma$) that occupies all the available space, in other words an ecosystem that has reached its upper spatial bounds. In this case there can be no *exterior* resources or waste: everything is *interior* (and the waste from some processes must be converted into the resources of others to prevent the formation of foreign bodies with harmful effects).

In the first case there are broad margins for developing and combining elements, since there is an exterior space that can provide an *additional* source of resources and an *additional* sink for waste. The human population can increase, even though the land available for the production of food in $E\lambda$ is already fully occupied, since there is land available outside. Similarly, waste can also grow in an unlimited manner without having to be transformed into resources for other processes.

In the second case ($E\gamma$), however, there is limited—if any—room for new development and combinations of elements since the resources are finite and delimited and it must be possible to convert waste into resources. This is especially clear as we approach the upper bounds of the Earth, entering into a zero sum game in which when something is used for a specific purpose, it cannot be used for another. In these circumstances, it is not possible to increase the human population—sticking with the same example—without automatically increasing the demand for productive land. Hence, this is a *limiting factor*. Limits are present in any dynamic process, and it is not possible to draw conclusions about viable practices *without considering the full set of elements*. This joint consideration is called *systemic or holistic thinking*.[1]

These considerations make it possible to draw a significant methodological conclusion: *to understand finite systems and their dynamics, it is necessary to recur to holistic thinking*. Moreover, this involves an attempt to free ourselves from the fragmentary approach to problems that currently dominates. Fragmentary thought is deceiving: it tricks us into thinking certain solutions are possible by ignoring the issue of upper bounds. Hence, the idea that the electric car will make it possible to indefinitely prolong the era of driving into the future often goes unchallenged, without taking into account limits on factors such as the availability of materials and the production of energy that make it necessary to think about transport in other terms. Only by considering the availability of space, materials and energy can we answer the question and determine the maximum size of the world's fleet of cars.

Between Informed Lucidity and the Paralysis of Will

It is often said that the last thing we lose is hope and that life is not possible without it. These statements contain a significant grain of truth. The belief that it is impossible to avert a catastrophe causes a paralysis of will, which is why it tends to be rejected.

There is thus a "natural" tendency to preserve a certain degree of hope and discount the fatality of a collapse, despite the presence of many signs that point to its inevitability. Cognitive psychology has identified a defensive mechanism that consists of *eliminating cognitive dissonances*. The philosopher Jon Elster illustrates this by the fable of the fox and the grapes: unable to reach the grapes, the fox decides they are sour, satisfying his pride or love for himself by disguising reality, since his self-esteem would be damaged by admitting the truth (Elster 1987). It is extremely painful to have to think that I am obliged to do something in the knowledge that it is extremely unpleasant or dangerous or seriously hurts my feelings: this simultaneity is referred to as "cognitive dissonance". Through a spontaneous and unconscious reaction, we tend to eliminate it by suppressing one of the two terms of the dilemma to avoid the discomfort that is caused. Simply put, I will exempt myself from the obligation or convince myself there is no danger.

Numerous surveys have been carried out on the perception of the danger of nuclear power plants among staff and residents in the surrounding area. The results invariably show that both groups believe the danger posed by the plants to be much lower than the general public. The explanation is simple: it is not possible to believe that living or working near a plant results in exposure to a deadly risk on a daily basis. The mechanism for eliminating cognitive dissonances pushes people to ignore the danger due to the complications or difficulties inherent in changing job or moving house.

A similar pattern occurs with the possibility of environmental collapse. Such is the difficulty of imagining a future of destruction and chaos that people opt (unconsciously) to reject the possibility outright, tending to discount the least palatable hypotheses of the future. However, this also implies *refusing to accept preventive measures that are believed to be exaggerated and unnecessary*. (In general, people "discount the future", attaching greater value to the present, which can lead to the adoption of measures that are beneficial today, despite the fact that they can reasonably be anticipated as

being harmful in the long run.) The collapse can be averted *provided a series of measures*, *which may be expensive and inconvenient*, *and hence unpopular*, *are taken in time*. However, to take these measures we must believe in the likelihood of the collapse, and if we tend to reject this likelihood, the willingness to take preventive measures decreases further still.

Social and Mental Inertias

Extreme Interdependencies and the Dangers of Apraxia

To these misconceptions, we must add inertias. The current popularity of the term *resilience* is largely a result of the fact that the division of labour in the industrial era has created extreme interdependencies that increase the fragility of the social order and render unilateral changes of course by countries unfeasible. Communities that are self-sufficient—above all if they are small—can change direction of their own free will. However, it is much harder for communities whose food, transport, industry and energy supplies are conditional on the functioning of the "mega-machine" (to use Lewis Mumford's term) and receiving a timely supply of materials, fossil fuels, foods, semi-manufactured products and other required goods from the rest of the world. This interdependence results in significant fragility and a loss of autonomy for human communities, which must place their trust in the operation of the enormous global machine moved by enormous quantities of fossil fuels. The great horror to be avoided is that which Langdon Winner calls *apraxia*, the paralysis of the operation of a whole society as a result of the paralysis of certain subsystems:

> "If a significant link in a technical system ceases to function, the whole system stops or is thrown into chaos. It is this condition I want to call *apraxia*, a term used in medicine to describe the inability to perform coordinated movements. In large scale technical networks composed of artificial components with complex interconnections and interdependencies, apraxia is a constant danger" (Winner 1977, 186).

This danger fosters a tendency to cling to the expectation of indefinite self-reproduction, without ruptures or surprises, and the functioning of the social machinery. Individuals and communities have already ceased to depend on their own initiatives and activities and are the playthings of foreign forces beyond their control, which overwhelm them and to which they must submit.

Mental Inertias and Cultural Dynamism: Which Will Prevail?

These social inertias, caused by highly complex structures with many interdependent parts, whose correct operation depends on the whole, are associated with or complemented by mental inertias. The human psyche is able to operate for long periods of time thanks to automation. Practically all repeated operations carried out by individuals in their daily lives crystallize into habits that do not directly depend on the neocortex. We do not need to think about what we are doing when we eat, dress or drive a vehicle. The sequence of our actions is highly automated and this results in important savings in concentration and mental energy that can be used for more valuable activities. However, this psychic economy does not always operate: there are periods and situations in which the psyche is creative and the neocortex takes control. The environmental disruptions suffered by people stimulate innovation: there are moments in the lives of people and societies in which the frequency or speed of changes requires them to be creative and overcome inertias. The struggle against mental inertias can voluntarily be accelerated and intensified when circumstances require, as would be the case with the PCT.

During the last two centuries, cultural transformations of significant scope have taken place. The mass migration from country to city and agriculture to industry and services, all in the space of a few generations, has resulted in surprising cultural and mental changes. The situation is similar when it comes to technological innovation: consider the importance of the telephone and computers in recent years. The continuity of habits, economic activities, formal education and leisure practices has been broken over and over again, severing cultural transmission from generation to generation. For many young people, the customs of their grandparents are almost unimaginable. Some of these discontinuities must be reverted, such as returning to the country, but we do not know how these "returns", which can never be a simple case of going back to the same, will take place.

We can, however, make out opposing tendencies, even though it is not possible to say which will prevail. On the one hand, there is the idea that the flexibility with which people adapt to new situations bodes well for good adaptive dynamics. On the other, it must be recalled that the PCT will mean going from having more comforts to less, from more abilities to less and from less physical effort to more. Furthermore, those who experience these changes will often pay a high price. The enormous changes that

the PCT will bring about will require varying levels of adaptive flexibility and adhesion to a certain generational continuity, without which we may lose the meaning of community (which must be understood not only as a community in space, but also as a community in time).

The Idea of Austerity as a Source of Confusion

Another source of confusion on the path of the PCT is the diffusion of an idea of *austerity* that has nothing to do with the austerity advocated by ecologism as a remedy for the destruction of ecosystems and the erosion of the Earth's capacity to support human life.

Ecologism has the bitter experience that its calls for austerity, frugality and self-control to save the Earth—or "save the future"—are unpopular and meet with fierce opposition from people who are either accustomed to enjoying significant material abundance from half a century of "developmentalism (the privileged part of humanity) or striving to obtain this material abundance (the less privileged part of humanity that enviously beholds the privileges of the richest part). Ecologists' calls for austerity, together with proposals to stop growth or adopt degrowth thus come up against widespread rejection. They are only heard by informed minorities who are conscious of the dangers implied by the current social metabolism.

In this context, the neoliberal policies of "austerity" as a response to the economic crisis precipitated by the bursting of the financial bubble in 2007–2008 have been a source of enormous complication in the debate, introducing a different idea of austerity far removed from its ecologist counterpart. People have experienced falling incomes, worsening working conditions, rising unemployment and precarious jobs, cuts to state welfare provisions, increasing inequality, economic mismanagement and the privatization of public assets. These highly unpopular measures have been labelled as "austerity" and this negativity is indiscriminately projected onto the notion of austerity in general. If the ecologist idea of austerity was already facing reluctance and opposition, this has increased with the unpopularity of neoliberal austerity, which has introduced a mist that shrouds the debate. This semantic confusion is an obstacle to the perception of the ecological crisis and possible ways out, and hinders acceptance of the fact that *there is a renunciation of consumerist abundance that is justified, necessary to avoid exhausting the sources of life on Earth and must be a desirable objective in the immediate future.*

The objective evidence for this necessary renunciation is provided by the ecological impact of human societies living *beyond their limits*, documented in numerous recent studies, the revision of the 1972 study *Limits to Growth* (Meadows et al. 2004) and the calculation of the global ecological footprint by the Global Footprint Network, being just two examples. The latter identified 1986 as the year when the global ecological footprint would reach and surpass the limits of the Earth's biocapacity. From this point onward, human activities have been damaging the capacity of the biosphere and the Earth's crust to support human life on the planet. To deal with this threat, it is absolutely imperative to reduce our ecological footprint by urgently implementing programmes to stop growth, reverse it and build a sustainable economic foundation, transforming the socio-metabolic regime. Given the high level achieved through the profligacy of resources, it seems inevitable that we must accept some form of austerity—voluntarily or otherwise—whose essential goal is to *reduce the ecological footprint of humankind to a sustainable level.*

The industrial crisis precipitated by the financial crash has reduced the consumption of energy and the emission of pollution, however this has been nothing more than a side-effect. As a whole, the productive system has not experienced any type of socio-metabolic change. Production is still based on dirty, non-renewable energies. A consumerist model that is predatory towards natural resources continues to prevail, encouraging increasing levels of consumption even though this does not represent a real improvement in human life. The system continues to operate with a misguided division of labour based on spatially dislocated activities, such as production and consumption, residence and place of work, and an excessive burden of transportation. Obsolescent artefacts that cannot be easily repaired when they break are still manufactured and the system continues to feed a culture of acquisition-based individualism (Langlois 2005). As a result, policies of austerity do not favour the transition to a more sustainable economy, but quite the contrary: they result in the consolidation of the predatory model. The anti-ecological habits of today's impoverished population are exactly the same.

In spite of all this, the progress being made by the production system (progress in renewable energy, improvements in efficiency, increasing the recycling of metals and other materials, to cite a few examples) has nothing to do with the financial crisis. These are changes that have been underway for years thanks to a growing awareness of these issues among society, including in the world of business. At individual or community

level, the crisis has triggered patterns of behaviour that make savings that move in the right direction. However, as a whole, no improvements have been made as a result of the crisis. In fact, quite the contrary has occurred: the unemployment and precarious jobs suffered by millions induce us to prioritize what is most urgent—job creation—over and above any other consideration, encouraging the dangerous idea that "the environment can wait".

The fact that this type of austerity is lived as a travesty by millions of people who are either unemployed, underemployed or working in precarious jobs means that *the idea of austerity itself becomes imbued with a highly negative connotation*, above all among the working class communities that have felt the brunt of the crisis. This constitutes a significant obstacle to understanding the meaning and value of the austerity associated with sustainability, and hence an obstacle to forming public opinion and a social and political force that could favour policies of degrowth and increased self-control.

Does Austerity Mean Living Worse?

One noteworthy aspect of the confusion surrounding the concept of austerity is the link often established between austerity and falling standards of living. The dominant discourse stresses the equation *austerity = living worse*, justified, at least in this instance, by neoliberal austerity. However, there is an extensive literature by proponents of degrowth and advocates of an ecologically sustainable economy (Latouche 2009; Jackson 2009; Viveret 2012), primarily concerned with arguing that not only is the tendency to equate abundance with well-being false but there are also many reasons to believe that upon reaching certain levels of wealth, life satisfaction and human happiness are better provided by frugality and self-control.

These visions suggest the need to imagine models of social organization based on human improvement in contexts of material austerity.[2] They are, of course, a *governing ideal* and their applicability and results cannot be separated from the socio-political contexts that come to prevail. Scarcity can give rise to a competitive struggle that results in patterns of inequality that do not favour stable and ecologically healthy solutions. However, this is not an inevitable outcome. Under different socio-political conditions, the PCT can give rise to more resilient and balanced societies with a simpler socio-natural metabolism, and hence a reduced ecological footprint,

but this can only occur if there are widely accepted alternatives of *living with less*, of renouncing growth, of adopting completely different priorities to the ones we have at present.

Hence the future will be played out not only in a social and political struggle but also a moral and philosophical one regarding the make-up of society and the socio-metabolic model. It can be conjectured that when the limits of the available natural resources are clearly perceived throughout the world, it will be easier for the socio-political conflict to be based on issues of distribution, in the sense that inequalities will become less easy to bear. Socialism as a struggle for distributive equality in a context of cooperation can then recover the popularity it has lost.

Austerity and Ecological Footprint

"Austerity" is a moral concept, in both the normative and descriptive sense: it refers to norms—giving up luxury and things that are unnecessary—and lifestyles resulting from these renunciations. The goal and justification of ecological austerity is to reduce our ecological footprint to a sustainable level. However, the reduction in our ecological footprint does not only rest on individual moral decisions but also on collective socio- political ones.

Let us consider two examples of such collective decisions: the transition to a 100% renewable energy model and the reduction in transport through changes in the territorial distribution of human activities. Both cases give rise to reductions in the ecological footprint that are dependent not on individual consumption or lifestyle choices but on socio-political decisions (although any support they receive from the public depends on ethical values of sobriety).

The Transition to a 100% Renewable Energy Model

In a recent study, Sans and Pulla (2013)[3] examine the financial cost of the transition to a 100 % renewable energy model of the 28 countries that make up the European Union between 2015 and 2050. Their calculation is based on the assumption that during these 35 years, the consumption of coal, oil and gas will be gradually abandoned while building and commissioning renewable facilities to replace the energy supply for these activities at the same time. Comparing the costs gives the following figures:

Cumulative cost of fossil fuels without change	€32,510.60 billion
Cumulative cost of fossil fuels with gradual transition	€8,577.75 billion
Cumulative savings over the 35 years	€23,932.85 billion

Multiplying the total cost of the renewable energy infrastructure over the 35 years by two gives a figure of €7,400 billion. This means that with the cumulative savings in fossil fuels, it would be more than feasible to finance the energy transition, *with a net saving of €16,532.85 billion* over this period.

While the study does not involve changes in the magnitude of consumption, it can nonetheless be regarded as an example of degrowth since the transition eliminates environmentally harmful and polluting activities, thus reducing the corresponding carbon footprint. It shows what it might mean to live with less in the sense discussed here: key to the reduction, decrease, diminution or degrowth that is proposed is *reducing our ecological footprint*, not necessarily the services obtained. This calculation is of great value when it comes to quantifying the potential financial cost of the energy transition and showing not only its financial viability but also the concomitant reduction in costs.

To complete its usefulness for planning, it is necessary to estimate the technical requirements for materials, above all on a global scale. Another recent study by García-Olivares et al. (2012) provides an estimate of this figure, calculating the quantity of metals required to implement a fully renewable model on a global scale. The basic materials are steel, cement, nitrates, neodymium, copper, aluminium, lithium, nickel, zinc and platinum. Steel, cement, aluminium and zinc are not limiting factors for the time being, however the remainder of the aforementioned materials give grounds for serious concerns based on the available reserves in the ground. Even with a *hypothesis of reducing global energy consumption to a quarter of its current level*, some of these metals will be exhausted in an extremely short period of time. This conclusion means it is necessary to consider a future of austerity, even after completion of the transition to a model based on clean and renewable energies.

Reducing Transport

Another case is reducing the need for transport. Under the current division of labour, which is largely based on a *territorial* division due to the delocalization caused by globalization, each phase of the production process

(the extraction, processing, production and transformation of raw materials) takes place in different locations that are often far apart (sometimes even thousands of kilometres). Goods are frequently consumed elsewhere, requiring more transport. Consequently, at any given moment, there are thousands of ships, trains, trucks and other vehicles circulating around the globe to transport raw or manufactured materials, and which are reliant on fossil fuels. It is worth noting that almost half of global energy consumption is used for transport.

A spatial restructuring of human activities to reduce the distance between production and consumption (or homes and places of work) would reduce this excessive requirement for transport. It would make it possible to obtain goods and services and hence a comparable level of well-being without such large distances being involved and using much less energy and much smaller fleets of vehicles. It is likely that as fossil fuels become increasingly scarce and expensive, such a restructuring will take place by force of necessity.

Is Solidarity Possible in a Context of Scarcity?

This widespread idea that the PCT must be governed by values of solidarity prevails among the proponents of an ordered and equitable transition, who are largely individuals, entities and networks concerned with the end of the fossil fuel era. Various names for the proposed "new economy" have been suggested, including ones as revealing as the Solidarity Economy, the Sharing Economy, Community Resilience, Community Economics and the Caring Economy.[4] The idea that such a profound transformation can only be achieved with a spirit of cooperation and solidarity, and that individual solutions based on other values can only give rise to fratricidal struggles is widespread. However, the idea that abundance reduces conflicts of distribution would seem to imply that increased scarcity will exacerbate such conflicts. If this idea holds universally, egalitarian outcomes to the crisis of resources would seem highly unlikely. Instead, the most probable future would be one filled with every-man-for-himself-type struggles. Only time will tell to what extent a lack of abundance is compatible with fraternalism and cooperation, however there are a number of considerations to be addressed in this respect.

The first is that capitalist abundance has not eliminated competitive and status rivalry. It promotes an endless race for the private accumulation of increasing amounts of money, a race that, because it has no destination

(it is always possible to imagine more than any given sum), will never reach an end point at which it stops. The experience of two centuries of economic growth shows that abundance does not guarantee the end of conflicts of distribution: regardless of how much it has amassed, all that matters to *homo economicus* is its status in society, and the never-ending accumulation of capital, always aspiring to have more. The only imaginable way out from such an absurd situation is to subvert the notion of material wealth and well-being itself, shifting it away from quantities, associating it with the idea of satisfying needs and aligning it with the natural environment's ability to sustainably provide goods and services. Thus put, it would appear to be possible to escape from competitive and status rivalry and create an economy based on solidarity and cooperation, founded on sharing and based on the ability to satisfy needs and provide happiness (beyond that provided by comparisons).

The second consideration involves emphasizing the human value of *life security*: it is impossible to live a satisfactory life without a basic level of security. People spend a great deal of effort to achieve enough stability in their lives to make them predictable, without which living would be a constant struggle for survival, day by day and minute by minute. Much of the effort that is made (to have a property, a secure job, acquired rights, etc.) is motivated by life security. If the instrumental nature of material wealth is accepted, in other words its main value is as a means to develop *human wealth* (related more to *being*, *doing*, *sharing*, *creating* or *enjoying* than *having*), we can conclude that the availability of enough goods and services to live our lives frees us from life insecurity and allows us to dedicate ourselves to what has real human value instead of becoming lost in the interminable instrumental effort to survive. Life cannot be fully human if *all* our energies are dedicated, without rest, to obtaining food and shelter, to achieving the bare minimum: a fully human life presupposes life security.

One of the West's successes during the last half century has been to provide people not only with a high purchasing power but also with a stable framework that provides protection and security. Basic health, education and social protection provisions—referred to as the welfare state—provide people with *life security or comfort*. Provision of the welfare state—an island of socialism in a capitalist sea—is financed by tax contributions from the public as a whole, which are then freely—or almost freely—distributed based on individual needs.[5] It is a powerful tool for social equality, a collectivist and non-market mechanism for providing life security. Serge Latouche (1998) notes that in certain African communities, "poverty" is not so much about scarcity but is determined by the absence of family

or neighbourhood networks that provide protection. From this point of view, people are poor if they live on their own, without a sense of belonging to society or community links to facilitate the fulfilment of their needs.

The collectivist foundation of the welfare state makes it possible to achieve security without the need to amass goods and properties. Individual security depends on the correct operation of social institutions and is founded not on *private property* but on *rights* (which come with the corresponding individual *responsibilities* towards society, such as paying taxes and making other contributions to allow the collective machinery to function effectively). The collective nature of the welfare state delivers efficiency in the service, as shown by studies comparing the public and private provision of these types of services. This results in the effective allocation of resources, which is of particular importance when facing a future of scarcity. The attack by austerity on the welfare state is thus doubly harmful. Populations should support a well-run welfare state that provides each individual or family with the greatest life comfort, as opposed to the maximum take home pay. Neoliberalism tends to do precisely the opposite, reducing taxes so that consumers spend more individually, even when this comes at the cost of making publicly managed services more fragile and thus undermining the security provided (making people more anxious to find security by possessing goods or money or through consumption). Hence, it can be conjectured that life security guaranteed by collective structures will reduce competitive passions for material goods.

On Complexity, Sustainability and Resilience

The term "complexity" is frequently used in ecologist and sustainability literature. Tainter defines complexity as "differentiation in both structure and behavior, and/or degree of organization or constraint" and collapse as "rapid simplification, the loss of an established level of social, political, or economic complexity" (2006, 92). Complexity is regarded as a basic tool for solving problems, albeit at a cost (energy, money, work or time), and increases in complexity are adopted because they are effective, improving well-being or increasing life expectancy. Our success as a species does not only depend on biological features, it also depends on knowing how to increase the complexity of our behaviour. In the last 12,000 years, the size and complexity of human societies have increased significantly in areas such as population, technology, hierarchy, the specialization of social roles, scales of integration and information, and as Tainter notes "since problems continually arise, there is persistent pressure for complexity to increase" (ibid., 93).

However, a point is often reached when the advantages peak and the process enters a crisis. Benefits from complexity tend to fall and the cost at which they are obtained begins to rise, resulting in a reduction in marginal earnings. This is illustrated by the evolution of the Western Roman Empire, which pursued complexity to the end and ultimately reached a point at which the costs became excessive and the Empire collapsed. Tainter contrasts this with the Byzantine Empire: the seventh century saw the adoption of "a strategy that is truly rare in the history of complex societies: systematic simplification" (ibid., 97). The Empire survived, outlasting its Western counterpart by a millennium. "Simplification rejuvenated Byzantium", albeit at a high cultural cost: "The economy developed into its medieval form, organized around self-sufficient manors. There was little education beyond basic literacy and numeracy, and literature itself consisted of little more than lives of saints" (ibid., 90).

Nonetheless, the option of *simplification* need not repeat the Byzantine experience. We now have sufficient technology to modulate the socio-natural metabolism and achieve an "artificial" sustainability, induced and partially governed by human beings. There is uncertainty as to whether the desirable level of well-being and civilization can be maintained in a scenario of scarcity and/or simplification, however, there are many possible ways scarcity and simplification can be organized. The distinction between *natural resources* and the *services* that provide these resources is key. We already know how to obtain many services that are necessary to preserve the levels of material well-being to which we are accustomed *radically reducing the consumption of natural resources* and hence resulting in less environmental degradation and pollution.

Mechanical reasoning might lead us to anticipate a regression in civilization: less energy equals less complexity and less civilization. However, perhaps we need *to revisit the concept of complexity.* Certain technological progress, above all in communications, may make it possible to *simplify the physical metabolism* with the natural environment—making society more resilient—without abandoning the *cultural complexity* that makes possible a civilization rich in opportunities for people. Complexity has many guises. Progress in communications technology allows us to ensure the compatibility of the simplicity of material systems, such as territorial self-sufficiency and the proximity of human activities with others, and the benefits of complexity, thus avoiding its ecological drawbacks. This thesis advocates a major reconsideration of the notion of complexity used in these contexts.

Conclusion

An awareness of the factors that contribute to clouding the perception of the ecological crisis and the necessary PCT, as we have seen, is a prerequisite for ensuring this perception is adequate. The financial crisis has also affected these aspects of the PCT, acting, on the one hand as a harbinger, requiring millions of people to experience the fact that growth is not eternal and adapt to scarcity, while on the other making it harder to prefigure the PCT, since, regardless of the form it adopts, it will drive a transformation of the social metabolism that is in some way foreshadowed by the austerity of the current crisis. The obsession of millions of people with recovering the material well-being they have lost may deliver them into the hands of demagogues who continue to feed the dream of recovering prosperity. Reducing the ecological footprint means working, producing, moving and consuming in different ways: without fossil fuels, without using chemicals in the production of food and with longer lasting artefacts. In all likelihood, it will mean less comfort, less travel and greater limitations on the use of electronics. It will almost certainly mean more manual labour and physical effort, with more labour dedicated to obtaining food from the Earth. The change may be too radical to be assumed or perhaps even be imagined without upheaval. It is more likely to be imposed by the force of events than voluntarily.

In any process of collective self-education for the PCT, the role of pioneering experiences, from cooperatives through to municipalities in transition, can be decisive in ensuring the populations affected by the crisis have models of alternative action to overcome their difficulties. These models imply a cultural revolution, a radical change in values. However, in the absence of these alternative models, or if they are not attractive to a sufficient critical mass, scarcity may result in periods of conflict and social chaos that present a grave danger to coexistence and the persistence of civilized human life.

Notes

1. The only situation that escapes from this logic is changes in the yield of the factors, or rather increases in efficiency. If it is possible to obtain more food from the same land or more electricity from a solar device, the limits expand. They do not disappear, however, but only move beyond their previous location.

2. The term "austerity" itself is even viewed with certain suspicion. Patrick Viveret, for example, prefers to avoid it: "'happy sobriety' is not austerity and is even less asceticism" (Viveret 2012, 95).
3. Details available online at www.cmescollective.org
4. See the website www.resilience.org
5. In contrast, needs as basic as food and housing depend on the market, which means they depend on access to a remunerated job or benefits, which are not guaranteed under a capitalist economy.

References

Boulding, K. E. (1966). The economics of the coming spaceship earth. In H. Jarrett (Ed.), *Environmental quality in a growing economy*. Washington, DC: Johns Hopkins University Press.

Elster, J. (1987). *Sour grapes. Studies in the subvertion of rationality*. Cambridge/Paris: Cambridge University Press-Maison des Sciences de l'Homme.

García-Olivares, A., et al. (2012). A global renewable mix with proven technologies and common materials. *Energy Policy, 41*, 561–574.

Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. Abingdon/Oxford/New York: Earthscan.

Langlois, S. (2005). *Consommer en France*. Paris: Éditions de l'Aube.

Latouche, S. (1998). *L'autre Afrique. Entre don et marché*. Paris: Albin Michel.

Latouche, S. (2009). *Farewell to growth*. Cambridge, UK/Malden: Polity Press.

Martínez Alier, J., & Roca Jusmet, J. (2000). *Economía ecológica y política ambiental*. México: PNUMA-FCE.

Meadows, D., Meadows, D., & Randers, J. (2004). *Limits to growth: The 30-year update*. White River Junction: Chelsea Green.

Sans, R., & Pulla, E. (2013). *La transición energética del siglo XXI. El colapso es evitable*. Barcelona: Octaedro.

Sempere, J. (2002). Necesidades, desigualdades y sostenibilidad ecológica. *Cuadernos Bakeaz, 53*, Bilbao, October.

Tainter, J. A. (2006). Social complexity and sustainability. *Ecological Complexity, 3*(2), 93–103.

Viveret, P. (2012). *La cause humaine*, Les liens qui libèrent (quotations translated from the Spanish edition *La causa humana. Cómo hacer buen uso del fin del mundo*, Barcelona, Icaria, 2013).

Winner, L. (1977). *Autonomous technology: Technics-out-of-control as a theme in political thought*. Cambridge, MA/London: MIT Press.

CHAPTER 3

Towards the Post-Carbon Society: Searching for Signs of the Transition and Identifying Obstacles

Ernest Garcia & Mercedes Martinez-Iglesias

In memoriam
For William R. Catton, who gave the word overshoot a sociological meaning
The transition to a post-carbon society, in which the consumption of fossil fuels falls over time, is determined by the need to prevent catastrophic climate change, the increasing cost and scarcity of energy or complex combinations of both these causes. The transition will not only entail political adjustments and the replacement of some technologies by others, but will be accompanied by social and cultural changes that bring about substantial modifications in the organization of our societies and our ways of life. Based on the situation in Spain, we examine whether the current conditions, which date back to the crisis that began in 2007, favour a benign

Translated from the Spanish by J.C. Kelly.

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and smooth transition, or, on the contrary, make the transition more difficult and more prone to conflict.[1]

Macro-structural data obtained from secondary sources points to a link between decarbonization, economic recession and the erosion of social cohesion. However, a comparative international analysis suggests this may not be the case, at least during the initial phases of the transition. The results of focus groups on how people imagine the future indicate that immediate anxieties tend to cancel out any concern for ecological problems, and hence that the crisis is not conducive to transformative dreams, but to regressive ones. Information on the environmental impact, or carbon footprint, of lifestyles and patterns of consumption shows the reduction in consumption induced by the crisis has shackled large swathes of the population to unsustainable ways of life in a new wave of poverty that is often characterized by high environmental costs. Finally, we discuss the relationship between the post-carbon transition, overshoot and degrowth, examining the cultural features associated with an eventual positive reconstruction of austerity.

The Post-Carbon Transition: Signs of the Future in the Present

A post-carbon society is, by definition, one in which the use of fossil fuels (oil, gas and coal) is substantially lower than present levels, the limit case being a society in which they have been completely replaced by alternative sources of energy. The transition to a post-carbon society (hereinafter referred to as the "post-carbon transition") is thus a process of social change in which the use of fossil fuels falls year-on-year. More precisely, it is a process of social change in which the use of fossil fuels follows a downward trajectory, albeit with discontinuities and temporary interruptions. Without these conditions in place, it would be meaningless to use the term "post-carbon" to refer to a future social state or process of social change that leads to it.

The post-carbon transition is imposed on us by the need to mitigate and adapt to climate change (IPCC 2013; Cook et al. 2013) and the increasing cost and scarcity of oil and natural gas (Campbell and Laherrère 1998; Deffeyes 2003; Hughes 2014; McCarthy 2014; IEA 2014), or by complex combinations of both causes. There are good reasons to believe the transition is inevitable: a course of social change determined by natural conditions, or rather, the limits of the planet.

A plausible explanation is that human activity is causing changes to the planet's climate, with the potential to produce severe, and even disastrous, effects that can only be limited by reducing the emission of greenhouse gases into the atmosphere. Hence, reducing the consumption of fossil fuels becomes inevitable, even if we accept some room for manoeuvre provided by carbon capture techniques or geo-engineering. Furthermore, their use is becoming increasingly expensive as the most accessible, concentrated, efficient and economic sources are exhausted and must be replaced by others that are less accessible, less concentrated, more expensive and, in the worst case, physically impossible to exploit. The combination of these two processes ("climate change" and "peak oil", to use the most common terms) is complex and can manifest in different ways: sometimes they reinforce each other, whereas on other occasions, they go against each other and clash. While they are beyond the scope of this analysis, it should be noted that there are currently a number of discussions on these issues (Kharecha and Hansen 2008; Höök et al. 2010; Rutledge 2011; Murray and King 2012; Campbell 2013; McGlade and Ekins 2015). As the premise of our argument, we shall assume the post-carbon transition is not a speculative conjecture about future events but an inevitable horizon that conditions and determines possible paths of social change. There is nothing strange or unusual about this premise; indeed, it has been a concern of research funded by the European Union for a number of years now (Directorate-General for Research and Innovation, European Commission 2007).

However, even if the transition to a post-carbon society can reasonably be postulated as a determined course of social change, both the possible paths and the resulting social forms are, in principle, much less deterministic: there will be many post-carbon societies, with many paths leading the way. The post-carbon transition goes far beyond changes in technology and production, encompassing wide-reaching social and cultural changes. It is not simply about switching from vehicles powered by a combustion engine to electric cars, or from petrol to hydrogen, or any other energy technology that might arise. The process will imply profound transformations in our lifestyles, patterns of consumption, value systems and forms of urbanization, as well as many other aspects of how our societies are organized, demanding proactive responses from politicians and social movements and agents.

The study of the sociological and anthropological dimensions of the post-carbon transition has been the defining feature of recent research

carried out for the POSTCARBON project, of which this work forms part. One of the research topics has been identifying and analysing "signs of the future in the present", that is the idea that certain phenomena can be interpreted as embryonic precursors of the transition or obstacles that prevent it taking place in a smooth and orderly manner. Here we examine information in three areas: the structural configurations that favour or act as barriers to the implied type of social change; the inclusion or exclusion of notions of the post-carbon society in current visions of the future; and the presence or absence of lifestyles that are compatible with or favourable to the transition. The economic, social and environmental dynamics of the recent past determine macro-structures that condition processes of change, foreshadowing or hampering them, determining favourable conditions for a smooth path or the presence of conflicts. However, the possible futures cannot be deduced from the present alone, and in many cases they must be imagined. In this respect, the visions of social change linked to the transition function as frames of reference that can inspire the design of social action (or else their absence suggests the future will erupt in an unpredictable and chaotic manner). By analysing current lifestyles and patterns of consumption, we can determine their compatibility with a low-carbon society and hence to what extent the transition might be difficult or require profound changes in our values. In this respect, it should be noted that the transition is as much—if not more so—about cultural reconstruction as innovation and technological change. There are a number of other interesting issues, such as the presence of social experiences that can be interpreted as voluntary precursors of the post-carbon future, so-called "real utopias" effected by means of "interstitial actions" (Wright 2010, 2012; Sempere 2014; Sempere and Garcia 2014); however, while this perspective has formed the basis of a number of the case studies undertaken as part of the POSTCARBON project, it will not be considered here.

The approach used to select the data presented below, together with the subsequent analysis, has sought to detect both obstacles and practical catalysts, with opportunities to cultivate and consolidate lifestyles with a moderate environmental impact, in the present, using these as a basis to explore the possibilities of a future post-carbon society. Both these categories, obstacles to change and proactive experiences, assume signs of change are visible at present, albeit in an incipient and uncertain manner. They also imply certain ideas regarding definitions that can be used to understand and interpret these signs. This will require a dialectic between

detectable emerging changes in the present and the normative principles of an alternate culture. Furthermore, it is important that this dialectic is not examined on a purely speculative level but is rooted in specific social contexts that impose limits, biases and specificity. Indeed, if our societies do move towards becoming more sustainable, there will not be just one culture of energy moderation, or "culture of sufficiency" (Garcia 2004: 320–326), but several or many, each determined by the cultural matrices of specific societies and their social and political experiences. The visions of a sustainable post-carbon society only acquire a minimum level of social consistency when filtered through cultural diversity. In this respect, the roots of this analysis in Spanish society, more specifically, in the context of the crisis that began in 2007, mean we do not claim it is universally valid, however in our opinion some of the lessons that can be learnt can probably be applied to other countries.

Macro-Structural Signs and Their Interpretation

As noted previously, one of the objectives of the POSTCARBON project has been to detect signs of the transition to a post-carbon society in the present in order to explore the idea that we can already glimpse at least some features of this transition.

To identify these signs, we have used a simple model that brings together economic, social and environmental factors to explore the macro-structural dimensions of the economic crisis that began in 2007. We have gathered data on population, GDP, unemployment, inequality, cement consumption, the consumption of materials and greenhouse gas emissions for the period 1995–2014, running from the phase of demographic and economic expansion that characterized the Spanish property bubble to the recent phase of contraction. The model was then used to plot Fig. 3.1, from which the following observations can be made:

1. Phenomena, which, by definition, pertain to the transition to a post-carbon society, are present, specifically, a downward trend in the use of fossil fuels and greenhouse gas emissions. This trend must form the basis of any post-carbon transition, regardless of the economic, social and political forms it takes.
2. There are also phenomena associated with degrowth (the reduction of GDP, material throughput and even the population), raising the question of whether the post-carbon transition and degrowth go together.

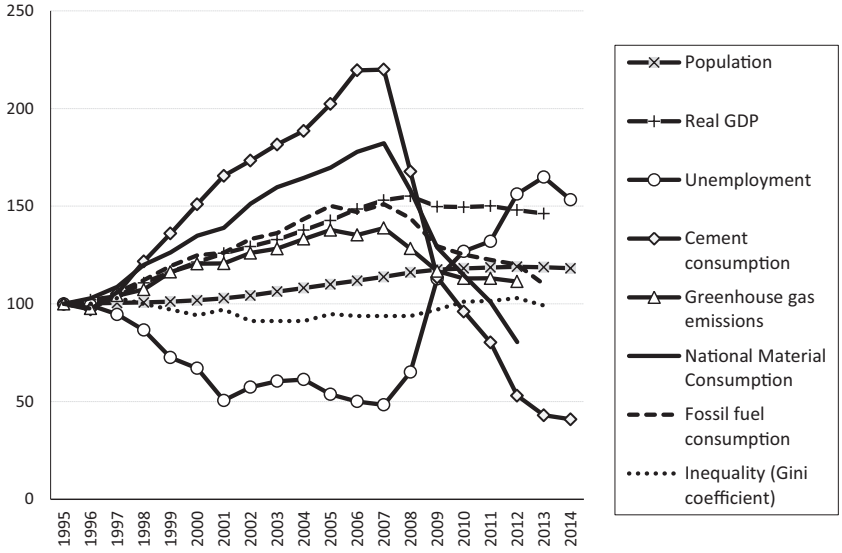

Fig. 3.1 Capitalist growth and degrowth in Spain: Relative trajectories of the economy, society, and the environment 1995–2014 (1995 = 100) (Sources: Eurostat; Spanish National Statistics Institute (INE); Ministry of Industry, Energy and Tourism; Spanish Cement Manufacturers Association (Oficemen), own elaboration)

Are they perhaps the same thing? Does one imply the other? Or is this a contingent and perhaps transient association?

3. Finally, there is data that suggests a severe erosion of social cohesion, most notably the sharp increase in unemployment and rising inequality. Here, the unknown is the conditions—if they exist—under which a post-carbon transition could occur without coinciding with a major social crisis. Are smooth transitions possible? Or must they be accompanied by a social crisis?

To summarize, the data indicates that in Spain, from 2007 to the present, decarbonization (the reduction in carbon dioxide emissions) has coincided with economic stagnation and an acute—but not extreme—social and political crisis, raising the issue of whether this must always be the case.

A comparative analysis with other countries, based on a simplified model with just three indicators (GDP for the economic dynamic, greenhouse gases for the use of fossil fuels, and the Gini coefficient to

measure inequality and hence social cohesion), suggests this is not the case: the coincidence does not always arise, or at least thus far. The results, summarized in Fig. 3.2, offer a number of insights. Firstly, in some countries, a sustained reduction in carbon dioxide emissions appears to be associated with a relatively higher capacity to recover from the economic crisis (Sweden and Germany), while in others (Spain, Italy and Greece) relative decarbonization is closely linked to recession. This suggests there may be certain margins—uncertain and albeit most certainly temporary—for ecological modernization, and that an in-depth exploration of the issue may be instructive. Secondly, there is no regular pattern associating trends in inequality to changes in GDP or carbon dioxide emissions, suggesting that certain measures aiming to promote or maintain social cohesion could be introduced in any economic or ecological context (at least in the absence of extreme scarcity).

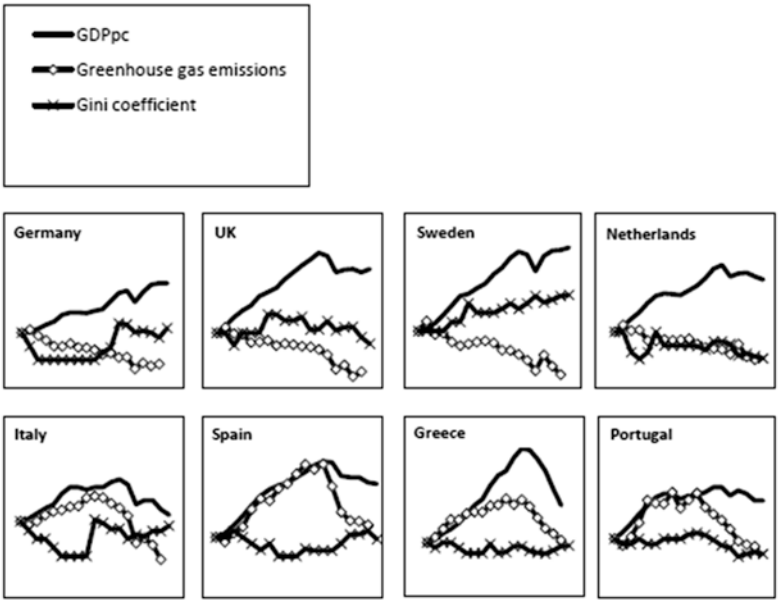

Fig. 3.2 The trajectories of economic output, inequality and carbon emissions in different European societies (1995–2013)

There appears to be no common pattern when it comes to the relationship between the three dimensions under consideration (economy, inequality and environmental pressure). Ecological modernization (understood as the deliberate application of policies designed to reduce greenhouse gas emissions) appears associated with a shorter and smoother recession, and both ecological modernization and a relatively short and shallow recession appear to be associated with higher levels of wealth. The distribution of income appears to follow its own logic in each country, regardless of the other two dimensions (see also Matsaganis and Leventi 2014).

We shall discuss these observations further, together with other issues, such as the relationship between the post-carbon transition and degrowth, in the final section of this chapter. For now, let us note that the most general conclusion to be drawn from our analysis is that the first steps of the post-carbon transition will manifest in socially diverse ways. Furthermore, as is almost always the case in history, the paths of social change will be uncertain, confusing and diverse.

The Unimaginable Transition: How Today's Anxieties Block Visions of a Different Tomorrow

In theory, the costs of the post-carbon transition—or, to put it another way, the transition towards a post-fossilist society—can be attenuated if individuals, social groups and the population as a whole imagine the transition and thus anticipate potential adaptations in some way. Put another way, it should be assumed there is a practical link between present experiences and the images of a future, which, regardless of how close it may seem, is nonetheless not an immediate one. In the 1970s, the Club of Rome was already exploring the possibilities of "anticipatory learning", suggested by the characteristic human ability to foresee the future (albeit with limitations), contrasting this with "learning by shock", which occurs when adaptation to environmental changes takes place without preparation (Botkin et al. 1979).

However, anticipatory learning is complicated by the fact that problems of sustainability and the restrictions imposed by the scarcity of natural resources tend to be less present in the collective conscious during periods of economic crisis. Faced with immediate economic difficulties, the productivist consensus is reinforced and ecologism is relegated to a secondary consideration (or even further into the background).

This phenomenon has been studied by the POSTCARBON project through specific qualitative research using focus groups to explore whether issues related to climate change, the exhaustion of oil and the environment in general would appear spontaneously in participants' visions of the future.[2] The groups began with a prompt by the moderator that made no mention of the issue: "we would like you to talk about what you think life and society will be like in the coming years, 20 to 30 years in the future, whether tomorrow's society will be similar to today's and what the changes will be, what will people's lives be like…" Only after 50 minutes, if the issue had not arisen spontaneously, did the moderator add: "do you think the scarcity of fossil fuels (oil, natural gas and coal) or global warming will require a substantial change in how we live?" The conclusions of this research are summarized below, based on our analysis of the content.

The Post-Carbon Transition is Absent from the Collective Imagination

In none of the eleven focus groups did climate change, the exhaustion of oil or any other aspect of the ecological crisis arise as a focal point of the discussion, not even in the group of activists from alternative social movements. When explicitly prompted, a number of quick and fragmentary comments were made before returning to other issues and in no case did this become the central focus of the discussion group:

> Participant 1: "…within 20 or 30 years we'll definitely have run out of oil, and that's going to be crucial for the operation of the global economy."
>
> Participant 2: "I see two options: either oil is replaced by another non-renewable energy source or we opt for solar energy. In Saudi Arabia, for example, there's a sheik who is already researching, they've already discovered a varnish, or something, made up of solar particles. If this is possible and is developed… part of the world might run on this solar energy, developing it, while another part of the world keeps searching, trying to replace oil with ethanol, or… water. No, water no, because water is already extremely scarce, we're already running out…" [G11].

After just two minutes, the conversation returns to other issues, such as the local currency, and it is striking that at no point does a possible process of social change arise. In this respect, all the signs are that if the current states of collective consciousness in existence in the midst of the recession at the end of 2013 persist, the dynamic of the post-carbon transition will

be more one of shock than anticipation. This conclusion agrees with other recent studies in Spain, which have shown, for example, that the economic crisis has led to stagnation in the consumption of green products (Alonso et al. 2014).

In the Collective Consciousness, the Transition is Primarily a Matter of Technology

A post-carbon society cannot only be defined by technology and politics: it also requires specific forms of social organization and action, together with lifestyles and value systems. We should recall that the introduction of new technologies is not independent of the social context in which this takes place. This was the case with the introduction of heat engines in industrial society (Gras 2007; Malm 2013) and it will also be the case when the supply of the fuel that has powered them begins to decline. In terms of politics, decisions made by governments with respect to the post-carbon transition can only be effective, as is always the case in democratic societies, if they are understood and, to a certain extent, actively supported by the people.

However, not only are the visions of the post-carbon transition present in the social imaginary weak, they are fully immersed in illusions of technological wizardry (Kunstler 2012).

> Moderator: "And what will happen when we run out of oil?"
>
> "As far as I know, and I've looked into this online, a water-powered car has been invented… a water-powered car!"
>
> "That's been around for ages…"
>
> "All that was invented ages ago but it's in nobody's interests."
>
> "No, a sheik got hold of the project and bought it up. He spent millions and millions on it so nobody could bring it to fruition. He destroyed it."
>
> "That's right, it wasn't in his interests."
>
> "It wasn't in his interests."
>
> […]
>
> "And they said there was something that was pure energy, that didn't need fuel. But like you say… It's not in their interests."
>
> "It's not in their interests"
>
> "It's all about money."
>
> "But when the oil runs out… What will we do? I suppose there will be electric cars and things like that." [G3]

The information obtained using qualitative techniques is fully coherent with the results of a statistical survey of the Spanish population as a whole.[3] The vast majority of the Spanish population believes that a considerable reduction in the use of fossil fuels as an energy source will be required in the not too distant future, either to attenuate the effects of climate change or as a result of difficulties in maintaining supplies of oil, gas and coal at current levels. Furthermore, 91.9% believe it is likely or highly probable that this process of reduction will occur within a horizon of two or three decades.

Notwithstanding, the exhaustion of oil is not expected to result in fundamental lifestyle changes, since it is believed that other energy production technologies (particularly renewable ones) will allow the problem to be reduced to a matter of technology. Those who responded that the requirement to significantly reduce the use of fossil fuels is likely or highly probable were asked the circumstances they believed most likely for such a reduction: 23.8% answered that it will result in a severe shortage of energy and an economic crisis, and 76.3% believe existing technology or a new invention will allow replacement by alternative energy sources without any major effects on the economy or people's lives (8.1% nuclear energy; 40.8% renewable energy; 22.7% a combination of nuclear and renewable energy; 4.7% a new invention). Moreover, insofar as the problem is regarded as a technological matter, the solution is left in the hands of those with the power and information: governments and experts.

Hence, the prevalence of this particular breed of technological optimism restricts the issue to a purely technical and economic framework, impeding the creation and development of social initiatives that lead to different forms of social organization and assigning these embryonic forms a marginal status that contributes to limiting their effects.

The ambiguity in the data with respect to the social role of renewable energies is striking: while their contribution to the energy supply remains relatively limited, their contribution to maintaining faith in technological progress is disproportionately large. This may further exacerbate the severity of the social consequences of a naturally imposed post-carbon transition that is not fully perceived until reaching an advanced stage of the process, an outcome that may increase the social, political and economic costs of adaptation.

The Oppressive Weight of the Present Stifles Our Ability to Imagine the Future

The problem outlined above goes much deeper than the fact that people are not thinking about a post-carbon society: in fact, there is no imaginable future at all, nothing beyond people's day-to-day concerns. As an example, consider the following fragment from Group 3, immediately after the prompt inviting the participants to discuss the future:

> "I think Spain… isn't doing well at all, in all truth, young people…"
> "It's not so much whether it's doing well or badly…"
> "Nothing will change until there is someone in government that represents the interests of the people."
> "But that's never going to happen."
> "That's politicians for you. One year it's my turn to steal… and I cover you [sic]. The next, it's your turn and I cover you. And so on..."
> "We're like slaves and we don't do anything."
> "But there has been a sharp increase in unemployment over the last two years. It's running at 26.9% now, unless I'm mistaken… If things keep on like this…"
> "I think the current solution is that everyone should leave Spain and try to live somewhere else. Germany, perhaps…"
> "But then you have the problem of learning another language." [G3]

There is nothing that makes it possible to think of a way out in the short term, not even among activists involved in social movements:

> "I can see tomorrow, in a future that can change from one day to the next, depending on how we conceive it."
> "But a far off future."
> "A far off future, in principle."
> "Extremely far off."
> "Don't expect anything for up to 20 years, perhaps even longer." [G11]

Nothing Will Be Like Before

In the eyes of the social consciousness in Spain at the end of 2013, these restrictions and cuts are not going to be temporary: people take it as a given that it will be necessary to live with less, like they are already doing. Generally speaking, there is no positive view of this fact, which is accepted

with a mixture of resignation and resentment, indignation and the evocation of catastrophic outcomes:

> "I think it's good for our generation, because we're used to what you were saying before. We're used to having it all. You want a mobile phone, here you go. You want… I can buy myself clothes. If I want these shoes, I buy them… All this is helping us to realize we don't need three wardrobes stuffed with clothes. In other words… you can get by with much less … You can get by without the latest phone, or without the latest car. All this is actually serving as a lesson for us."
>
> "Yes a lesson."
>
> "To help us realize we've been living the good life... I want an apartment, I want a car, I want it all…"
>
> "That really annoys me… Because lots of people say… we have lived beyond our means…"
>
> "I'm not saying…"
>
> "I earned my money and I knew my limits. I don't need anyone to tell me. For example, our leaders tell us we have lived beyond our means. No, *you* have lived beyond our means, because *you* are stealing from us. I'm talking about the state... about... them. But it really annoys me when people say 'you bought this phone or you bought an apartment…' You know what? Maybe life was going well for me… But I knew my limits." [G2]
>
> "What's more, we always succumb to the same. Now, for example, our leaders aren't doing anything for anyone. They're not paying for anything. Everything is the same or worse than before. I think we'll get the same ones as before, if not worse." [G7]
>
> "… for a social revolution, for the ruling classes to tremble…" [G8]
>
> "And now, what's coming, there is definitely a war coming, one that will destroy everything". [G9]

Opportunities for a positive reinterpretation of the ecologist slogan "less is more" (Sempere 2009; Riechmann 2004) do not materialize. The only group in which the participants come close is Group 2 (young unemployed or first-time jobseekers, female, aged 25–35, with a university degree).

> "What's interesting about the crisis is that it can help us, as people who have lived just within or beyond our means... it's possible to live with much less. In other words, it's not about complaining. You can complain because you don't have a job but not because you don't have the latest mobile phone…" [G2]

It is perhaps significant that this critical reflection arises among people who are educated to a higher level and have their lives in front of them, and thus need to plan for the future. In principle, these are people with the potential to redefine the situation based on categories that have not been inherited and innovative ideas about how to live and understand the world. However, this idea is extremely scarce and its articulation extremely weak, and as such it cannot be interpreted as a possible symptom of generalizable practical adaptation.

Cuts Lead to Unsustainable Poverty

In Spain, there has been a visible reduction in greenhouse gas emissions since 2007, together with a fall in other indicators for energy consumption and the use of natural resources. This means pressure on the environment has decreased, in a trend that apparently conforms to the requirements of the theory of the post-carbon transition. However, it should be noted that this reduction has fundamentally been the result of a fall in both productive activity and private consumption and not of deliberate policies for ecological modernization or substantial changes in lifestyles and patterns of consumption. The relative lightening of the environmental load has gone hand-in-hand with increasing unemployment, less job security, falling wages and cuts in public spending. The fact that this contraction has coincided with perceptible socio-economic hardships suffered by large segments of the population means the relative improvement in environmental indicators has had extremely limited social visibility and has not been positively valued.

It can be argued that in spite of the fact that social costs have been and continue to be high, events in recent years have nonetheless represented the first steps in the transition to a society that is less dependent on fossil fuels. However, while this may be the case, it is currently impossible to know for sure and a minimum historical perspective will be required to form any solid opinion on the matter.[4] What is perceptible, however, is the presence of major tensions in the process.

The information provided by the Future Perspectives survey (see endnote 3) makes it possible to identify the source of some of these tensions.

The first can be summarized as follows. The crisis and its cuts have created new types of poverty. This has implied a reduction in consumption, which contributes in part to the emission of less carbon into the atmosphere. However, not only do the lifestyles in the expanded spaces of this new form of poverty remain unsustainable, people are even more

constrained and shackled to the reproduction of unsustainable lifestyles. This makes the transition to the post-carbon society narrower, the conditions more rigid and the causes of conflict more intense, bringing us closer to the possibility of a catastrophic interruption. Let us consider this argument in more detail.

The impoverishment of a large part of the Spanish population in recent years is a well-established fact (Servicio de Estudios de la Fundación 1° de Mayo 2014; Núñez 2014; Pitarch Garrido 2014), with a quarter of Spanish households having a monthly income of less than €1,000. In the least worst cases, this manifests in the need to severely curtail spending, whereas in the worst it serves to prolong dependency on the extended family network and aid institutions such as food banks.

In Spanish society, as in other European countries (Lenglart, Lesieur and Pasquier 2010), there is a close positive correlation between monetary income and environmental impact (Table 3.1). Hence, the lifestyle and consumption of the quarter of households with a monthly income

Table 3.1 Income and environmental impact in Spain 2013

Monthly household income (€)	*% of the population*[a]	*% of the survey sample*	*Impact index (ii)*[b]	*Carbon footprint*	*Number of planets*[c]
< 1,000	24.58	23.91	63.06	8.52	2.15
≥ 1,000	75.42	76.09	67.79	13.93	2.62
Total/Overall	100	100	66.66	12.64	2.51

Source: POSTCARBON Project, http://www.uv.es/poscarbo, *Perspectivas de futuro de la sociedad* [Future Perspectives of Society] survey, December 2013

[a]According to data from the National Statistics Institute for 2012, http://www.ine.es [Accessed 4 November 2013]

[b]The impact index (ii) is a quasi-ordinal indicator constructed by assigning numeric values to the survey responses. The values have been estimated based on literature on the environmental impact of specific patterns of consumption and practices. As such, the indicator measures the environmental costs of lifestyles and patterns of consumption. The aggregate value is within the range 26–123:

Low impact: 26–40

Moderate impact: 41–65

High impact: 66–85

Very high impact: 86–123

[c]The carbon footprint and number of planets required to sustainably support the corresponding level of consumption have been established based on the online calculator provided by the Center for Sustainable Economy (http://myfootprint.org/es/visitor_information/) and are provided as better known and more widely available alternatives to the impact index to help the reader better understand the meaning and scope of these values

below €1,000 has a moderate environmental impact, even though the Earth would still need to be twice its current size for this to be sustainable, while monthly incomes above €1,000 are associated with a high environmental impact.

The financial hardships caused by the crisis have resulted in a lifestyle that is substantially the same as the groups whose level of income has seen the least erosion, albeit on a notably lower scale. Cuts result in environmentally unsustainable poverty because mobility costs remain high and are concentrated on the modes of transport with the highest environmental cost. Hence, on average, people in households with a monthly income below €1,000 travel 5,036 km by car, 1,108 km by plane, 1,205 km by bus and 959 km by train every year. Despite these values being much lower than those of the population as a whole, they nonetheless conform to the same model of mobility. A similar situation occurs with food, with diet composition, supply in large commercial structures operating in global markets and the presence of highly processed foods common to all social groups. To summarize, the population remains highly consumerist, despite the fact it is not as wealthy.

In fact, not only do the cuts lead to the increasingly precarious and threatened reproduction of the consumerist model, but they help entrench it by making it harder to avoid. In a significant number of cases, transport costs and the characteristics of accessible jobs increase dependence on cars, making this mode of transport harder to avoid, while in the case of food, more environmentally expensive agro-industrial processes are often associated with lower prices. For victims of the crisis, the choice of alternative models of consumption can become less viable.

Hence, it is not surprising that those who experience the poverty exacerbated by the cuts regard it as wholly negative and not as an opportunity. With a monthly income below €1,000, many services and resources that are largely essential in a society such as Spain, become inaccessible. Moreover, the connection between money and happiness is persistent. The Living Conditions Survey in 2013 shows a positive correlation between overall life satisfaction and income levels, with an average score of 6.2 for those with low incomes and 7.5 for the group with the highest incomes (on a scale of 0–10).[5]

Hence, neither material conditions nor subjective perceptions suggest "less is more" as a generalized effect of the restrictions created by the crisis. However, this does not preclude localized and voluntary experiences of alternative forms of organization that lead to less unsustainable ways

of living (Sempere 2014; Sempere and Garcia 2014). In fact, it is clear that the crisis stimulates the appearance and development of experiments of this nature, described by Wright as "real utopias" effected by means of "interstitial actions" (2010, 2012). Simply put, our concern is that the connection between these alternative approaches and the majority of the population is becoming, in significant ways, increasingly tenuous.

A second interesting result of the survey is that it is possible to identify the sociological profile of a "moderate" group: a segment of the population whose way of life is the most sustainable, with an impact index below 51.4 and a level of consumption below 1.5 planets (note that full sustainability would require not just adjustments to lifestyles and patterns of consumption but profound transformations of production and distribution structures). This subset of the population does not have specific features in terms of age, gender, level of education, place of residence, political opinion or "ecologically recommendable" consumption and practices. Above all, it is distinguished by living "in proximity", without excessive movement, eating in moderation and following a balanced diet. However, rather than the result of a conscious decision, all this would appear to be accidental, or imposed by a below average income.

The distances travelled by members of the moderate group in motor vehicles are less than the adult population as a whole (up to 9 times less by car and 27 times less by plane), and the group eats slightly less (particularly meat) and buys food from local markets and shops. The group also produces less waste and earns 30% less money than the average (Table 3.2).

We have used the term moderate group; however, apart from the fact that the lifestyle of its members does not have a high environmental cost, the group does not appear to have a defined sociological profile. It is a heterogeneous subset of the population in which the moderation of consumption occurs more as a result of objective conditions than as a voluntary decision, making it hard, in principle, to imagine the group as a collective subject. Hence, the emergence of collective projects from within this subset that connect the current lives of its members to the vision of a post-carbon society seems highly unlikely.

Let us also make a third observation. The survey data also suggests that the effects of the most characteristic traits of "environmentalist modernity" (the most superficial behaviours in tune with an "ecologically conscious" lifestyle) are extremely limited when it comes to reducing environmental impact. Hence, people who use energy saving fluorescent light bulbs, regularly buy ecological food, habitually choose biodegradable

Table 3.2 The distinctive features of ecological moderation in Spain 2013

		Moderate group (ii < 51.4) (< 1.5 planets)	*General population (ii = 66.66) (2.51 planets)*
Motorized mobility	km by car/year	1,242.8	11,323.2
	km by bus/year	351.4	1,482.2
	km by train/year	191.2	1,363.2
	km by plane/year	168.8	4,536.5
Food	Diet[a]	2.6	3.28
	Shopping habits[b]	1.88	3
	Quantity[c]	1.3	1.78
Domestic waste	Refuse sacks	1.7	2.3
Habitat	Housing in urban centres	46.51 %	38.04 %
Employment status	Unemployment rate	32.56 %	20.99 %
	% with temporary or one-off contract	27.9 %	16.97 %
Approx. income	€/household/month	1,200	1,750

Source: POSTCARBON Project, http://www.uv.es/poscarbo, *Perspectivas de futuro de la sociedad* [Future Perspectives of Society] survey, December 2013

[a]Values from 1 to 5: 1 vegan diet, 2 vegetarian, 3 omnivorous, 4 carnivorous and 5 basically carnivorous

[b]Values from 1 to 5: 1 municipal markets and cooperatives, 5 restaurants, fast food and ready meals

[c]Values from 1 to 3: 1 one main meal and two snacks a day, 3 three main meals and multiple snacks a day

cleaning products and recycle all the paper they use have an impact index of 61.4 and an ecological footprint of 1.95 planets, making their environmental impact higher than that of the moderate group and only slightly lower than the group with a monthly income below €1,000. Highly conscious and active minorities aside, the effect of "pro-environmentalist" behaviours that have attained some degree of popularity among society is extremely limited.

To summarize, pro-environmentalist opinion and ecological moderation appear to follow different paths. The coincidences that have been detected appear to be one-offs, occurring occasionally and in isolation. If the post-carbon transition continues down the path travelled in recent years, it is foreseeable that we will find a process of social change characterized by severe conflicts, stark contradictions and internal limits, a process that will perhaps ultimately be self-destructive, giving rise to some form of collapse. We would like to close by discussing this idea further.

Post-Carbon, Overshoot, Way Down, Austerity

To bring us to our conclusion, we would like to discuss two perspectives on our analysis. The first is the idea that the need for a post-carbon transition is a specific manifestation of a more general problem related to overshooting the limits of the planet, the way down, degrowth and the risk of collapse. The second is the idea that the particularly convulsive nature that has characterized events since 2007, as dramatically illustrated in Fig. 3.1, is largely a result of the inability of economic growth to continue contributing to well-being. The main conceptual and theoretical references for the first of these perspectives are Catton (2009), Hubbert (1993), Meadows, Randers and Meadows (2004), Odum and Odum (2001), Latouche (2006), Tainter (1995), Diamond (2005) and Duncan (2006). For how to articulate this from a sociological perspective, see Martinez-Iglesias and Garcia (2011) and Garcia (2012). The second perspective essentially follows the path of the bioeconomy and the steady-state economy traced in Georgescu-Roegen (1971), Daly and Cobb (1994), Talberth, Cobb and Slattery (2007), Kubiszewski et al. (2013) and Daly (2014).

The post-carbon transition differs from other processes of social change because it is imposed on us by nature. Its origins do not lie in the emergence of new values, although there is no doubt it will produce substantial modifications to the system of values that has arisen under industrial capitalism. Nor do they lie in technological change, despite the fact there is now a strong demand for technological innovation, particularly in terms of energy, to reduce the negative impacts of using less fossil fuels. Finally, nor do they lie in the economic dynamic, even though there is a growing interest in business opportunities in this area. Its origins lie in the physical impossibility of continuing to live as we do at present, beyond the limits of the planet. Over and above anything else, the post-carbon transition is the result of overshooting these limits.

The term overshoot refers to a system that has expanded until exceeding the carrying capacity of the ecosystem that maintains it (Catton 1980). As such, the concept refers to overshooting the natural limits to growth, the imminence of which is manifest in various processes, most notably global warming and peak oil, both of which are specific instances of a more general overshoot, which must also include (as a minimum) the extinction of animal and plant species, the overloading of renewable land and marine systems, the scarcity of certain minerals, the multiple forms of pollution and the extreme tension already apparent between population growth and

food production (Kolbert 2014; Millennium Ecosystem Assessment 2005; Bardi 2014; Colborn et al. 1996; Gershwin 2013; Pimentel and Pimentel 2007; Smil 2001; Schade and Pimentel 2010; Foley 2011). Although it is extremely difficult to predict which of these will, in the end, be the limiting factor, a number of interesting attempts have been made to answer this question (Rockström et al. 2009; Steffen et al. 2015). However, in some senses, this is a secondary consideration: the limits to the expansion of the number of human beings and their activity on the planet are closely interrelated and do not manifest themselves in isolation, meaning overshoot is a systemic phenomenon (Meadows, Randers and Meadows 2004). In terms of the global ecological footprint, industrial civilization may have reached a state of overshoot quite some time ago. One recent calculation estimates this occurred 40 years ago (WWF 2014), however according to other indicators, humanity has not yet overshot the limits, despite being extremely close to doing so. Yet determining the exact point at which this occurs is by no means the most important issue.

Overshoot is by definition a temporary state: it cannot be stable or last for a long period of time. As we now say, it is unsustainable, and must give rise to a reduction in the magnitudes of the system (e.g. amplitude, activity, integration, differentiation) until they are once again compatible with the carrying capacity of the damaged ecosystem (Meadows 2013). In short, it will bring about a reduction in the scale of the social system with respect to the natural ecosystem that maintains it. We can refer to the process of social change in which this reduction of scale occurs as the "way down", of which the post-carbon transition should be regarded as a part or element.

Hence, the decarbonization—or rather, the reduction in the consumption of fossil fuels and the emission of greenhouse gases—that has occurred in Spain since the start of the crisis in 2007 must not be regarded as a one-off and transient phenomenon, but as a path that will perdure throughout time, albeit with ups and downs. Moreover, in the time frame under analysis, decarbonization has been accompanied by other phenomena (degrowth, economic recession and social crisis), raising the question of whether this association is inherent or accidental.

Figure 3.2 noted that the association between decarbonization, on the one hand, and social cohesion, on the other, appears to be relatively accidental, at least in the initial phases of the process. The trajectories of the way down will exhibit varying degrees of equality, as determined by political and economic decisions, which are at least partly independent of ecological constraints.

In terms of the relationship between decarbonization and degrowth, let us note that degrowth can be defined both as the process in which a system becomes smaller and the result of this process. For this analysis, degrowth is the strictly physical component of the way down that must result from a state of overshoot. Hence, degrowth is not a moral, political or aesthetic option for individuals to choose based on their ideological preferences; it is simply part of what happens when a system overshoots its limits. In the words of Daly, degrowth "arises from the recognition that the present scale of the economy is too large to be maintained in a steady-state", adding that this "is almost certainly true" (2014: 234). In the current crisis facing Spain, decarbonization has been associated with some features of degrowth, namely the stagnation and even reduction in the population, economic recession and a fall in the national consumption of materials (see Fig. 3.1). The data on decarbonization points in the same direction and, leaving to one side the matter of technological innovation, which at any rate is currently unpredictable, it seems unlikely the post-carbon transition will not lead to degrowth on a physical scale in one way or another.

(As an aside, it is worth noting that the concept of degrowth suggested in the paragraph above does not coincide exactly with that used by the majority of the movement's adherents in Spain and France. For many, degrowth is a voluntary choice, essentially a political decision that aims to increase people's well-being and is inherently anti-capitalist, ideas often expressed by the phrase: "their recession is not our degrowth". For the purposes of our analysis, however, degrowth is an involuntary effect of the overshoot, which may manifest in benign or malignant ways and is relatively independent of the economic and political system. In our opinion, it would be better to accept the possibility of different types of degrowth, using an appropriate qualifier, such as convivial, sustainable or benign, to identify the most desirable. Furthermore, we also believe it is important to point out that since 2007, Spain has witnessed a particular form of degrowth that has shown, at least temporarily, that it is not incompatible with capitalism, however—and this is a point on which we agree with activists—the combination of the two bears all the hallmarks of a disastrous partnership.)

This leaves the question of whether the post-carbon transition must necessarily imply economic recession, as has been the case since 2007. Given the historically close relationship between economic growth and energy consumption (Krausmann et al. 2009), given that their eventual decoupling has limits that cannot be overcome (Tverberg 2015), and

given the absence of similarly abundant, concentrated, versatile and economic alternatives to fossil fuels at present (Hall and Day 2009; McCluney 2005), in principle, the answer must be affirmative: the post-carbon transition and economic growth are largely incompatible. However, how we conceive this incompatibility depends on our perceptions of the contribution made by GDP growth to well-being, which leads to the second of the perspectives mentioned at the start of this section.

In our opinion, the particularly convulsive nature of the crisis that began in 2007 and the acute imbalances of the preceding period of expansion dating back to 1995 show that, in terms of its contribution to well-being, GDP growth has reached its limits. As Daly (2014) notes, growth has now become uneconomic. Calculations of the Genuine Progress Indicator for the wealthiest countries show the social and environmental costs of increasing GDP have outstripped the associated benefits for quite some time, with the concomitant loss in net well-being (Talberth et al. 2007). It has been calculated that, in terms of the global economy, GDP growth and increasing well-being exhibit a strong correlation until $7,000 per capita, tending to stagnate above this level (Kubiszewski et al. 2013). Another indicator, the Happy Planet Index, shows that the greatest balance between life satisfaction and environmental costs is not found in the wealthiest or poorest countries (NEF 2012). These new indicators, which have been devised by ecological economists, attempt to put into practice the philosophical foundations laid by Illich (2004), who, quite some time ago, argued that development tends to reach a point at which it becomes counter-productive.

Generally speaking, this should come as no surprise. We experience well-being when we feel our needs are satisfied, and there are three spheres of satisfaction. The first is the economic: goods and services produced and distributed by the market or the state (e.g. food, clothes, furniture, education received at schools and medical care provided in hospitals). The second is non-mercantile, non-bureaucratized relationships that provide us with care, love, identity and social recognition. The third is the useful functions of nature, such as the air we breathe, the water we drink and sunlight, which are not—and cannot—be produced. Viewed thus, development is precisely the growth of the economic sphere at the expense of the others, since it only results in well-being when economic goods and services are scarce and the contributions from the other two spheres are in relative abundance, ceasing to do so when this is no longer the case. Hence, the fixation on GDP growth leads to increasingly short-lived,

imbalanced and environmentally destructive phases of expansion, accompanied by increasingly convulsive, deep and prolonged episodes of contraction. The obsession with growth demands an exhausting effort to, at best, preserve the status quo.

The connection between an imminent way down and the exhaustion of the positive contributions of economic growth is essential to understanding the conditions under which the post-carbon transition can take place.

The three empirical analyses presented in this paper show how the crisis has created considerable difficulties to a smooth transition. The first steps to decarbonization have been accompanied by economic stagnation, increased inequality and considerable political tensions. A significant part of the population, almost certainly the majority, is unable to conceive of a different future, their imagination stymied by the difficulties of a present characterized by unemployment, insecurity and social cuts. Furthermore, even though the loss of purchasing power reduces the environmental impact of consumption, it results in a model of production and distribution that is essentially unsustainable.

In theory, the way down that will form the context of the post-carbon transition may come in one of two forms: a sudden and catastrophic collapse that takes the form of an abrupt and intense simplification that may even give rise to an uninterrupted spiral of deterioration and conflict that endangers the continuity of civilized life; or a consciously assumed, collectively led and politically controlled reorganization that results in a more modest, less globalized and less accelerated society than at present, albeit one that remains compatible with a certain level of material well-being and complex, democratic political structures (Diamond 2005; Heinberg 2004, 2011). In practice, however, the descent will follow geographically and socially diverse paths between these extremes.

It is impossible to make predictions in this respect. By studying the present, we can glimpse the features of a context that favours a sudden collapse in the midst of repeatedly frustrated illusions of "recoveries". In principle, this scenario would appear in no way favourable to a conscious and controlled change, and much less to a prosperous way down or happy degrowth. The belief that the solution to all our social problems begins with recovering strong GDP growth is the only point on which all the current economic and political actors in Europe, from Syriza to the Troika, appear to coincide, a consensus which anchors politics to a space that abounds in risk.

Indeed, recent years have seen the emergence of a consensus we believe to be extremely deceiving, one in which austerity is viewed as bad and

can be rejected, while growth is good and desirable. It is a consensus that identifies austerity with pay cuts and the loss of jobs and social rights, instead of renouncing the superfluous in order to sustain and guarantee the necessary, a consensus which, against all the evidence of the last two or three decades, views growth as the only solution to unemployment, precariousness and the impoverishment of workers. This consensus, in its own right, constitutes a powerful obstacle to a smooth post-carbon transition that is able to avoid, if possible, a catastrophic collapse.

Given industrial society is now in, or is extremely close to, a state of overshoot, given that this inevitably implies the advent of a historical era that will be defined by the way down, and given that this way down implies degrowing to a level determined by the carrying capacity of the planet, the collective and positive reconstruction of austerity is much more important than ad nauseam repetitions of a magical faith in unlimited growth on a finite planet.

But just what is a "positive reconstruction of austerity"? It is an idea that is open to multiple interpretations and is not subject to a single model, meaning it would be of limited use to give a categorical answer. However, in our opinion and drawing on existing ideas, we believe that for a path of genuine progress that results in a smooth way down, it will be necessary to reflect on at least three issues:

1. A reform of the system for the production and distribution of goods and services that deglobalizes and decelerates (smaller, slower, more local) to levels compatible with the carrying capacity of the Earth. Lifestyle changes, regardless of whether they are voluntary, are not sufficient on their own. Under the current system of production, even an ecologically conscious austerity would be unsustainable.
2. A transition towards lifestyles based more on spatial proximity between the different spheres of life and the adoption of more balanced diets in terms of composition, quantity and origin, as well as management that is more conducive to the sustainability of existing housing stock and the social construction of convivial institutions.
3. The definition and application of more egalitarian rules for the distribution of wealth and labour in an attempt to prevent the combination of a breakdown of social cohesion and the frustration of economic expectations leading to large-scale outbreaks of unrest and social disorganization.

Essentially, this is the equation that must be resolved by any proposals for a benign form of austerity based on the idea of "less is more", that is, of course, if such a project is ultimately possible.

Notes

1. This work was supported by the Spanish National R&D Programme of the Ministry of Science and Innovation, under grant number CSO2011-24275, associated with the POSTCARBON research project (*Transitions Towards a Post-Carbon Society: Redistributive Impacts and Everyday Life in a Context of Non-Fossil Energies and Climate Change*).
2. The geographic scope of the study was the Autonomous Community of Valencia, a Spanish region with a population of over four and a half-million. The fieldwork took place between 18 September and 29 October 2013 in four different cities (Valencia, Alicante, Castellón and Gandía).

   The groups were designed to represent a broad section of the population, with the specific presence of social categories particularly affected by or sensitive to the economic crisis. The profiles were as follows:

   Group 1: Students, male and female, aged under 24.
   Group 2: Young unemployed or first-time jobseekers, aged 25–35, female, with a university degree.
   Group 3: Young unemployed or first-time jobseekers, aged 16–25, male, basic level of education.
   Group 4: Retired people and pensioners, male, diverse socio-professional backgrounds.
   Group 5: Retired people, pensioners and stay-at-home mothers: aged 50 and above, diverse socio-professional backgrounds (where applicable).
   Group 6: Self-employed or small-business owners, aged 35–55, male and female, various sectors.
   Group 7: Private-sector workers, aged 30–45, male and female, various sectors.
   Group 8: Civil servants and public-sector workers, aged 30–45, male and female, various sectors.
   Group 9: Immigrants, low-skilled industry or services jobs, aged 30–60, male and female.
   Group 10: Unemployed with previous work experience in the construction industry or property services, male and female, aged 30 and above, various levels of education.
   Group 11: Grass-roots activists in recently formed social movements (e.g. the social and solidarity economy, Spain's 15-M or "indignados" anti-

austerity movement, neo-rural, barter, Attac), male and female, various age groups.

3. The *Perspectivas de futuro de la sociedad* [Future Perspectives of Society] survey was carried out between 1 and 12 December 2013. An online questionnaire was sent to a sample of 1,200 people, representative of the Spanish population aged 18 or over, with fixed quotas for age groups, gender and monthly household incomes, based on data from the National Statistics Institute in November 2013. It provides information on the social perception of the potential scarcity of oil and gas in the near future and the possible social effects, as well as information on the environmental impact associated with different levels of income and different lifestyles and patterns of consumption.
4. In Spain, the level of dependency on fossil fuels (the percentage of total primary energy consumption that corresponds to coal, oil and natural gas) has fallen from 83.58% in 2007 to 73.93% in 2013. A cursory glance at this statistic might give the impression of a significant push towards structural decarbonization; however, a more careful analysis raises serious doubts. The stagnation of production and the contraction of consumption have resulted in a substantial fall in primary energy consumption (from 146,779 thousand tonnes of oil equivalent in 2007 to 121,119 in 2013). This reduction primarily corresponds to the consumption of fossil fuels, which, in transport and other sectors, is extremely sensitive to the economic cycle (MITYC 2008; MINETUR 2014). However, in terms of alternative energies, the structural capacities appear much the same, with the exception—questionable on account of its trajectory and long-term viability—of the use of biomass.
5. http://www.ine.es/prensa/np850.pdf

References

Alonso, L. E., Fernández Rodríguez, C. J., & Ibáñez Rojo, R. (2014). Crisis y nuevos patrones de consumo: discursos sociales acerca del consumo ecológico en el ámbito de las grandes ciudades españolas. *EMPIRIA- Revista de Metodología de Ciencias Sociales, 29,* 13–38. doi/empiria.29.2014.12939.

Bardi, U. (2014). *Extracted: How the quest for mineral wealth is plundering the planet*. White River Junction: Chelsea Green.

Botkin, J. W., Elmandjra, M., & Malitza, M. (1979). *No limits to learning: Bridging the human gap. A report to the club of Rome*. Oxford: Pergamon.

Campbell, C. J. (2013). *Campbell's atlas of oil and gas depletion*. New York: Springer.

Campbell, C. J. & Laherrère, J. (1998). The end of cheap oil. *Scientific American*, 278(3-March), 78–83.

Catton, W. R. (1980). *Overshoot: The ecological basis of revolutionary change*. Urbana: University of Illinois Press.

Catton, W. R. (2009). *Bottleneck: Humanity's impending impasse*. Bloomington: Xlibris.

Colborn, T., Dumanoski, D., & Myers, J. P. (1996). *Our stolen future: Are we threatening our fertility, intelligence and survival?—A scientific detective story*. New York: Dutton.

Cook, J., et al. (2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental Research Letters, 8*, 024024 (7pp). doi:10.1088/1748-9326/8/2/024024.

Daly, H. E. (2014). *From uneconomic growth to a steady-state economy*. Cheltenham: Edward Elgar.

Daly, H. E., & Cobb, J. B. (1994). *For the common good: Redirecting the economy toward community, the environment, and a sustainable future*. Boston: Beacon Press.

Deffeyes, K. (2003). *Hubbert's peak: The impending world oil shortage*. Princeton: Princeton University Press.

Diamond, J. (2005). *Collapse: How societies choose to fail or survive*. London: Allen Lane.

Directorate-General for Research and Innovation, European Commission. (2007). *Towards a "post-carbon society": European research on economic incentives and social behaviour*. Luxembourg: Office for Official Publications of the European Communities.

Duncan, R. C. (2006). The Olduvai theory: Energy, population, and industrial civilization. *The Social Contract, 16*(2). http://www.hubbertpeak.com/duncan/OlduvaiTheorySocialContract.pdf

Foley, J. A. (2011). Can we feed the world and sustain the planet? *Scientific American*, 305(November), 60–65.

Garcia, E. (2004). *Medio ambiente y sociedad: La civilización industrial y los límites del planeta*. Madrid: Alianza.

Garcia, E. (2012). Degrowth, the past, the future, and the human nature. *Futures, 44*, 546–552.

Georgescu-Roegen, N. (1971). *The entropy law and the economic process*. Cambridge, MA: Harvard University Press.

Gershwin, L. A. (2013). *Stung! On jellyfish blooms and the future of the ocean*. Chicago: University of Chicago Press.

Gras, A. (2007). *Le choix du feu: Aux origines de la crise climatique*. Paris: Fayard.

Hall, C. A. S., & Day, J. W. (2009). Revisiting the limits to growth after peak oil. *American Scientist, 97*(May–June), 230–237.

Heinberg, R. (2004). *Powerdown: Options and actions for a post-carbon world*. Gabriola Island, Canada: New Society.

Heinberg, R. (2011). *The end of growth: Adapting to our new economic reality*. Gabriola Island, Canada: New Society.

Höök, M., Sivertsson, A., & Aleklett, K. (2010). Validity of the fossil fuel production outlooks in the IPCC emission scenarios. *Natural Resources Research, 19*(2), 63–81.

Hubbert, M. K. (1993). Exponential growth as a transient phenomenon in human history. In H. E. Daly & K. N. Townsend (Eds.), *Valuing the earth: Economics, ecology, ethics* (pp. 113–126). Cambridge, MA: The MIT Press.

Hughes, J. D. (2014). *Drilling deeper*. Santa Rosa: Post-Carbon Institute.

IEA. (2014). *World energy outlook 2014*. Paris: International Energy Agency.

Illich, I. (2004). *Oeuvres completes* (Vol. 1). Paris: Fayard.

IPCC. (2013). *Climate change 2013: The physical science basis. Contribution of working group I to the fifth assessment report of the intergovernmental panel on climate change*. Cambridge: Cambridge University Press.

Kharecha, P. A., & Hansen, J. E. (2008). Implications of 'peak oil' for atmospheric CO_2 and climate. *Global Biogeochemical Cycles, 22*(3), GB3012. doi:10.1029/2007GB003142.

Kolbert, E. (2014). *The sixth extinction: An unnatural history*. New York: Henry Holt and Co.

Krausmann, F., Gingrich, S., Eisenmenger, N., Erb, K. H., Haberl, H., & Fischer-Kowalski, M. (2009). Growth in global materials use, GDP and population during the 20th century. *Ecological Economics, 68*(10), 2696–2705.

Kubiszewski, I., Costanza, R., Franco, C., Lawn, P., Talberth, J., Jackson, T., et al. (2013). Beyond GDP: Measuring and achieving global genuine progress. *Ecological Economics, 93*, 57–68.

Kunstler, J. H. (2012). *Too much magic: Wishful thinking, technology, and the fate of the nation*. New York: Atlantic Monthly Press.

Latouche, S. (2006). *Le pari de la décroissance*. Paris: Fayard.

Lenglart, F., Lesieur, C., & Pasquier, J. L. (2010). Les émissions de CO_2 du circuit économique en France. In Collectif, *L'economie française: Comptes et dossiers*. Paris: INSEE.

Malm, A. (2013). The origins of fossil capital: From water to steam in the British cotton industry. *Historical Materialism, 21*(1), 15–68.

Martinez-Iglesias, M., & Garcia, E. (2011). La décroissance: Le changement social au-delà des limites de la planète. In Y.-M. Abraham, L. Marion, & H. Philippe (Eds.), *Décroissance versus développement durable: Débats pour la suite du monde* (pp. 187–203). Montréal: Écosociété.

Matsaganis, M., & Leventi, C. (2014). The distributional impact of austerity and the recession in southern Europe. *South European Society and Politics, 19*(3), 393–412. doi:10.1080/13608746.2014.947700.

McCarthy, S. (2014). *Plunging crude paving way to oil shortages, price spikes: IEA*. Ottawa, The Globe and Mail, http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/plunging-crude-paving-way-to-oil-shortages-price-spikes-iea/article21542721/. Accessed 11 November 2014.

McCluney, R. (2005). Renewable energy limits. In A. McKillop & S. Newman (Eds.), *The final energy crisis* (pp. 153–176). London: Pluto.

McGlade, C. & Ekins, P. (2015). The geographical distribution of fossil fuels unused when limiting global warming to 2°C. *Nature, 517*, 187–190 (8 January). doi:10.1038/nature14016.

Meadows, D. (2013). Conclusion, il est trop tard pour le développement durable. In A. Sinaï (Ed.), *Penser la décroissance: Politiques de l'Anthropocène* (pp. 195–210). Paris: Presses de Sciences Po.

Meadows, D., Randers, J., & Meadows, D. (2004). *Limits to growth: The 30-year update*. White River Junction: Chelsea Green.

Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Current state and trends*. Washington: Island Press.

MINETUR (Ministerio de Industria, Energía y Turismo). (2014). *La energía en España 2013*. Madrid: CPMINETUR.

MITYC (Ministerio de Industria, Turismo y Comercio). (2008). *La energía en España 2007*. Madrid: CPMITYC.

Murray, J. & King, D. (2012). Oil's tipping point has passed. *Nature, 481*, 433–435 (26 January).

New Economics Foundation. (2012). *The happy planet index: 2012 report- A global index of sustainable well-being*. London: NEF. http://www.happyplanetindex.org/

Nuñez, F. (2014). El 34% de los trabajadores españoles gana menos de 645 euros mensuales. El Mundo, Nov 21, http://www.elmundo.es/economia/2014/11/21/546e5c3dca4741a15b8b457d.html

Odum, H. T., & Odum, E. C. (2001). *A prosperous way-down: Principles and policies*. Boulder: University Press of Colorado.

Pimentel, D., & Pimentel, M. (2007). *Food, energy, and society*. London: CRC Press.

Pitarch Garrido, M. D. (2014). Desigualdades regionales, pobreza y vulnerabilidad social en España durante la crisis (2007–2013). In J. M. Albertos Puebla & J. L. Sánchez Hernández (Eds.), *Geografía de la crisis económica en España* (pp. 201–230). Valencia: Publicacions de la Universitat de València.

Riechmann, J. (2004). *Gente que no quiere viajar a Marte: Ensayos sobre ecología, ética y autolimitación*. Madrid: Libros de la Catarata.

Rockström, J. et al. (2009). Planetary boundaries: Exploring the safe operating space for humanity. *Ecology and Society, 14*(2), 32. http://www.ecologyandsociety.org/vol14/iss2/art32/

Rutledge, D. (2011). Estimating long-term world coal production with logit and probit transforms. *International Journal of Coal Geology, 85*, 23–33.
Schade, C., & Pimentel, D. (2010). Population crash: prospects for famine in the twenty-first century. *Environment, Development and Sustainability, 12*, 245–262.
Sempere, J. (2009). *Mejor con menos: Necesidades, explosión consumista y crisis ecológica*. Barcelona: Crítica.
Sempere, J. (2014). Papel y límites de la acción intersticial en las transiciones post-carbono. *Papeles de relaciones ecosociales y cambio global, 127*, 91–106.
Sempere, J., & Garcia, E. (2014). ¿Qué papel pueden tener las cooperativas en una transición postcarbono? Reflexiones desde el cooperativismo en Cataluña. *Revista de Economía Crítica, 18*, 31–47.
Servicio de Estudios de la Fundación 1° de Mayo. (2014). *Pobreza y trabajadores pobres en España-Informe 2014*. Madrid: Fundación 1° de Mayo.
Smil, V. (2001). *Feeding the world: A challenge for the twenty-first century*. Cambridge, MA: The MIT Press.
Steffen, W., et al. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science, 347*, 1259855. doi:10.1126/science.1259855.
Tainter, J. (1995). *The collapse of complex societies*. Cambridge: Cambridge University Press.
Talberth, J., Cobb, C., & N. Slattery. (2007). *The genuine progress indicator 2006: A tool for sustainable development*. Oakland: Redefining Progress. www.rprogress.org
Tverberg, G. (2015). Charts showing the long-term GDP-energy tie (Part 2- A New Theory of Energy and the Economy). http://ourfiniteworld.com/2015/02/05/charts-showing-the-long-term-gdp-energy-tie-part-2-a-new-theory-of-energy-and-the-economy/. Accessed 25 February 2015.
Wright, E. O. (2010). *Envisioning real utopias*. London: Verso.
Wright, E. O. (2012). Transforming capitalism through real utopias. *American Sociological Review*, 1–25. doi:10.1177/0003122412468882.
WWF. (2014). *Living planet report 2014: Species and spaces, people and places*. Gland: WWF International.

CHAPTER 4

The Degrowth Imperative: Reducing Energy and Resource Consumption as an Essential Component in Achieving Carbon Budget Targets

John Wiseman & Samuel Alexander

This paper provides a critical overview of rapidly evolving debates about the necessity and desirability of including planned and equitable "degrowth" as an important component in global decarbonization strategies. In doing so the paper highlights and explores the tension between two apparently paradoxical propositions about the relationship between climate change solutions and economic growth.

The first proposition, as Lord Stern has recently reiterated in launching *The New Climate Economy Report* (see Global Commission on the Economy and Climate 2014), is this: "Reducing emissions is not only compatible with economic growth and development, if done well it can actually generate better growth than the old high-carbon model" (see Harvey 2014).

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The second proposition, informed by the inconvenient truth of carbon budget mathematics, is that decarbonization at the speed and scale required to keep global warming below 2 degrees will also require a systematic, planned and equitable reduction in the consumption of energy and resources. Tyndall Centre climate change researchers, Kevin Anderson and Alice Bows, summarize this argument in the following way: "For a reasonable probability of avoiding the 2°C characterisation of dangerous climate change the wealthier nations need, temporarily, to adopt a degrowth strategy" (see Anderson 2013).

This chapter, therefore, begins with an assessment of whether continued economic growth, in terms of GDP, is consistent with the necessary speed and scale of decarbonization which is called for by carbon budget analyses. Those who argue that it is believe growth and a safe climate are compatible, provided there is a swift implementation of renewable energy, energy efficiency and low-carbon land-use strategies, complemented by other policies, such as putting a price on carbon. The contrasting and more radical position, as Anderson and Bows argue, is that keeping to a fair share of the carbon budget now requires wealthy nations to implement those low-carbon policies *but also* undertake deliberate degrowth strategies of planned economic contraction (see Latouche 2009; Kallis 2011; Alexander 2012a).

Not surprisingly, this latter conclusion—that a period of planned degrowth in consumption and production may be required to stay within carbon budget targets—has triggered strong debate (see e.g. Victor 2012; Hopkins and Miller 2012; Grantham Institute for Climate Change 2013; Global Commission on the Economy and Climate 2014). The second section of our paper therefore addresses five "frequently asked questions" about the importance—and the challenges—of inserting alternative economic paradigms, such as degrowth, into mainstream conversations about climate change solutions.

Carbon Budget Targets: Implications for Economic Growth Goals and Paradigms

Recent analysis of the global resource depletion trends, first quantified 40 years ago in *Limits to Growth* (Meadows et al. 2004), combined with more recent work on the "planetary boundaries" within which humanity can thrive (Rockstrom et al. 2009), continues to indicate that business-as-usual consumption trends are driving significant risks of global

economic collapse in the second half of this century, or earlier (Turner 2012; Ehrlich and Ehrlich 2013). More specifically, as the probability of catastrophic climate change continues to grow (Potsdam Institute 2012; Christoff 2013), analysis of global carbon budget trends and targets provides grounds for thinking that carefully planned, equitable reductions in the global consumption of energy and resources may be required to meet the climate challenge. The controversial question is whether dealing with these crises adequately, and reducing energy demands sufficiently, is consistent with the growth paradigm that currently structures and informs macro-economic thinking around the world (Purdey 2010; Rezai, Taylor and Mechler 2013).

The concept of a "carbon budget" (Le Quere et al. 2014; Committee on Climate Change 2013; Carbon Tracker 2011; Messner et al. 2010) refers to the total amount of carbon emissions that can be released into the atmosphere in order to retain a reasonable chance of avoiding "dangerous" climate change (Mann 2009; Anderson and Bows 2011; Anderson 2012). While there are, as noted below, a range of views about the global warming "guard rail" consistent with avoiding dangerous climate change, current IPCC (2013, 2014) carbon budget calculations are based on the goal of keeping global temperature levels below a 2°C temperature rise above pre-industrial levels (see also Meinhausen et al. 2009; Macintosh 2010).

The 2013 IPCC 5th Assessment Report concluded that, to achieve a greater than 66% chance of limiting warming to 2°C, a total of approximately 1,000 gigatons of carbon dioxide can be emitted in the period following the beginning of the industrial revolution (IPCC 2013: 27–28). As of 2011, approximately 515 gigatons had already been emitted. According to this analysis, continuation of business-as-usual emission rates would see the global carbon budget run out by around 2045. Increasing the probability of success to 80% or higher would mean the carbon budget would be consumed even sooner (see e.g. Carbon Tracker 2011; Carbon Tracker and Grantham Institute 2013). Delaying the date at which global emissions begin to be reduced would lead logically to the requirement for more rapid reductions in later years. Conversely, an earlier date at which more rapid emissions reductions begin would allow a more gradual path to overall emissions reductions.

A growing array of decarbonisation roadmaps, such as the UN Deep Decarbonization Pathways Project (SDSN and IDDRI 2014) and *The New Climate Economy Report* (Global Commission on the Economy and

Climate 2014), demonstrate widespread agreement about the overall suite of technological and market initiatives needed to drive swift emissions reductions (for a review, see Wiseman, Edwards and Luckins 2013). The policy levers available to achieve these goals are now widely understood.

1. Raising resource efficiency through direct government regulatory and legislative intervention; the replacement of subsidies to fossil fuel industries with incentives strengthening demand for renewable energy, energy efficiency, low emissions agriculture and carbon sequestration; and a robust price on carbon;
2. Stimulating and driving a diverse mix of societal and technological innovations; and
3. Mobilizing the infrastructure investment needed to drive the transition to a just, equitable low-carbon economy.

Swift implementation of many of the strategic priorities outlined in plans like the Deep Decarbonization Pathways and *The New Climate Economy Report* will clearly form an essential basis for any comprehensive, equitable global decarbonization strategy.

However, the increasingly large elephant in the room is that, as *The New Climate Economy Report* itself notes, there is still a large gap between the decarbonization outcomes likely to result from these strategies and the actions needed to have a real chance of keeping global warming below 2 degrees. Here, for example, is what *The New Climate Economy Report* (Global Commission on the Economy and Climate 2014: 10) says about the alignment between actions and targets.

> *Implementation of the policies and investments proposed in this report could deliver at least half of the reductions in emissions needed by 2030* to lower the risk of dangerous climate change. With strong and broad implementation, rapid learning and sharing of best practice this number could potentially rise to 90%. *Further action would also be required*. Some of this, such as the development of carbon capture and storage technologies will have net costs to be borne solely for the purpose of reducing climate risk. *Beyond 2040 net global emission will need to fall further* towards near zero or below in the second half of the century [italics added; bold emphasis removed].

A number of questions immediately arise: How can the widening gap between proposed actions and required emissions reductions be closed? To what extent is it wise or prudent to build long-term climate solutions

that are so reliant on prohibitively expensive and fundamentally unproven technologies such as carbon capture and storage (CCS)? And how can the formidable barriers standing in the way of rapid, "strong and broad implementation" be overcome? (see Rickards, Wiseman, Kashima 2014).

The case for including planned and equitable degrowth in a comprehensive suite of decarbonization strategies has been most compellingly presented through the work of Kevin Anderson and Alice Bows in their January 2011 paper in the journal *Philosophical Transactions of the Royal Society*, "Beyond Dangerous Climate Change: Emissions Scenarios for a New World". Anderson and Bows take as their starting point the 2009 Copenhagen Accord commitment to "hold the increase in global temperature below 2 degrees Celsius and take action to meet this objective consistent with science and on the basis of equity". They then challenge us to carefully consider the implications of the following scenarios and assumptions on climate change and economic growth expectations (see also Anderson 2013; Anderson and Bows 2008a, b, 2012).

1. If our aim is to achieve decarbonization targets consistent with a 50% probability of keeping global warming below 2 degrees.
2. And we work on the (highly optimistic) assumption that the "least developed economies" peak emissions by 2025 and then reduce their emissions by 7% per year.
3. It then follows that developed economies will need to reduce emissions by 8–10% p.a. until zero emissions are approached or attained.
4. However, mainstream economic analyses (e.g. Stern 2006) consistently argue that emissions reductions of more than 3% or 4% p.a. are incompatible with economic growth.
5. It is therefore likely that developed economies will need to implement temporary policies of degrowth in consumption and production if there is to be a 50% probability of keeping global warming below 2 degrees.

While there are many variations in the precise way this scenario might unfold (depending, for example, on assumptions about the timing of peak emissions, probabilities of success, and the equity principles used to allocate national responsibilities), Anderson and Bows's core argument about the need to include degrowth in the debate about decarbonization options demands serious consideration. "We cannot get off the emissions curve fast enough through technology alone", they argue. "We have to change what it is we consume. Not just what we consume but the rates and

levels of our consumption" (see Anderson and Wiseman 2012: 4). This understanding of degrowth is consistent with the definition employed by Schneider et al. (2010: 512), who describe degrowth as "an equitable downscaling of production and consumption that increases human well-being and enhances ecological conditions".

Two points of clarification are immediately called for here. First, we need to carefully distinguish the concept of *planned* reductions in consumption and production (i.e. "degrowth") from *unplanned* economic contraction (i.e. "recession"). This distinction highlights the difference between a future in which rapid reductions in energy and resource demands are achieved through a deliberative, equitable process as opposed to an alternative future in which consumption crashes as a result of *unplanned* economic collapse. Peter Victor (2008) uses the language of moving beyond growth either by "design or disaster", and this language can be used to highlight the important distinction between degrowth, on the one hand, and recession/depression/collapse, on the other.

Secondly, the transition to a zero-carbon, degrowth economy is likely to require expansion in some sectors (such as renewable energy) as well as accelerated "degrowth" in other sectors (such as aviation, fashion, luxury goods, etc.). As argued below, degrowth in the consumption of energy and resources might also be consistent with "growth" in health and well-being or in the time available to care for children and the elderly (see generally Odum and Odum 2001; Jackson 2009; Bilancini and D'Alessandro 2012; Alexander 2012b; Diffenbaugh 2013; Kubiszewski et al. 2013). It is also assumed that there may need to be "growth" of some form in the Global South in order to attain a dignified quality of life for all, so calls for degrowth should be understood to be directed primarily at the wealthy and most developed nations. At the same time, it is critical to emphasize that any adequate response to climate change will require the Global South to avoid the high-carbon development path which would also burst the carbon budget by locking poorer nations into decades of high-carbon living.

Decarbonization and Degrowth: Frequently Asked Questions and Key Debates

The argument that downscaling of production and consumption should be a core component in the implementation of comprehensive decarbonization strategies often triggers strong reactions—such as Nobel Laureate Paul Krugman's (2014) recent *New York Times* critique: "The idea

that economic growth and climate action are incompatible may sound hardheaded and realistic, but it's actually a fuzzy-minded misconception." The following reflections are therefore designed to respond to five of the most common criticisms of the argument that climate science requires careful consideration of the case for degrowth.

Are the Global Warming and Carbon Budget Targets Underpinning the Case for Planned Degrowth Overstated or Understated?

One of the most compelling features of the case for degrowth is the cautious and conservative assumptions about decarbonization targets underpinning scenarios and propositions such as those outlined by Anderson and Bows (2011).

The data on which their argument is constructed was originally published in 2011. Since then the emissions reduction challenge has in fact become even tougher with the 2014 *Global Carbon Budget* update (Le Quere et al. 2014) confirming that global carbon dioxide emissions grew by 2.3 % to a record annual high of 36.1 billion tonnes of carbon dioxide in 2013 with further increases expected in coming years.

As the most recent United Nations Environment Program (UNEP) Emissions Gap Report also notes (see Fig. 4.1) the 2030 "emissions gap", defined as the difference between global emission levels consistent with the 2°C target versus the emissions levels expected if current national cases are extrapolated to 2030 is 14–17 gigatonnes of carbon dioxide equivalent (i.e. about a third of current global emissions).

While few climate scientists advocate a global warming target above 2 degrees, many express grave concern about consequences for the health and well-being of human beings and other species of global warming above 2 degrees (Jordan et al. 2013; Christoff 2013). Noting also the escalating risks of triggering key climatic tipping points, many indeed argue for a target of 1.5 degrees or below with the aim, over time, of reducing global temperatures to pre-industrial levels (for a review, see Spratt 2014a, b). If this analysis is correct then the global carbon budget is already spent, or close to being spent. This conclusion would further reinforce the case for including degrowth goals in a comprehensive suite of decarbonization initiatives.

The goal of a 50% probability of keeping global warming below 2 degrees is also extremely conservative given that the Copenhagen Accord commitment of a *low* to *very low* chance of exceeding 2°C would normally imply

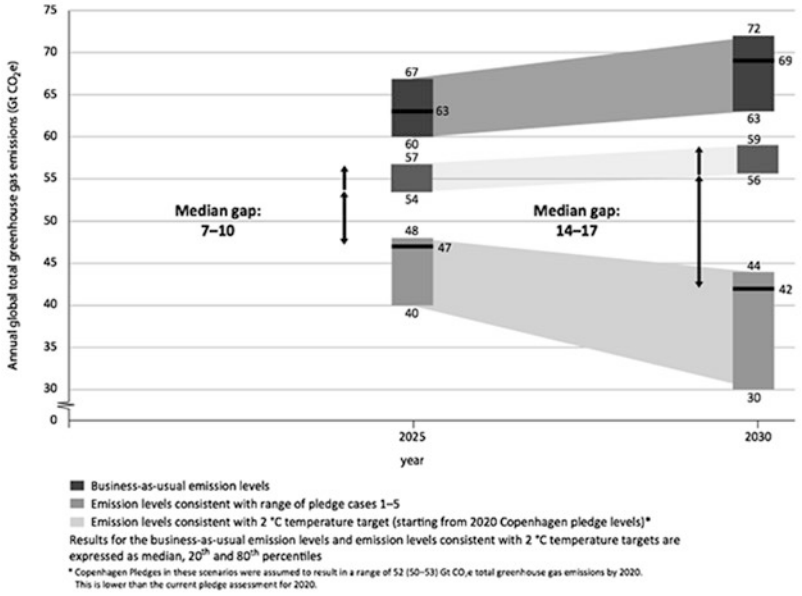

Fig. 4.1 Emissions gap 2030: difference between global emission levels consistent with the 2°C target versus the emissions levels expected if the pledge cases are extrapolated to 2030 (Source: UNEP 2014)

a probability of staying under 2 degrees warming of 90% or above. The assumption that emissions from less developed economies might peak by 2025 and then decrease at an unprecedented rate of 7% p.a. is also extremely optimistic. Extrapolation of current emissions trends indicates that this outcome remains extremely challenging and suggests that Anderson and Bows's case for considering some level of "degrowth" in the wealthiest, highest emitting economies is in fact based on very moderate premises indeed.

Will Existing Technological Solutions Be Sufficient to Stay Within the Global Carbon Budget?

As Ronald Reagan's seductively reassuring response to *Limits to Growth* reminds us, blind faith in the capability of technical and engineering solutions to deliver climate change "magic bullets" continues to be a formi-

dable barrier to honest appraisal of the actions needed to fully address carbon budget challenges. "There are no great limits to growth", Reagan cheerfully explained, "because there are no limits of human intelligence, imagination, and wonder" (Cider Mill Press 2010: 2). Exxon CEO Rex Tillerson's bald assertion that climate change is "an engineering problem and it has engineering solutions" (Daily 2012: np) is a more recent example of the pervasive influence of such self-serving techno-optimism.

The pace of technological innovation in renewable energy, energy efficiency and low-carbon land use is impressive and encouraging. Breakthroughs in battery storage, smart grids and distributed systems now demonstrate real potential to address renewable energy baseload and intermittency issues (Diesendorf 2014), although questions remain (see Trainer 2013a, b). The extraordinary acceleration in Chinese renewable energy production is also driving down solar and wind energy costs significantly, and advances in digital printing continue to bring forward the prospect of transformational change in the energy intensity of manufacturing and transport.

While formidable renewable energy challenges remain (such as the replacement of liquid fuels for shipping and aviation) these promising developments are useful reminders of the extent to which technological innovation will clearly play a *necessary* and central role in rapid emissions reductions. However there also are a number of important reasons why technological innovation alone is unlikely to provide a *sufficient* basis for addressing carbon budget challenges at the required speed and scale.

The first heroic assumption underpinning techno-optimist solutions is the ongoing reliance in many of the most influential large scale decarbonization strategies on CCS (carbon capture and storage). While CCS may play a valuable, albeit modest, long term role, the current state of knowledge suggests that we are still a very long way from affordable and scalable CCS deployment. Even the Global CCS Institute (2013: 5) has recently reported that, "while CCS projects are progressing, the pace is well below the level required for CCS to make substantial contribution to climate change mitigation". The growing "emissions gap" is also providing increasing impetus for speculation about the "necessity" of geoengineering "solutions" with all their attendant concerns about ethical implications and unintended consequences (see Hamilton 2013).

The second debatable assumption is that technological innovation will necessarily and rapidly translate into global reductions in energy consumption. Important questions remain about the speed with which 100%

renewable energy can realistically be achieved (see e.g. Smil 2010, 2014); the extent of fossil fuel energy consumption required to drive the initial massive expansion in renewable energy infrastructure; and the full life cycle energy return on investment (EROI) outcomes of solar and wind energy—particularly if these calculations factor in the full costs of energy storage (see e.g. Palmer 2013; Prieto and Hall 2013). Noting that emissions reductions of 4% p.a. in an economy growing at 2% p.a. are likely to require carbon intensity improvements of around 6% p.a., Anderson (2013) notes that he has yet to find any credible mainstream economist prepared to argue that prolonged emissions reductions of 3% or 4% or more are compatible with economic growth.

Indeed, as Lord Stern (2006: 231) himself has noted:

> There is likely to be a maximum practical rate at which global emissions can be reduced. At the national level, there are examples of sustained emissions cuts of up to 1% per year associated with structural change in energy systems... whilst maintaining strong economic growth. However, cuts in emissions greater than this have historically been associated only with economic recession or upheaval, for example, the emissions reduction of 5.2% per year for a decade associated with the economic transition and strong reduction in output in the former Soviet Union. These magnitudes of cuts suggest it is likely to be very challenging to reduce emissions by more than a few percent per year while maintaining strong economic growth.

The third reason for caution in assuming overly optimistic relationships between technological innovation, carbon intensity and emissions reductions is the impact of the "rebound effect" (see Jevons 1865; Herring and Sorrell 2009; Holm and Englund 2009; Jackson 2009). This phenomenon refers to the tendency for innovation and efficiency gains to be rapidly overwhelmed as cheaper unit costs combined with the formidable reach and power of the global advertising industry enable and encourage individuals to consume more of the same or alternative services and products. The harsh reality remains that global emissions continue to grow (IPCC 2013)—along with the global trends in the consumption of energy and resources—with apparent improvements in developed economy energy efficiency often masking the reality of energy intensive production being offshored to developing economies.

The likelihood of full and fast deployment of new technologies is the fourth problematic assumption that needs to be addressed given the formidable political and social obstacles standing in the way of rapid imple-

mentation. As noted in the recent *Post Carbon Pathways* review of learning from the implementation of large-scale decarbonization strategies (see Wiseman et al. 2013), experienced climate scientists and policymakers consistently come to the conclusion that the key obstacles standing in the way of rapid decarbonization are political and social rather than technological. Key roadblocks include the following.

1. Climate scepticism and denial of the necessity and urgency of action.
2. The power and influence of vested interests in the fossil fuel, finance and media industries.
3. Extreme individualist and neo-liberal values and ideologies.
4. Inequitable distribution of emission reduction costs and responsibilities.
5. Technological, social and economic path dependencies.
6. Financial and governance constraints.

How Can the Global Social Equity and Economic Well-Being Implications of a Deliberate Reduction in Energy and Resource Consumption Be Addressed?

Implementing decarbonization solutions which are fundamentally equitable in terms of current and historical emission responsibilities as well as current income and wealth distribution is essential from both an ethical and strategic point of view. This is why Anderson and Bows (2011) and other degrowth advocates (see generally D'Alisa et al. 2014; Lawn and Clarke 2010) place such emphasis on the need for the wealthiest citizens in the wealthiest economies to take on the heavy lifting in relation to reducing consumption.

The first response to criticisms of degrowth strategies based on professed concern for impacts on the poorest communities is of the same order as the response to the disingenuous arguments sometimes heard from mining executives about the impact of cutting coal exports on the poor of India or Africa. The impacts of catastrophic climate change (see Potsdam Institute 2012) on the most vulnerable populations will surely be vastly greater than the impacts of even the most rapid emissions reductions policies. It will also be far easier to ensure that the impacts of reduction in economic growth are managed in an equitable way if the reductions are brought about through a process of planned contraction rather than a sudden and unplanned slide into recession or depression.

George Monbiot's (2014) recent reflections on the distributional costs and benefits of the current growth paradigm are also highly relevant here.

> One of the remarkable characteristics of recent growth in the rich world is how few people benefit. Almost all the gains go to a tiny number of people: one study suggests that the richest 1% in the United States capture 93% of the increase incomes that growth delivers. Even with growth rates of 2 or 3% or more, working conditions for most people continue to deteriorate, as we find ourselves on short contracts, without full employment rights, without the security or the choice or the pensions their parents enjoyed.

While it is ethically and strategically crucial that developed economies take primary responsibility for the initial peak and decline in emissions (Gardiner 2011), it is also essential that less developed economies begin the transition to a zero-carbon economy pathway as soon as possible (Anderson and Bows 2008b). It will therefore be vital that less developed nations are given increased support to create low-carbon economies *now*, rather than follow fossil fuel based development pathways that "lock" societies into decades of high-carbon living. Any equitable pathway to global de-carbonization therefore needs to deliver sustained financial commitments from the most developed to the least developed economies to support technology transfer, structural adjustment and climate resilience strategies. This is even truer of decarbonization strategies which include a significant emphasis on planned reduction in global consumption.

An additional important priority for degrowth advocates will be the design of transition strategies which address the very real concerns of vulnerable workers and communities about employment implications. Reductions in overall paid working hours, the exploration of a variety of forms of basic or guaranteed income and structural adjustment policies targeted to meet the challenges facing workers in industries likely to be downscaled (such as coal mining) will all be part of this crucial conversation.

Will Raising the Case for Degrowth Undermine Political Support for Decisive Climate Action?

The risk that some supporters of decisive climate action might be unsettled by public debate about the inclusion of planned reductions in economic output in a comprehensive decarbonization strategy is not an argument for staying silent about the full risks and implications of climate science. It

is however an important reminder of the need to ensure that arguments about alternative economic growth paradigms are framed in ways which maximize resonance and impact.

While the goal of "planned and equitable degrowth" works well for some audiences, the language of a "well-being" or "sufficiency" economy may be useful in demonstrating the desirability of economic paradigms focused on growing health and well-being for the many rather than endless acceleration in energy and resource consumption for the few. As the authors of the *Limits to Growth* (Meadows et al. 2005: 11–12) report remind us:

> A sustainable society [does not] need to be stagnant, boring, uniform, or rigid.…It could be a world that has the time, the resources and the will to correct its mistakes, to innovate, to preserve the fertility of its planetary ecosystems. It could focus on mindfully increasing quality of life rather than on mindlessly expanding material consumption and the physical capital stock.

While care is required to avoid romanticizing poverty and inequality, evidence also continues to grow that, beyond a relatively modest level of income, growth in average subjective well-being levels off (see Alexander 2012b). Once core material needs are met, non-material priorities such as reduced stress, more time with friends and family and more meaningful and creative work become increasingly important (see generally Helliwell et al. 2013; Kasser 2002). Accordingly, the goal of a "well-being economy" (see e.g. Diener and Seligman 2004) has the potential to be framed as a desirable alternative to the psychological stresses and ecological risks of a growth obsessed economy. Alternative progress and well-being indicator frameworks—such as the Genuine Progress Indicator, the OECD Better Life Index or the Bhutanese Gross National Happiness framework—can play a valuable role in providing tangible reality to these alternative economic paradigms (see generally Costanza et al. 2014; Kubiszewski et al. 2013; Royal Government of Bhutan 2012; Stiglitz et al. 2010; Lawn 2006).

In the end, however, this debate reflects two competing views about climate change solutions and political strategy. One view is that the first priority must be to secure broad popular support for at least some level of significant emissions reduction, in the hope that, once the process is underway, the momentum will rapidly accelerate. The alternative view is that it is preferable to build political support for comprehensive climate change solutions on the basis of an honest appraisal of scientific evidence

and the full magnitude of the challenge rather on wishful thinking or an implausibly optimistic reliance on technological silver bullets. It is critical that a coherent climate solution is expressed in a way that engages as many people as possible; at the same time, it is no good engaging a wide audience if that means presenting a false or misleading picture of what a genuine climate solution or response looks like. If one should call a spade a spade, perhaps one should call for degrowth if that indeed is the clearest description of what is required. This is a debate that may have no single right answer, but it is clear that the issues under consideration are of the highest importance and deserve close attention.

What Political Strategies Could Plausibly Build Broad Support for Rapid and Comprehensive Reductions in Consumption and Production?

Any plausible pathway towards equitable degrowth will need to be built on the same mix of transformational change strategies required to remove the political and structural roadblocks standing in the way of overall solutions to the climate crisis: education and evidence; ethical and moral persuasion; disruptive social and technological innovation; citizen mobilization; visionary and courageous leadership; and decisive action at moments of ecological, economic and social crisis.

To date the primary social change focus of many degrowth advocates has been on building the ethical and moral case for low consumption lifestyles and through the politics of prefigurative action and example: of driving and flying less and cycling and walking more; of Transition towns and permaculture; of growing and sharing local food; of retrofitting our houses for energy efficiency; of wearing warmer clothing rather than turning on heaters; of recycling, making and mending things rather than buying new; and of generally trying to build a more localized, egalitarian and low-carbon society from the grassroots up.

Actions at the personal, household and community levels will be important and surely necessary foundations for broader cultural change but are likely to remain small-scale and marginal without systematic work to address key social and physical constraints limiting the adoption of sustainable consumption lifestyles (e.g. Sanne 2002). It is, for example, hard to drive less in the absence of safe bike lanes and good public transport; it is hard to find a work-life balance if access to basic housing burdens us with excessive debt; and it is hard to re-imagine a way of life built on reduced

consumption if we are constantly bombarded with advertisements insisting that "nice stuff" is the key to happiness.

Therefore, a fully scalable, mainstreamed strategy for building a low consumption economy may also require a far more proactive role for government leadership and policy intervention, although it may be that such "top down" leadership arrives only *after* there has been a deep cultural shift (Alexander 2013). In reflecting on the possibilities of courageous high-level leadership it is interesting to reflect on the preparedness of a former US President, Jimmy Carter, in 1979, to openly question the dominant values of consumerist culture.

> Too many of us now tend to worship self-indulgence and consumption. Human identity is no longer defined by what one does, but by what one owns. But we've discovered that owning things and consuming things does not satisfy our longing for meaning. We've learned that piling up material goods cannot fill the emptiness of lives which have no confidence or purpose. (Carter 1979: np)

The ferocious political response to Carter's so-called "malaise speech" certainly alerts us to the storm of hostility and ridicule which is likely to erupt around anyone attempting to lead public debate about alternative economic and consumption paradigms. The strategic advice (often attributed to Mahatma Gandhi) may be relevant to remember here. "First they ignore you, then they laugh at you, then they fight you, then you win."

As influential contributors to the emerging literature on post-growth economic policy paradigms such as Tim Jackson (2009) and Peter Victor (2008) note, the first step in achieving a rapid and equitable transition to a post-growth, post-carbon economy will be the adoption of an integrated framework of social, ecological and economic well-being goals, targets and indicators reflecting an explicit commitment to this goal. Implementation strategies and policies consistent with this goal are likely to include the following:

1. Taxation, income security and pension policies driving an equitable, economy-wide shift from consumption to savings.
2. Deployment of the institutions and incentives needed to build a fully circular, zero-waste economy.
3. Financial institutions and regulatory frameworks capable of mobilizing savings into post-carbon economy infrastructure and industry investments.

4. Urban design, housing, freight and public transport systems enabling more localized economic relationships and transactions.
5. Labour market and income security policies facilitating a rapid shift to shorter working hours.
6. Structural adjustment policies which address employment and income issues for vulnerable workers and communities.

As writers like Jackson and Victor also rightly note, there is still considerable work to be done to construct a coherent body of economic policies capable of delivering an equitable agenda of post-growth, ecological economics (but see Kallis et al. 2012). This task along with strengthening understanding of the most effective ways of developing a low consumption culture are two of the highest research and policy priorities which sustainability campaigners concerned with building informed support for degrowth strategies might usefully begin to focus on.

Conclusion

Our overall argument can be summarized in the following way. The core implication from all of the most recent analyses of carbon emissions trends is clear. Swift implementation of even the most ambitious renewable energy, energy efficiency and low-carbon land-use measures will still fall well short of the emissions reductions needed to stay within the global carbon budget (UNEP 2014). This gap can be bridged in three main ways:

1. Gambling on leap of faith mitigation technologies such as biofuels, CCS, nuclear fusion and geo-engineering.
2. Gambling on the even more unlikely leap of faith that adaptation to global temperatures of 4 degrees and above is possible.
3. Reducing the consumption of energy and resources by the wealthiest people in the wealthiest countries. Importantly this is the only option which also addresses other urgent global ecological challenges such as ocean acidification, the collapse of biodiversity—and the equitable distribution of increasingly scarce resources.

Many complex and contested questions remain.

1. How should we balance overall reductions in consumption with the expansions in production in the industry sectors required to build a zero-carbon economy?
2. How precisely should we define, describe and deliver planned and equitable degrowth?
3. What set of arguments and circumstances could plausibly achieve popular support for degrowth policies in the wealthiest economies?

The important point however—and the key point of this chapter—is to argue the case for including planned and equitable reductions in the consumption of energy and resources in debates about the suite of actions needed to meet global climate change and planetary boundary challenges. In preparing this paper we have been very conscious that imagining a degrowth society is almost as hard as imagining a zero-carbon global economy. We have therefore kept in mind Nelson Mandela's reflections on a very different but equally formidable challenge. "It always seems impossible until it is done."

References

Alexander, S. (2012a). Planned economic contraction: The emerging case for degrowth. *Environmental Politics, 21*(3), 349–368.

Alexander, S. (2012b). The optimal material threshold: Toward an economics of sufficiency. *Real-World Economics Review, 61*, 2–21.

Alexander, S. (2013). Voluntary simplicity and the social reconstruction of law: Degrowth from the grassroots up. *Environmental Values, 22*(2), 287–308.

Anderson, K. (2012). Climate change going beyond dangerous—Brutal numbers and tenuous hope. *Development Dialogue, 61*, 16–40.

Anderson, K. (2013). Avoiding dangerous climate change demands de-growth strategies from wealthier nations. Available at: http://kevinanderson.info/blog/avoiding-dangerous-climate-change-demands-de-growth-strategies-from-wealthier-nations/. Accessed 1 February 2014.

Anderson, K., & Bows, A. (2008a). Reframing the climate change challenge in light of post-2000 emissions trends. *Philosophical Transactions of the Royal Society, 366*, 3863–3882.

Anderson, K., & Bows, A. (2008b). Contraction and convergence: An assessment of the *COOptions* model. *Climatic Change, 91*, 275–290.

Anderson, K., & Bows, A. (2011). Beyond "Dangerous" climate change: Emission scenarios for a new world. *Philosophical Transactions of the Royal Society, 369*, 20–44.

Anderson, K., & Bows, A. (2012). A new paradigm for climate change. *Nature Climate Change, 2*, 639–640.

Anderson, K., & Wiseman, J. (2012). *We need the courage to seek and develop a new paradigm: An interview with Kevin Anderson* (31 July 2012). Available at: http://www.postcarbonpathways.net.au/wp-content/uploads/2013/05/KA_Interview.pdf. Accessed 15 November 2014.

Bilancini, E., & D'Alessandro, S. (2012). Long-run welfare under externalities in consumption, leisure, and production: A case for happy degrowth vs. unhappy growth. *Ecological Economics, 84*, 194–205.

Carbon Tracker. (2011). *Unburnable carbon: Are the world's financial markets carrying a carbon bubble?* Available at: http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf. Accessed 20 February 2014.

Carbon Tracker and Grantham Institute. (2013). *Unburnable carbon 2013: Wasted capital and stranded assets*. Available at: http://carbontracker.live.kiln.it/Unburnable-Carbon-2-Web-Version.pdf. Accessed 15 July 2014.

Carter, J. (1979). *Crisis of confidence* (Presidential speech delivered on 15 July 1979). Available at: http://www.cartercenter.org/news/editorials_speeches/crisis_of_confidence.html. Accessed 15 November 2014.

Christoff, P. (Ed.) (2013). *Four degrees of global warming*. London: Taylor and Francis.

Cider Mill Press (Ed.). (2010). *The deepest and noblest aspirations: The wisdom of Ronald Reagan*. Kennebunkport: Cider Mill Press.

Committee on Climate Change. (2013). The Fourth Carbon Budget Review—Part 1. Available at: http://www.theccc.org.uk/publication/fourth-carbon-budget-review-part-1/. Accessed 15 July 2013.

Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K., et al. (2014). Time to leave GDP behind. *Nature, 505*, 283–285.

Daily, M. (2012). Exxon CEO calls climate change an engineering problem. *Reuters* (27 June 2012). Available at: http://www.reuters.com/article/2012/06/27/us-exxon-climate-idUSBRE85Q1C820120627. Accessed 15 November 2014.

D'Alisa, G., Demaria, F., & Kallis, G. (2014). *Degrowth: A vocabulary for a new era*. London: Routledge.

Diener, E., & Seligman, M. (2004). Beyond money: Toward an economy of well-being. *Psychological Science in the Public Interest, 5*, 1–31.

Diesendorf, M. (2014). *Sustainable energy solutions for climate change*. New York: Routledge.

Diffenbaugh, N. (2013). Human well-being, the global emissions debt, and climate change commitment. *Sustainability Science, 8*, 135–141.

Ehrlich, P., & Ehrlich, A. (2013). Can a collapse of civilization be avoided? *Simplicity Institute Report, 13a*, 1–19.

Gardiner, S. (2011). *A perfect moral storm: The ethical tragedy of climate change*. Oxford: Oxford University Press.

Global Commission on the Economy and Climate. (2014). *Better growth, better climate*: *The new climate economy report* (*the synthesis report*). Available at: http://static.newclimateeconomy.report/wp-content/uploads/2014/08/NCE-SYNTHESIS-REPORT-web-share.pdf. Accessed 15 November 2014.

Grantham Institute for Climate Change. (2013). Halving global CO2 by 2050: Technologies and costs. Available at: http://www3.imperial.ac.uk/climatechange/publications/collaborative/halving-global-co2-by-2050. Accessed 1 February 2014.

Hamilton, C. (2013). *Earthmasters: Playing God with the climate*. Crows Nest: Allen and Unwin.

Harvey, F. (2014). Climate change report: Prevent damage by overhauling global economy. *The Guardian* (16 September 2014).

Helliwell, J., Layard, R., & Sachs, J. (Eds). (2013). *World Happiness Report 2013*. Available at: http://unsdsn.org/wp-content/uploads/2014/02/WorldHappinessReport2013_online.pdf. Accessed 15 November 2014.

Herring, H., & Sorrell, S. (2009). *Energy efficiency and sustainable consumption: The rebound effect*. London: Palgrave Macmillan.

Holm, S.-O., & Englund, G. (2009). Increased ecoefficiency and gross rebound effect: Evidence from USA and six European countries 1960–2002. *Ecological Economics, 68*, 879–887.

Hopkins, R., & Miller, A. (2012). Climate after growth: Why environmentalists must embrace post-growth economics and community resilience. *Post-Carbon Institute Report*, 1–28.

Intergovernmental Panel on Climate Change (IPCC). (2013). *Climate Change 2013: The physical science basis (Fifth Assessment Report)*. Available at: http://www.ipcc.ch/report/ar5/wg1/. Accessed 1 August 2014.

Intergovernmental Panel on Climate Change (IPCC). (2014). *Climate Change 2014: Impacts, adaptations, and vulnerability (Fifth Assessment Report)*. Available at: http://www.ipcc.ch/report/ar5/wg2/. Accessed 1 August 2014.

Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London: Earthscan.

Jevons, W. S. (1865). *The coal question: An inquiry concerning the progress of the nation and the probable exhaustion of our coal-mines*. London: MacMillan.

Jordan, A., Rayner, T., Schroeder, H., et al. (2013). Going beyond two degrees? The risks and opportunities of alternative options. *Climate Policy, 13*(6), 751–769.

Kallis, G. (2011). In defence of degrowth. *Ecological Economics, 70*, 873–880.

Kallis, G., Kerschner, C., & Martinez-Alier, J. (2012). The economics of degrowth. *Ecological Economics, 84*, 172–180.

Kasser, T. (2002). *The high price of materialism*. Cambridge, MA: MIT Press.
Krugman, P. (2014). Errors and omissions: Could fighting global warming be cheap and free? *New York Times* (18 September 2014). Available at: http://www.nytimes.com/2014/09/19/opinion/paul-krugman-could-fighting-global-warming-be-cheap-and-free.html?_r=0. Accessed 15 November 2014.
Kubiszewski, I., Costanza, R., Franco, C., Lawn, P., Talberth, J., Jackson, T., et al. (2013). Beyond GDP: Measuring and achieving global genuine progress. *Ecological Economics, 93*, 57–68.
Latouche, S. (2009). *Farewell to growth*. Cambridge, UK: Polity Press.
Lawn, P. (2006). *Sustainable Development Indicators in Ecological Economics*. Cheltenham: Edward Elgar.
Lawn, P., & Clarke, M. (2010). The end of economic growth? A contracting threshold hypothesis. *Ecological Economics, 69*, 2213–2223.
Le Quere, C., et al. (2014). Global carbon budget 2014. *Earth Systems Science Data, 7*, 521–610.
Macintosh, A. (2010). Keeping warming within the 2C limit after Copenhagen. *Energy Policy, 38*, 2964–2975.
Mann, M. E. (2009). Defining dangerous anthropogenic interference. *Proceedings of the National Academy of Science USA, 106*, 4065–4066.
Meadows, D., Randers, J., & Meadows, D. (2004). *Limits to growth: The 30-year update*. London: Earthscan.
Meinshausen, M., Meinshausen, N., Hare, W., Raper, S., Frieler, K., Knutti, R., et al. (2009). Greenhouse-gas emission targets for limiting global warming to 2-degrees. *Nature, 458*, 1158–1162.
Messner, D., Schellnhuber, J., Rahmstorf, S., & Klingenfeld, D. (2010). The budget approach: A framework for a global transformation toward a low-carbon economy. *Journal of Renewable and Sustainable Energy, 2*, 1–14.
Monbiot, G. (2014). It's time to shout stop on this war on the living world *Guardian* (2 October 2014). Available at: http://www.theguardian.com/environment/georgemonbiot/2014/oct/01/george-monbiot-war-on-the-living-world-wildlife. Accessed 15 November 2014.
Odum, H., & Odum, E. (2001). *A prosperous way down: Principles and policies*. Colorado: University of Colorado Press.
Palmer, G. (2013). Household solar voltaics: Supplier of marginal abatement, or primary source of low-emissions power? *Sustainability, 5*(4), 1406–1442.
Potsdam Institute. (2012). *Turn down the heat: Why a 4° warmer world must be avoided*. Published by the World Bank. Available at: http://documents.worldbank.org/curated/en/2012/11/17097815/turn-down-heat-4%C2%B0c-warmer-world-must-avoided. Accessed 15 July 2014.
Prieto, P., & Hall, C. (2013). *Spain's photovoltaic revolution: The energy return on investment*. New York: Springer.

Purdey, S. (2010). *Economic growth, the environment, and international relations: The growth paradigm*. New York: Routledge.

Rezai, A., Taylor, L., & Mechler, R. (2013). Ecological macroeconomics: An application to climate change. *Ecological Economics, 85*, 69–76.

Rickards, L., Wiseman, J., & Kashima, Y. (2014). Barriers to effective climate change mitigation: the case of senior government and business decision makers. *Wiley Interdisciplinary Reviews: Climate Change, 5*(6), 753–773.

Rockstrom, J., et al. (2009). Planetary boundaries: Exploring the safe operating space for humanity. *Ecology and Society 14*(2). Article 32.

Royal Government of Bhutan. (2012). *The report of the high-level meeting on well-being and happiness: A new economic paradigm*. Available at: http://www.2apr.gov.bt/images/BhutanReport_WEB_F.pdf. Accessed 14 December 2013.

Sanne, C. (2002). Willing consumers—Or locked in? Policies for a sustainable consumption. *Ecological Economics, 42*, 273–287.

Schneider, F., Kallis, G., & Martinez-Alier, J. (2010). Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. *Journal of Cleaner Production, 18*(6), 511–518.

Smil, V. (2010). *Energy transitions: History, requirements, prospects*. Westport: Praeger.

Smil, V. (2014). The long, slow rise of solar and wind. *Scientific American, 310*, 52–57.

Spratt, D. (2014a). The real budgetary emergency and the myth of "burnable carbon. *Climate Code Red*. Published 22 May 2014. Available at: http://www.climatecodered.org/2014/05/the-real-budgetary-emergency-burnable.html. Accessed 28 July 2014.

Spratt, D. (2014b). Carbon budgets, climate sensitivity, and the myth of burnable carbon *Climate Code Red*. Published 8 June 2014. Available at: http://www.climatecodered.org/2014/06/carbon-budgets-climate-sensitivity-and.html. Accessed 28 July 2014.

Stern, N. (2006). *Stern review on the economics of climate change*. Cambridge, UK. Her Majesty's Treasury, Cambridge: Cambridge University Press.

Stiglitz, J., Sen, A., & Fitoussi, J. P. (2010). *Mis-measuring our lives: Why GDP doesn't add up*. New York: The New Press.

Sustainable Development Solutions Network (SDSN) and Institute for Sustainable Development and International Relations (IDDRI). (2014). *Pathways to deep decarbonization: interim 2014 report*. Published by the SDSN and IDDRI (July, 2014).

Trainer (2013a). Can Europe run on renewable energy? A negative case. *Energy Policy, 63*, 845–850.

Trainer (2013b). Can the world run on renewable energy. *Humanomics, 29*(2), 88–104.

Turner, G. (2012). On the cusp of global collapse? Updated comparison of the *Limits to Growth* with historical data. *Gaia, 21*(2), 116–124.

United Nations Environment Program (UNEP). (2014). *The Emissions Gap Report 2014: Synthesis*. Available at: http://www.unep.org/publications/ebooks/emissionsgapreport2014/portals/50268/pdf/EGR2014_EXECUTIVE_SUMMARY.pdf. Accessed 25 November 2014.

Victor, P. (2008). *Managing without growth: Slower by design, not disaster*. Cheltenham, UK: Edward Elgar.

Victor, P. (2012). Growth, degrowth, and climate change: A scenario analysis. *Ecological Economics, 84*, 206–212.

Wiseman, J., Edwards, T., & Luckins, K. (2013). *Post carbon pathways: Toward a just and resilience post carbon future*. CDP Discussion Paper, April 2013. Available at: http://www.postcarbonpathways.net.au/wp-content/uploads/2013/05/Post-Carbon-Pathways-Report-2013_Final-V.pdf. Accessed 1 July 2014.

PART II

Rethinking Austerity

CHAPTER 5

Austerity Pasts, Austerity Futures?

Rebecca Bramall

Introduction

In current political discourse, "degrowth" and "austerity" are regularly presented as policies that must be sharply differentiated. In a paper written for Attac Germany,[1] Alexis J. Passadakis and Matthias Schmelzer insist that "your austerity is not our degrowth!" (2010), while the Le Parti Pour La Décroissance (the Degrowth Party of France) has been construed as promising "degrowth without austerity" (de Saint-Do 2013). Aurélie Maréchal, director of the Green European Foundation, asks:

> Should Greens be in favour of austerity? No, because austerity uses the pretext of scarce (monetary only) resources to impose policies that increase inequalities and poverty while failing to resolve environmental issues. (Maréchal 2012)

In a context in which mainstream critical thinkers are increasingly identifying neoliberal capitalism as the obstacle that is preventing meaningful action to combat climate change (Klein 2014), and austerity policies are widely understood as a "neoliberal trick" (Blyth and Mills 2013),

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it is entirely clear why those invested in green politics or the politics of degrowth should want to make this distinction. Yet the vehemence with which these actors seek to differentiate degrowth and austerity (that exclamation mark after Passadakis and Schmelzer's assertion!) indicates that they might be policing a distinction between two concepts that cannot, in fact, be entirely disassociated.

Indeed, there are other voices who have argued that "austerity" is a critical concept with which advocates of degrowth must engage. Ernest Garcia, for instance, argues that through its association with the economic and ideological practices of neoliberal governments in the wake of the 2007–2008 financial crisis, the concept of austerity has been "perverted". He notes that in political philosophy "austerity" describes a policy of maintaining that which is socially "necessary" at the expense of that which is "superfluous", while in the current context austerity policies appear to achieve the very opposite. There is a pressing need, Garcia insists, to recover and to elaborate a concept of austerity for environmental sustainability and for well-being—a concept of austerity for degrowth (Garcia 2013).

Other key advocates of degrowth have developed a distinct but related argument. Giacomo D'Alisa et al. (2014: 220) reject the tainted concept of "austerity", calling instead for individual "sobriety" alongside socialized "dépense"—a ritual destruction of accumulated surplus. The "sober subject of degrowth" that they envisage "does not aspire to the private accumulation of things"; freed from the "unbearable weight of limitless choice", this sober subject finds meaning in social relations, while social dépense is the outcome of collective decision-making about what to "waste". Thus for D'Alisa et al. personal sobriety and social dépense are intended to replace the pairing of social austerity and individual excess that predominates in contemporary neoliberal societies.[2]

What are the conditions under which the meaning of the signifier "austerity"—as well as cognate phrases such as "living within our means" and "less is more"—might be reworked for environmental ends? Could the concept of "austerity" describe a mode of living that is compatible with the challenges of working towards transition and degrowth? In what follows I consider what can be learnt from the UK context, in which social actors in environmental and transition politics have—since the early 2000s—elaborated a concept of "eco-austerity". This has been achieved via the mobilization of a particular historical period as symbolic resource: the period 1939–1954, an era widely known as "austerity Britain", when a system of rationing was imposed in the UK. Through an evaluation of

this activity, the chapter identifies the significant challenges presented by a project of reworking the meaning of the signifier "austerity", as well as the possibilities for alternative future-making that may yet be associated with this concept.

The chapter begins with a narrative of the emergence of an historically inflected eco-austerity discourse in the UK in the period before the 2007–2008 financial crisis. I will identify some of the key social actors in environmental and transition politics who have perpetuated this discourse, and explain why the period of austerity Britain has been a valuable symbolic resource in this context. Turning to the struggle over this symbolic resource that took place in the wake of the financial crisis, I will identify the ways in which neoliberal social actors have made use of the same period of history. I will elaborate in particular a certain argument that the turn to a discourse and practices of austerity in green politics may have smoothed the way for the UK coalition government's economic austerity policies. I conclude by drawing out the challenges this case study implies for a broader project of reconstructing the concept of austerity.

The Rise of "Eco-Austerity"

The idea that there is an analogy to be drawn between the present conjuncture and "austerity Britain" began to be communicated some years before the financial crisis. Since the early 2000s, this historical period—and specifically the era of the Second World War (1939–1945)—has been an important point of reference in environmental politics (Hinton and Redclift 2009; Randall 2009; Bramall 2011; Ginn 2012). There is a rather longer history of the emergence of "war"—as in "the war on climate change"—as a central metaphor in environmental discourse and politics (Massumi 2009; Dibley and Neilsen 2010) and the turn to the Second World War in particular can be seen to build on this metaphorical language (Cohen 2011).

In the UK, the policy institute the New Economics Foundation (NEF)—which is part of the Schumacher Circle of organizations[3]—has been a key actor in the promotion of this analogy, driven in particular by the work of its former policy director, Andrew Simms. In publications authored by Simms, the use of the rhetoric of war becomes more concrete and more literal. In a pamphlet titled *An Environmental War Economy* (2001), Simms argues that Britain's experience during the Second World War is highly relevant to the challenge of climate change (2001: 31). The specific actions taken and practices condoned in this context—the exemplar of the "war economy", rationing and "fair shares"—are a significant

dimension of this relevance. More important, however, is the availability of a certain narrative about people's accommodation of these sacrifices—the "myth of the home front"[4]—that enables the Second World War to function as a powerful rhetorical resource.

Simms's influence, and in particular his attempt to construct austerity Britain as a model for sustainable consumption, is clearly evident in several of NEF's later projects and publications. In 2009, the organization commissioned a performance piece titled "Ration Me Up", staged by "The Ministry of Trying to Do Something About It". A home front "rationeer" dressed in 1940s clothing handed out wartime-styled "ration" books containing one month's "equitable carbon ration" in the form of coupons for various energy-consuming activities. The aims of the project were to show participants their "fair share of the world's resources" and to provide them with a way of minimizing their "impact on the planet" (The Ministry, 2009). A few years later Simms authored a report for the UK's Green Party titled *The New Home Front* (2011), which explores how Britain can learn from its wartime past in an age of climate change and energy insecurity. Noting that there are "few historical precedents" for the transition to a low-carbon economy, Simms argues in this publication that "the example of wartime Britain is exceptional, instructive and illuminating" (2011: 14).

These projects seek to construct an analogy between the war economy of the austerity Britain era and a low-carbon economy. At the same time, other actors in the environmental movement have found value in the practices that civilians were encouraged to take up during the period of war and rationing. These practices include recycling, growing vegetables, mending, repairing, and other activities that have been valued as part of a "great reskilling" for transition (Simms and Potts 2011; Transition Network 2013a).[5] The revival of popular slogans from austerity Britain—most notably, "dig for victory" and "make do and mend"—has served to give new meanings to these practices and to attach value and significance to them. I will outline the revival of "dig for victory" in more detail in order to indicate how this process of attaching new meanings to familiar practices has been achieved.

The "dig for victory" campaign was instigated in 1939 as part of the war effort, with the aim of encouraging British citizens to grow their own vegetables and become more self-sufficient. A similar campaign was conducted in the United States, where the practice is known as "victory gardening". In both national contexts, the idea of digging for victory has persisted into the post-war era (Bentley 1998: 172; DeSilvey 2003: 454), and has been articulated to different debates and themes during this time.

In the 1990s, a UK-based land activism group became one of the first groups to use the slogan "dig for victory" in the context of an environmental campaign, and specifically to stimulate debate about land use and access (Crouch and Parker 2003: 403). Over the next decade or so, the idea of "digging for victory" was picked up by many different social actors working towards diverse projects and objectives. These contexts ranged from the allotment movement[6] and urban agriculture to sustainability education in schools.[7]

"Dig for victory" resonates with a very wide range of projects, and so its politics are complex. In class terms, for instance, the democratic nature of the wartime campaign—the notion that all kinds of people got involved—has clearly been valuable to a number of social actors. Linked to allotment keeping, the slogan opens up the connotations of that practice beyond the culture and stereotypes of "working-class agitation" with which it has been associated (Crouch and Ward 1997: 18; see also Hope and Ellis 2009: 5). By contrast, the "dig for victory" campaign has also been an appealing resource for an organization such as the Soil Association, which champions organic food and thus can be perceived as being "for wealthy, middle-class people". The Association's call for a "revival of the 'dig for victory' ethos" communicates a shift in emphasis away from exclusive organicism and towards a "local and sustainable" agenda (Hickman 2008: 33).

"Dig for victory" can be articulated to a wide range of policy areas and outcomes. The act of imagining a historical precedent for the present conjuncture opens up a space in which some of today's most critical environmental demands have been articulated and linked together: concerns about "food miles" to questions about quality of life, ideas about nutrition and healthy eating to the demand for land in common, and a valorization of social interaction to the concept of sustainability. In this sense, "dig for victory" has become a critical nodal point in contemporary discourses about sustainability, and has been recognized as such by policymakers. The authors of a local government report on allotments argue that "[a] new 'Dig for Victory' would be a dig for scores, if not hundreds, of victories across a range of policy areas" (Hope and Ellis 2009: 28).

History as Symbolic Resource

What can this case study tell us about the project of giving new meaning to the signifier "austerity"? The popularization of the comparison between austerity Britain and today's climate crisis provides an example

of a reworking of "austerity" to signify an economy and practices that are oriented towards environmental sustainability and well-being as opposed to economic growth. In this case, the recourse to history as a symbolic resource has been central to the process of creating a new meaning for austerity. While the past is not the only symbolic resource that is available for such a task, it is a particularly valuable resource, for a number of reasons that I shall now elaborate.

First, this historical era is one that is very familiar to UK citizens; as others have documented, the Second World War has a weighty presence within British cultural memory (Eley 2001; Noakes and Pattinson 2013). Simms's confidence in mobilizing this resource is founded in his sense of the potency of the historical era in the British cultural imaginary; he describes it as "living history" (Simms 2013: 13). Within the transition movement there is a strong sense that the skills and knowledge we require in order to respond to peak oil and climate change are not new ones but "skills that our grandparents took for granted" (Transition Network 2013b). From this perspective austerity Britain represents a valuable rhetorical resource for the communication of environmental objectives because it can be constructed as "a regime resembling sustainable consumption" that remains in living memory (Theien 2009). Making reference to the Transition Handbook (Hopkins 2008), Nick Stevenson explains that for its author, Rob Hopkins, memories of the "dig for victory" campaign "need to be recovered to shatter the idea of 'normality' fostered by the dominant consumer economy. By reminding us how previous generations lived, we are being asked to begin to imagine how a less hazardous lifestyle may be possible" (Stevenson 2012: 72).

Second, austerity Britain offers a precedent for some of the policies and practices that environmental social actors endorse. Presenting the Second World War as a precedent for pro-environmental action allows Simms and others to assert that the policies he proposes can work, and to fend off the argument that people will not—for example—accept controls on consumption (Simms 2001: 32–3). In his book *How We Can Save the Planet*, Mayer Hillman uses historical analogy in a similar way to establish that carbon rationing is achievable and comprehensible (Hillman and Fawcett 2004: 143). Relatedly, the imagery of rationing in austerity Britain provides social actors with a way of rendering intelligible the idea of a limited but fair allocation of resources.

Third, precisely because wartime and austerity Britain is such a familiar historical period, it is a reference point that can be recognized by many

different constituencies in Britain today. The story that is told about this historical period is not in the least challenging—on the contrary, eco-austerity discourse reiterates a unifying, dominant-hegemonic narrative of British resilience, resourcefulness and triumph against the odds. I have argued elsewhere (2013) that these kinds of stories might prove valuable for the communication of political visions that can seem challenging from the perspective of certain social groups. These intransigent constituencies need to be persuaded of the legitimacy of the need for transition and environmental action. The narratives and discourses that are required for this task are those that resonate with these constituencies, and specifically with the way that they presently construe their interests. Dominant-hegemonic history, like the story of Britain's resilience in the Second World War, constitutes such a resource precisely because it is already available, already common sense (Bramall 2011).

Fourth, the vision of life in austerity Britain that eco-austerity discourse perpetuates is one that has proved highly appealing to certain constituencies in the UK. This is perhaps surprising, given that we are talking about a period that demanded extreme hardship and sacrifice. Yet an austere way of life has been recast as one that has appeal through an emphasis on alternative sources of pleasure. In eco-austerity discourse, an austere life means buying something only if you really need it, preferring to buy second-hand goods, and "making do" if what you need isn't available; it involves "reskilling", or learning how to sew, knit, mend, repair, conserve, preserve and bake; it means cycling or walking instead of driving; it involves spending more time being outdoors, and perhaps more time with family and friends. These alternative ways of living one's life are constructed, in eco-austerity discourse, as more pleasurable, rewarding, and conducive to well-being than the consumerist practices that they replace; they promise "more" from "less".

This foregrounding of the pleasures of an "austere" life resonates in some respects with the philosopher Kate Soper's principle of "alternative hedonism". Explaining this principle, Soper argues that "new forms of desire, rather than fears of ecological disaster" will be "the most likely motivating force in any shift towards a more sustainable economic order" (Soper 2009: 3). In endorsing alternative hedonism, Soper does not have eco-austerity in mind. On the contrary, she appears to reject the idea that austerity or frugality might constitute emergent objects of desire and sites of gratification (2008: 578, 2009: 5). Some commentators have responded to Soper's argument as if it were self-evident, reiterating the case against

what they call "hairshirt puritanism" (Lawson 2009; Scott Cato 2009). Yet within eco-austerity discourse, it has proved possible to construct a concept of austerity that has become an object of desire to some, through an emphasis on the rewards of doing more with less (Bramall 2013).

I have explained how the activities of certain actors in environmental politics in the UK have led to the construction of a new meaning for austerity—or "eco-austerity"—and offered some reasons as to why that meaning has resonated with significantly wide constituencies. In the next section of this chapter I will continue to document the emergence of new meanings of austerity, turning this time to the wake of the 2007–2008 financial crisis. Despite the apparent success that actors in environmental politics can claim for remaking the concept of austerity via the resources of austerity Britain, this meaning of austerity has subsequently been sidelined, with key actors such as Simms recognizing that the "whiff of [economic] austerity" has made it harder to make the case for "less is more" (Simms 2013: 312). In the final part of this chapter I will draw out some of the reasons why this has happened, reasons that indicate significant challenges for any project that seeks to remake the concept of austerity.

Securing Consent for Economic Austerity

In the immediate wake of the 2007–2008 financial crisis, the UK's Conservative Party sought to win the forthcoming general election by positioning themselves as the only party who would manage the economy "responsibly". David Cameron's speech to the Conservative Party Spring Forum (2009) began to elaborate this construction via a promise that the "age of irresponsibility" (that is, of the Labour Party's tenure) was "giving way to the age of austerity", and that a Tory government would deliver "more for less" (Cameron 2009). It is no surprise, then, that reference to austerity Britain—the same historical period that environmental actors had been using as a symbolic resource—quickly became integral to the Conservative Party's rhetoric of economic austerity, and later to the coalition government's justification of cuts. Conservative and neoliberal actors have drawn on this historical period to secure a notion of economic austerity as a highly moral policy (Cameron 2009; Osborne 2009). Calling forth a dominant recollection of the war as a time of "national unity" (Noakes 1998: 6), historical analogy has been used to summon up "a nation united in the face of adversity" (Clarke and Newman 2012: 303) and to lend weight to the argument that "we are all in this together" (Cameron 2010).

For this reason, commentators on the political left have observed that history has served as a critical symbolic resource in the task of securing the nation's consent—or at least acquiescence—to the coalition government's ideological and economic austerity agenda. Historical precedent has been used to reinforce a logic of "doing more with less" that has facilitated the further marketization and neoliberalization of public services. As Anita Biressi and Heather Nunn have argued, approving mobilizations of "historical lessons" from the austerity years have informed a "public reassessment of citizens' current and future prospects" (Biressi and Nunn 2013: 170).

These "historical lessons" have become highly visible as a certain vision of austerity Britain has become mainstreamed in British media and consumer culture. Routed via "[v]intage, nostalgia-led marketing, and retro-chic" (de Groot 2009: 10), the idea that austerity Britain offers a historical precedent for contemporary times has been widely disseminated, and there has been a surge of popular fascination in this period of history. The historical analogy between past and present has been reiterated in texts and contexts that include exhibitions, television programmes, magazine articles, recipe books and advertising. In these texts and contexts the style and iconography of the home front and the post-war austerity years are evoked through many of the same aesthetic elements revived within environmental campaigning, including the propaganda slogans "dig for victory" and "make do and mend".

The high level of saturation that this historical period has achieved in contemporary media culture has met with significant criticism from commentators on the left. Critics have blamed a culture steeped in nostalgia for austerity Britain—and enamoured of its affects, style, and "consolatory aesthetics"—for promoting ideological compliance to a neoliberal vision of the future (Hatherley 2009). The coalition government is perceived to have "seized the opportunity" presented by "austerity nostalgia" to assert that "doing without [can] be an occasion for virtue and health" (Seymour 2013); in short, nostalgia has been used to "sell us austerity" (Williams 2015).

Eco-Austerity, Co-Opted?

I have described two visions of the future to which "austerity" and the resources of the past have been articulated: one that imposes austerity for neoliberal ends, and the other that embraces austerity for transition and degrowth. While these orientations are clearly distinct, the symbolic

resources they deploy are shared, and these resources have become widely disseminated in consumer culture. Some of the practices that austerity discourse recommends—sewing and mending, for instance—have different ideological resonances, depending on the futures to which they are articulated. What consequences, then, does the mobilization of austerity Britain for neoliberal interests have for the eco-austerity discourse that I outlined above?

At a certain moment in the financial crisis, it seemed to many commentators as if the state of the global economy would only confirm the rectitude of anti-consumerist and environmental arguments. As David Evans notes (2011: 550), there has been a tendency within green politics to regard economic instability as "emblematic of a more extensive process of structural reorganisation" in which "ecological transition" can be achieved "through austerity" (Cohen 2012: 24). Reading the conjuncture optimistically in the wake of the financial crisis, the political commentator Neal Lawson argued that the recession was "opening up spaces for new ways to live and be free" (Lawson 2009: 241). Yet this hasn't proved to be the case, and in the struggle over austerity's meaning, a neoliberal, pro-growth vision has "won out". As the director of NEF Stewart Wallis put it recently, "when the financial crisis exposed plainer than ever the failings of today's economic status quo, it wasn't our vision that rose out of the ashes" (Wallis 2014).

I use the notion of a struggle deliberately, in order to identify austerity as a concept which divergent political interests, occupying a shared political terrain, have sought to "own", and to draw attention to the fact that the rise of eco-austerity discourse has a relationship to the currently prevailing discourse of economic austerity. While there has been very little recognition of the extent to which meanings of austerity and uses of the past connect and compete in the current conjuncture, several identifiable arguments have been made about the influence of eco-austerity discourse on the prevailing rhetoric around economic austerity. These arguments are worth discussing in more detail, as they raise issues that are highly relevant to the challenge of reconstructing the concept of austerity.

We can begin with a certain appraisal of eco-austerity that issues from an anti-environmentalist, politically libertarian position. Making reference to the fact that austerity was a significant concept in green politics long before the coalition government began to develop their own rhetoric of austerity, Neil Davenport (2009) argues that "the green champions of poverty […] helped to popularize a malign framework through which

the recession is now being discussed". Brendan O'Neill (2008a, see also 2008b) attributes a lack of debate about "the need for belt-tightening" to "a wide-ranging political consensus […] that people's material desires must be restrained", a consensus that he asserts was already in place before the financial crisis. The argument that these commentators pursue is that the turn to practices of austerity in green politics smoothed the way for the government's (economic) austerity policies. In establishing a connection between the notions of responsibility, sustainability, thrift and austerity, the popularization of eco-austerity discourse facilitated a claim about the morality and necessity of spending cuts (Bramall 2013).

Tracey Jensen has developed a more sophisticated reading of this discursive development that is also sympathetic to the original motivations of those actors in green politics who have sought to endorse practices of thrift and austerity. Jensen notes that practices of "new thrift" have become popular amongst the affluent middle-classes in the UK—those minimally affected by the impact of the spending cuts. She argues that these practices may "draw on older environmental and ecological countercultures and principles, but they are articulated in distinctly new ways":

> "New thrift" promises that it is not only possible to survive on less, but also that we will be happier as a result and that we will reconnect with moral virtue and discover new kinds of value that are not predicated on consumption and extravagance. "New thrift" is a reinvention of frugality for the neoliberal generation. (Jensen 2013: 64)

For Jensen, the new cultural politics of austerity feeds off meanings of austerity and thrift generated in green politics, but no longer has very much to do with these principles. Her analysis is not a critique of anti-consumerism per se, but of how this orientation, when communicated via a neoliberal politics of thrift, can serve as a means of circulating "pathologies about the 'wrong' kind of […] consumption" (2013: 65). In the context of economic austerity, she argues that thrift has been "reinvigorated as a source of cultural value", and has become "a site where classed Others are produced and symbolically shamed for not being austere enough" (2012: 15).[8]

These readings of the relationship between discourses of eco-austerity and economic austerity are in certain respects rather limited. They tend, first of all, to assume that environmental or transition-oriented concerns have already been residualized (or largely put aside) in the practices and

discourses of austerity that they seek to critique. These practices and discourses are viewed instead as necessarily reflective of dominant political-economic interests and therefore as fostering ideological compliance. The problem here is that this argument tends to obscure the antagonism towards dominant neoliberal interests that eco-austerity or a politics of thrift continues to present. Even in those cases where eco-austerity practices are adopted primarily as a means of generating class distinction—for instance, in a context where a middle-class family blogs about their efforts to become self-sufficient in a mode that is highly judgemental of others' consuming practices—those practices continue to be aligned with a politics of transition or degrowth rather than the dominant orientation towards economic growth.

A second and related limitation of these readings is that they tend to assume that an environmental or transition-oriented politics is (or often can be) hostile to the interests of ordinary working-class people. This attitude is evident in the libertarian Marxist perspective I cited earlier, in which "eco-austerity" is aligned with the hegemony of liberal environmentalism, and is attacked as a "tool of political oppression" heralding "war-style cuts in people's choices and living standards" (O'Neill 2008a). Just as they obscure the continuing antagonism towards an ideology of degrowth that eco-austerity presents, these commentators arguably fail to take account of the centrality of principles of social justice and equality within the degrowth and transition movements. As Ernest Garcia has argued, austerity for degrowth requires more, not less, equality (2013; Suryawinta and Maas 2012). While it must be recognized that certain expressions of eco-austerity can work to consolidate class distinction, many eco-austerity-inspired interventions—such as those initiated by the NEF—are oriented towards greater social equality, as well as towards environmental sustainability. As my discussion of the discourse of "digging for victory" demonstrated, the historical period of austerity Britain can be used as a symbolic resource that opens up participation in transition-oriented activities to diverse constituencies. The mindset exemplified in O'Neill's critique of eco-austerity discourse, in which the protection of "hard-won privileges" is primary (Ross 2009: 9), is one that prevails in many strands of left politics. A long-standing hostility towards political projects that appear to endanger these privileges is surely one of the most serious obstacles that any attempt to remake the concept of austerity will have to confront.

It has to be recognized, however, that the criticisms Jensen develops of austerity culture and the "new thrift" are significant ones. As Sarah Marie Hall (2015: 145) emphasizes, it is inappropriate and insensitive to equate austerities adopted as "sustainable" lifestyle choices with the imposition of austerity (for example in the form of welfare cuts) on people who may already be living in poverty.[9] Jensen draws our attention to the ways in which practices and symbolic resources that can be articulated to environmental objectives have, in some cases, been transformed into resources that perpetuate inequalities, and in particular those of class. The risk that environmental principles could be elaborated in this way can be seen as an outcome of an environmental politics that is oriented towards an inward-facing, communitarian politics of resilience, localism and self-sufficiency. Too often, environmental practices become ways of closing down, rather than opening up, the possibilities for wider participation and benefit. In these contexts, post-material values may be constructed in exclusionary terms.

Austerity for Transition and Degrowth

In the course of this chapter I have discussed the rise of a historically inflected austerity discourse in the UK with a view to identifying some of the lessons this case study provides for a project of remaking the concept of austerity and cognate phrases such as "living within our means" and "less is more". There are perhaps three key insights to be derived from this survey.

First, the turn to a concept of austerity in environmental and transition politics demonstrates the radical discursivity of austerity. Against the views of those that would argue that "austerity" will always and necessarily be associated with puritanism, self-denial and displeasure, the rise of desire for austerity in this context provides evidence that the meanings linked to this signifier can in fact be radically reinvented. At the same time, this radical discursivity must be reckoned within a broader context of discursive struggle between different political agendas; there is a high risk that emergent discourses can be co-opted by divergent interests, particularly where they have begun to be successfully disseminated in popular media culture.

Second, any project of remaking the concept of austerity will require high levels of creativity when it comes to the task of identifying the symbolic resources that will facilitate such a project. These symbolic resources need to deliver opportunities for modelling pro-environmental economies and practices, and for the construction of analogy and precedence. While

the past is not the only symbolic resource that is available for such a task, my case study demonstrates that it is a particularly valuable and potent resource. When it is approached with a degree of instrumentality, history can deliver many of these opportunities.

Third, and above all, a socially reconstructed concept of austerity for transition and degrowth must be both meaningful and appealing to the broadest possible constituencies. This will involve perpetuating a vision of austerity that promotes equality and social justice, rather than one that facilitates class distinction. A vision that accommodates a leftist defence of the living standards of the economically vulnerable is required, rather than one that instigates such a critique. The broader critical insight to be gleaned here is that any project of giving new meaning to the signifier "austerity" must at the same time recognize and engage with the broader task of forging connections between labour and environmental politics in order to meet the challenges of the present conjuncture. In emphasizing the need for such articulations to occur, Andrew Ross describes a "potential alliance" between red and green politics as "one of the great unfulfilled legacies from the twentieth century" (Ross 2009: 129). In the wake of the global financial crisis and the implementation of economic austerity policies, the task of articulating "green" austerity to "red" anti-cuts protest has become all the more pressing (Compass 2011; see also Bailey 2015).

This is a significant challenge, and I want to end by drawing attention to two possible ways forward. On the challenge of promoting post-material values, I find Ruth Levitas's utopian reading of austerity culture and its constraints extremely valuable. Levitas recognizes that the endorsement of post-material, anti-consumerist values risks "diverting attention from distributive questions" (Levitas 2012: 338). She argues nonetheless that the "appeal of austerity" lies in the fact that it carries "the desire for an alternative society" (Levitas 2012: 339), and recommends that we try to read austerity through a "hermeneutics of faith" rather than one of suspicion. The purpose of such a reading would, she argues, be to "create a narrative" in which the promotion of ideas about reduced consumption and self-organization "cease to be an ideological cover for neo-liberal dispossession of the poor, and become positive attributes embodied in another potential society" (Levitas 2012: 336).

Informed by this perspective, the task of reconstructing the concept of austerity is one that demands close attention to ways in which post-material values and environmental objectives can be linked to questions of social justice (Levitas 2012: 338). In relation to the case study I have been

discussing, this task might involve paying close attention to the practices of austerity—of digging, making and "doing"—that are so highly valued in austerity culture, and to the contexts in which these practices can be articulated to a politics of transition or degrowth that prioritizes equality and distributive justice. It might involve exploring how and where desire for austerity is articulated not only to care for the environment, but to institutions of the public sector, to care for others, and to alternative conceptions of the future.

Alongside Levitas's utopian hermeneutics, I also want to draw attention to the opportunities that reimagining austerity outside of a paradigm of scarcity might present. Reflecting on the interpenetration of rhetorics of economy and ecology in an earlier moment of recession, Andrew Ross has argued that a certain environmentalist perspective that regards the "principle of scarcity" as "a rudimentary circumstance of nature" is guilty of projecting "particular social prejudices […] into ideas about the natural world. Nature only appears to be 'limited' or 'scarce' if it is conceived as a finite quantity of economic resources that can be renewed or exhausted" (1994: 261). The story of eco-austerity's co-option to neoliberal interests in the UK context can be attributed, on this account, to an acceptance of scarcity "as a default condition", and by the adoption of a framework "strikingly similar to that used to describe the global debt economy" (1994: 14). In a post-scarcity future, Ross argues, "scarcity no longer exists conceptually as a default condition, and an ecological society has developed a more democratic way of ordering its priorities" (1994: 271; see also D'Alisa et al. 2014). A further challenge might then be to imagine the conceptual function of "austerity" not just for transition or degrowth but in a post-scarcity future.

Notes

1. Association for the Taxation of Financial Transactions and for Citizens' Action.
2. For further discussion of this pairing see Bramall et al. (forthcoming).
3. The Schumacher Circle is a group of organizations inspired by the work of E. F. Schumacher. See: http://www.schumacher.org.uk/schumacher-circle/
4. The term "home front' refers to the civilian contribution to the war effort.
5. For a discussion of the recasting of similar traditional and domestic practices in the context of Poland, see Podkalicka and Potkańska (2015).
6. In the UK, allotments are small plots of land that are rented for a small fee, and used primarily for growing vegetables. Usually located a short distance

from the allotment holder's residence, they exist in both rural and urban settings.

7. See for example Imperial War Museum London (2008); Isaac (2012).
8. Extending this argument, it might also be argued that austerity nostalgia's "vogueish signifiers', which have been interpreted as "almost comically white' (Harris 2009), also serve as a site for the production of raced "others' (see Pitcher 2014: 59).
9. For a resource database of research on the impact of spending cuts on low income families and deprived communities in the UK, see http://www2.warwick.ac.uk/fac/soc/law/research/centres/chrp/projects/spendingcuts/resources/database/reportsgroups

References

Bailey, D. (2015). The environmental paradox of the welfare state: The dynamics of sustainability. *New Political Economy*, 1–19.

Bentley, A. (1998). *Eating for victory: Food rationing and the politics of domesticity*. Urbana: University of Illinois Press.

Biressi, A., & Nunn, H. (2013). *Class and contemporary British culture*. Basingstoke: Palgrave Macmillan.

Blyth, M., & Mills, T. (2013, August 14). Power and prejudice: The politics of austerity (Part 1). New Left Project . http://www.newleftproject.org/index.php/site/article_comments/power_prejudice_the_politics_of_austerity_part_1. Accessed 4 November 2014.

Bramall, R. (2011). Dig for victory! Anti-consumerism, austerity, and new historical subjectivities. *Subjectivity, 4*(1), 68–86.

Bramall, R. (2013). *The cultural politics of austerity: Past and present in austere times*. Basingstoke: Palgrave Macmillan.

Bramall, R., Gilbert, J., & Meadway, J. (forthcoming). Roundtable: The politics of austerity. *New Formations*.

Cameron, D. (2009, April 27). The age of austerity. Speech to the Spring Forum. Politics.co.uk. http://www.politics.co.uk/comment-analysis/2009/04/27/tory-spring-conference-speeches-in-full. Accessed 10 November 2014.

Cameron, D. (2010, October 6). David Cameron's conservative conference speech in full. http://www.telegraph.co.uk/news/politics/david-cameron/8046342/David-Camerons-Conservative-conference-speech-in-full.html. Accessed 10 November 2014.

Clarke, J., & Newman, J. (2012). The alchemy of austerity. *Critical Social Policy, 32*(3), 299–319.

Cohen, M. J. (2011). Is the UK preparing for "war"? Military metaphors, personal carbon allowances, and consumption rationing in historical perspective. *Climatic Change, 104*, 199–222.

Cohen, M. J. (2012). Transitioning to a postconsumerist future. *Green European Journal, 3*, 21–31.

Compass. (2011). *Good society/green society? The red-green debate*. London: Compass.
Crouch, D., & Parker, G. (2003). "Digging-Up" utopia? Space, practice and land use heritage. *Geoforum, 34*, 395–408.
Crouch, D., & Ward, C. (1997). *The allotment: Its landscape and culture*. Nottingham: Five Leaves.
D'Alisa, G., Demaria, F., & Kallis, G. (2014). From austerity to dépense. In G. D'Alisa, F. Demaria, & G. Kallis (Eds.), *Degrowth: A vocabulary for a new era*. Abindgon: Routledge.
Davenport, N. (2009, January 20). A society out of joint. Spiked. http://www.spiked-online.com/review_of_books/article/6160#.VGDDRofZeT8. Accessed 10 November 2014.
de Groot, J. (2009). *Consuming history: Historians and heritage in contemporary popular culture*. Abingdon: Routledge.
de Saint-Do, V. (2013). Degrowth without austerity: Interview with Vincent Liegey. Un Projet de Décroissance, http://www.projet-decroissance.net/?p=1624. Accessed 4 November 2014.
DeSilvey, C. (2003). Cultivated histories in a Scottish allotment garden. *Cultural Geographies, 10*, 442–468.
Dibley, B., & Neilsen, B. (2010). Climate crisis and the actuarial imaginary: "The war on global warming". *New Formations, 69*, 144–159.
Eley, G. (2001). Finding the people's war: Film, British collective memory and world war II. *American Historical Review, 106*(3), 818–838.
Evans, D. (2011). Thrifty, green or frugal: Reflections on sustainable consumption in a changing economic climate. *Geoforum, 42*, 550–557.
Garcia, E. (2013, August 28–31). Austerity, degrowth, equality and sustainability. XIESA European Sociological Association Conference, Turin.
Ginn, F. (2012). Dig for victory! New histories of wartime gardening in Britain. *Journal of Historical Geography, 38*(3), 294–305.
Hall, S. M. (2015). Everyday ethics of consumption in the austere city. *Geography Compass, 9*(3), 140–151.
Hatherley, O. (2009). Lash out and cover up: Austerity nostalgia and ironic authoritarianism in recession Britain. *Radical Philosophy, 157*, 2–7.
Hickman, L. (2008, August 30). Dig for victory. Guardian, 33.
Hillman, M., & Fawcett, T. (2004). *How we can Save the planet*. London: Penguin.
Hinton, E., & Redclift, M. (2009). *Austerity and sufficiency: The changing peolitics of sustainable consumption*. Environment, politics and development working paper series 17. http://www.kcl.ac.uk/sspp/departments/geography/research/epd/HIntonRedcliftWP17.pdf. Accessed 4 November 2014.
Hope, N., & Ellis, V. (2009). Can you dig it? Meeting community demand for allotments. http://www.nlgn.org.uk/public/2009/can-you-dig-it-meeting-community-demand-for-allotments/. Accessed 10 November 2014.
Hopkins, R. (2008). *Transition handbook: From oil dependency to local resilience*. Totnes: Green Books.

Imperial War Museum London. (2008). *Dig for victory teachers' pack*. http://archive.iwm.org.uk/upload/package/79/DigForVictory/schools.htm. Accessed 10 November 2014.
Isacc, D. (2012). How does your garden grow? *Guardian Weekend, 22*, 92–93.
Jensen, T. (2012). Tough love in tough times. *Studies in the Maternal, 4*(2), 1–26.
Jensen, T. (2013). Austerity parenting. *Soundings, 55*, 61–71.
Klein, N. (2014). *This changes everything*. New York: Simon and Schuster.
Lawson, N. (2009). *All consuming*. London: Penguin.
Levitas, R. (2012). The just's umbrella: Austerity and the big society in coalition policy and beyond. *Critical Social Policy, 32*(3), 320–342.
Maréchal, A. (2012). No growth? In search of another path for Europe. *Green European Journal, 3*. http://www.greeneuropeanjournal.eu/no-growth-in-search-of-another-path-for-europe. Accessed 4 November 2014.
Massumi, B. (2009). National enterprise emergency: Steps toward an ecology of powers. *Theory, Culture and Society, 26*(6), 153–185.
Noakes, L. (1998). *War and the British: Gender and national identity, 1939–91*. London: I.B. Tauris.
Noakes, L., & Pattinson, J. (2013). The cultural memory of the second world war. In L. Noakes & J. Pattinson (Eds.), *British cultural memory and the second world war*. London: Bloomsbury.
O'Neill, B. (2008a). Against austerity. *Spiked*. http://www.spiked-online.com/newsite/article/5790#.VGDED4fZeT8. Accessed 10 November 2014.
O'Neill, B. (2008b). The joy of less. Guardian. http://www.guardian.co.uk/commentisfree/2008/nov/02/recession. Accessed 10 November 2014.
Osborne, G. (2009, August 11). Progressive reform in an age of austerity. Speech to Demos. Demos. http://www.demos.co.uk/press_releases/george-osborne-progressive-reform-in-an-age-of-austerity. Accessed 10 November 2014.
Passadakis, A. J. & Schmelzer, M. (2010). 12 lines of flight for just degrowth. Postwachstum in Bewegung. http://postwachstum.files.wordpress.com/2010/11/justdegrowth_12_lines_of_flight1.pdf. Accessed 4 November 2014.
Pitcher, B. (2014).*Consuming race*. Abingdon: Routledge.
Podkalicka, A., & Potkańska, D. (2015). On the meaning of popular representations of low budget urban practices in Poland: The case of cultural translation. *ephemera, 15*(1), 95–119.
Randall, R. (2009). Loss and climate change: The cost of parallel narratives. *Ecopsychology, 1*(3), 118–129.
Ross, A. (1994). *The Chicago gangster theory of life: Nature's debt to society*. London: Verso.
Ross, A. (2009). *Nice work if you can get it: Life and labor in precarious times*. New York: New York University Press.
Scott Cato, M. (2009, December 21). Greens should revel in Christmas, not shun it. *Ecologist*. http://www.theecologist.org/blogs_and_comments/commentators/Molly_Scott_Cato/383948/greens_should_revel_in_christmas_not_shun_it.html. Accessed 10 November 2014.

Seymour, R. (2013). "Austerity cooking" has been hijacked by the moralisers. Guardian. http://www.theguardian.com/commentisfree/2013/aug/28/austerity-cooking-jack-monroe-hijacked-moralisers. Accessed 2 September 2014.

Simms, A. (2001). *An environmental war economy*. London: New Economics Foundation.

Simms, A. (2011). *The new home front*. London: Caroline Lucas/Green Party.

Simms, A. (2013). *Cancel the Apocalypse: The new path to prosperity*. London: Little, Brown.

Simms, A. & Potts, R. (2011). The great reskilling. *Resurgence* 269. http://www.resurgence.org/magazine/article3509-the-great-reskilling.html. Accessed 4 November 2014.

Soper, K. (2008). Alternative hedonism, cultural theory and the role of aesthetic revisioning. *Cultural Studies, 22*(5), 567–587.

Soper, K. (2009). Introduction: The mainstreaming of counter-consumerist concern. In K. Soper, M. Ryle, & L. Thomas (Eds.), *The politics and pleasures of consuming differently*. Basingstoke: Palgrave Macmillan.

Stevenson, N. (2012). Localization as subpolitics: The transition movement and cultural citizenship. *International Journal of Cultural Studies, 15*(1), 65–79.

Suryawinta, D., & Maas, W. (2012). Austeria: City of minimum consumption. *Architectural Design, 82*(4), 114–118.

The Ministry of Trying to Do Something About It. (2009). *About ration me up*. The Ministry of Trying to Do Something About It. http://theministryoftryingtodosomethingaboutit.wordpress.com/. Accessed 10 November 2014.

Theien, I. (2009). Food rationing during world war two: A special case of sustainable consumption? *Anthropology of Food, S5*. http://aof.revues.org/6383. Accessed 10 November 2014.

Transition Network. (2013a). The great reskilling. Transition Network. https://www.transitionnetwork.org/ingredients/deepening/great-reskilling. Accessed 4 November 2014.

Transition Network. (2013b). 12 ingredients. Transition Network. https://www.transitionnetwork.org/support/12-ingredients. Accessed 4 November 2014.

Wallis, S. (2014, November 4). An economic system that supports people and planet is still possible. *Guardian*. http://www.theguardian.com/sustainable-business/2014/nov/04/economic-system-supports-people-planet-possible. Accessed 10 Nov 2014.

Williams, Z. (2015, April 30). Let's ditch the nostalgia that's invaded our TV and seeped into our politics. *Guardian*. http://www.theguardian.com/commentisfree/2015/apr/30/ditch-nostalgia-television-politics-austerity-bake-off. Accessed 30 April 2015.

CHAPTER 6

Coffee, Toast and a Tip? Initial Reflections on the Transformation of the Self

Jorge Riechmann

In memory of Paco Fernández Buey and Miguel Romero "Moro"

Speaking at the opening ceremony of the museum to commemorate the victims of the 9/11 attacks in New York on 15 May 2014, US president Barack Obama avowed that "nothing will change what we are" (*Time*, 15 May 2014). In contrast, the slogan of the Second Conference on Degrowth held in Madrid 6–8 June 2014, evoked the words of Uruguayan writer Eduardo Galeano: "we are what we do to change what we are".

One would have to be almost wholly illiterate in history and psychology to talk like Obama or be taken in by such propaganda… What is clear, however, is that we tend to systematically underestimate the extent to which, regardless of whether we want to, human beings change, both individually and collectively (Baggini 2011). Yet the subject of this reflection is not this inevitable and continuous unintentional change but rather the changes we seek to enact intentionally, and it seeks to explore the outlooks opening up before us to change what we are, informed by our inadequacies and insufficiencies, as discussed at the conference in Madrid.

Translated from the Spanish by J.C. Kelly. Unless otherwise stated, all quotes have been translated from the Spanish.

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We often think of the "New Man" as a matter for the left, evoking names such as Karl Marx and Che Guevara… In fact, it is also a central issue for the neoliberal thought that has come to dominate over the last four decades. As Margaret Thatcher once famously remarked, "economics are the method: the object is to change the soul" (*Sunday Times*, 7 May 1988). Indeed, as Dardot and Laval (2014) show, neoliberal politics must *constantly change and reconstruct the human subject*: in an economy based on perpetual movement, incessant intervention in the way we live and think is needed to maintain adaptation to the economic conditions to which we are subjected.[1]

Context-Dependent Decisions

I often have breakfast in a bar in Madrid, where a cup of coffee and a (generous) portion of toast with tomatoes and olive oil cost €2.40.[2] Depending on what day it is, one of two waiters may bring me my change. The first, who is older, always puts the coins into my hand and I put them away in my wallet; the second, who is perhaps a little sharper, hands me the change on a plate and I leave him a tip, normally about ten cents.

The results of this seemingly trivial experiment will come as no surprise to anyone who has studied human behaviour. Whether or not to leave a tip often depends on simple contextual factors (in this case, perhaps the mechanism involved is a personal rule such as not wanting to leave an empty plate to avoid looking mean, which does not come into play when there is no plate). However, many of the most important decisions we make, such as whether to help when we see someone in danger, are also, to a similar extent, context-dependent.

Such matters have been studied by a branch of "experimental philosophy" for a number of years now,[3] informed by disciplines such as social psychology, the cognitive sciences, neurology, cultural anthropology, sociology and primatology.

Our Closest Context and Environment: The Other Human Beings in the Groups We Belong to

It all goes back to the—oldest—institutionalist schools of thought in the social sciences, which have emphasized the importance of good and bad institutions in shaping our politico-moral behaviour for many years now. The French economist Michel Husson, for example, insists on this point, highlighting the importance of deliberative (and even decision-making)

institutions, such as "citizen tribunals" and "consensus conferences" in a society that strives to become a true democracy, a society worthy of being described as participative. Husson advocates such institutions

> as a means to re-appropriate the debates between experts and sidestep pressure groups, not as a substitute for parliamentary democracy or for decisions that result from a long and complex process of deliberation by a society over the course of days regarding its next options. It does, however, reveal the decisive importance of institutional regulations and the process of exchange and confrontation. This almost naturally gives rise to positions that favour non-mercantile solutions or the development of public goods… (Husson 2013, 132)

Hence different rules result in alternatives that aspire to the common good instead of the staunch defence of private and corporate interests. This recalls the famous claim made by the Augsburg playwright Bertold Brecht in the context of the debates on the "New Man" that took place in the heart of the socialist and communist movements of the twentieth century. The New Man, he claimed, is nothing more than the old man in new situations. His claim would be borne out by results from all the scientific disciplines mentioned above.

Is the New Man Really Just the Old Man in New Situations?

Has the secular problem of social change and human transformation thus been solved? Not entirely… In a famous passage from Marx's *Critique of Hegel's Philosophy of Right*, is an incitement to "overthrow all conditions in which man is a debased, enslaved, neglected, contemptible being" (Marx 1970, 137). But how can we change these situations? Who educates the educator? Who watches over the guardian? How can we shape contexts that favour good human behaviour? Moreover, how can this be done without at least a few "New Men" (and New Women) willing to sacrifice themselves for the common good? The situation recalls another famous problem of the left: that of the emancipatory egg and the chicken of liberation. At the very least, we must be aware of the problem of "Ulysses and the Sirens" described by Elster (1979) and there must be mechanisms to secure the commitment required to deal with the numerous instances of "lack of willpower", of politico-moral weakness, of letting ourselves sink to a level that brings out our worst.[4]

Perhaps all this needs to be stated in even stronger terms. Towards the end of his 1983 lecture "The Marxist Tradition and New Problems" Manuel Sacristán insisted on the need for a profound cultural change, introducing one of Marx's ideas from the *Grundrisse* that continues to play a fundamental role in all our conceptions of future liberated communities:

> A subject that does not oppress women, is not culturally violent and does not destroy nature, let us be clear, is an individual that will have had to undergo a significant change. At the risk of sounding provocative, to catch people's attention, we could say: this individual must have experienced what religious traditions refer to as *a conversion*. […] The necessary changes thus require a conversion, a change of the individual. (Sacristán 2003, 360)[5]

As Salvador López Arnal has suggested, the idea of the *feminization of the revolutionary subject and the idea of a just society itself* is closely related to this notion of conversion, a point on which Sacristán owes much to Wolfgang Harich: "the values of positivity, nutritious continuity, restraint and balance—'piety'—are, in our cultural tradition, largely female" (Sacristán 1987, 15). The ecologically grounded socialism of Sacristán and Paco Fernández Buey would hence be feminist: ecofeminist.

The other proposal from Sacristán's later works, coming during the last decade of his life dedicated to rethinking Marxist communism from an ecosocialist standpoint, which must be considered alongside this notion of conversion, is the idea of *not separating means from ends*. While a classical Marxist, argued the Spanish eco-Marxist thinker,

> above all from the Third International, from the early days of the Third International, or the Fourth International, would tend to see a certain separation between ends and means, I believe the enormous repercussions between—if not the inseparability of—means and ends is becoming increasingly part of the contemporary sensibility. (Sacristán 2005, 154)

Hence the continuous feedback between means and ends.

How Can the After Engender the Before?

In the colloquium following a conference held on 12 January 2012 in the School of Labour Relations at the Universidad Complutense de Madrid (the first session of a course entitled "Global Crisis: Struggles for Dignity and Alternative Projects"), Juan Carlos Monedero insisted on the need for

positive outlooks to prevent people becoming demoralized, demotivated and paralysed by fear. He was right. But what type of outlooks?

While it is true that fear is necessary to cause reaction, what is important is the delicate balance to be struck whereby fear stimulates without paralysing. We also know that the transition to a more austere and sustainable world will not only imply having to make sacrifices, but that we will also gain in the process. The issue is about *living well with less* (Linz et al. 2007). What we will lose in terms of gadgets plagued with programmed obsolescence, for example, we will gain in the pleasures to be found in rich social relations (let us here recall that we are all *homo compensator*, as Odo Marquard delights in reminding us). However, the problem, and it is an enormous one, lies in the fact that *being able to appreciate these gains almost always implies living according to a different set of values*: new, post-transition values that must replace the old communist ones. Hence, the after, in a sort of retroactive dialectic, must construct these foundations to engender the before.

If we realize, for example, that current levels of air travel are unsustainable and unjust,[6] if we accept that ecological decency and environmental justice advise us to turn our backs on planes and go back to slow journeys by train and boat, *we must first have revalued slowness in order to see this change as a gain and not a painful loss.* (Here I leave to one side the important issue of structural constrictions on speed, which in some cases simply makes choice impossible.)

In the absence of some sort of leap, we would appear to have reached a dead end, hence our reflection on the notion of conversion. There is no way a non-repressive (and secular) culture of frugality can emerge without a profound transformation of contemporary ideas about pleasure, satisfaction, happiness and the good life.

Politico-Moral Self-Construction

It should be noted that the Greek, or Greek–French, philosopher Cornelius Castoriadis was also interested in the issue of "conversion", around the same time as Sacristán. For Castoriadis, the idea of true democracy required a

> radical transformation of what human beings regard as important and unimportant, valuable and without value; in other words, a profound psychic and anthropological transformation with the creation of new ways of life and new meanings across all domains in parallel.

He continued:

> Perhaps we are far from this, perhaps not. The biggest contemporary social and historical transformation, which we have all been able to observe during the last decade, which is when it has become truly visible, even though it was taking place three quarters of a century before, was not the Russian revolution or the bureaucratic revolution in China, but the change of the position of woman and her role in society. (Castoriadis 1980, 216)

Here, Edgar Morin's reflections and proposals on human reform are also of relevance.[7]

Writing about the capital city of his country, the Colombian author William Ospina remarked:

> some people say Bogotá is just a great mass of ugliness and disorder, without anything of use in constructing a true city and a civic culture. But seven million people are seven million human stories full of meaning, with pasts and hopes; this fundamental material has always been central to great historical tasks and no one has the right to deprive people of the possibility of transformation. (Ospina 2012, 93)

This human *capacity for self-transformation* leads to an interesting idea by the Israeli political scientist Avishai Margalit, who stresses that the human capacity of "reevaluating one's life at any given moment, as well as the ability to change one's life from this moment on" is the foundation of human dignity. He writes of the

> ability of human beings to repent of their sins, in the secular sense of this concept—that is, to abandon their evil ways. The claim is that humans have this ability. Even if there are noticeable differences among people in their ability to change, they are deserving of respect for the very possibility of changing. (Margalit 1996, 70)

Christians know that in most cases, to become good people, we must break ourselves and undergo a profound reconstruction, an experience referred to as *conversion*. We on the left cannot ignore this basic fact. Once again, we have reached a point where we require some form of New Man and New Woman, this time as part of a *politico-moral self-construction* (both individual and collective).

Who Educates the Educator?

The only escape from the apparent dilemma lies in realizing that the emancipatory egg and the chicken of liberation are related through *feedback loops*, to use a term from systems theory, not so far removed from the old philosophical vocabulary of the *dialectic*. In the third of his *Theses on Feuerbach*, Marx describes dialectic feedback as between being shaped by circumstances and shaping them:

> The materialist doctrine concerning the changing of circumstances and upbringing forgets that circumstances are changed by men and that it is essential to educate the educator himself. This doctrine must, therefore, divide society into two parts, one of which is superior to society.
>
> The coincidence of the changing of circumstances and of human activity or self-changing can be conceived and rationally understood only as *revolutionary practice*. (Marx 1969)[8]

Canadian Marxist Michael Lebowitz has also stressed the importance of practice, emphasizing its relationship with *human development*:

> Implicit in the emphasis of the concept of socialism for the 21st century upon human development and how that development can occur only through practice is our need to be able to develop through democratic, participatory and protagonistic activity in every aspect of our lives. Through revolutionary practice in our communities, our workplaces and in all our social institutions, we produce ourselves as "rich human beings"—rich in capacities and needs—in contrast to the impoverished and crippled human beings that capitalism produces. (Lebowitz 2008)

The solution—or the way to a solution—to the problems of chicken and egg in human matters, is called *praxis*. In the end, the Marxist concept of praxis is closely related to the philosophical and religious concept of *conversion*. Hence, praxis must also—and not by chance—be understood as a *self-transformation of the subject*.[9] On the one hand, as individuals we in fact "re-socialize" when we participate in the struggles of emancipatory social movements (which self-construct themselves as collective subjects through this practice);[10] on the other, we also need the other type of individual transformation that can be achieved by leading a *philosophical life* in small groups. The French classical Greco-Roman philosopher Pierre Hadot (1922–2010) placed a particular emphasis on this point, neatly captured by his belief in Henri Bergson's idea that "philosophy is not the

construction of a system, but the resolution made once to look naively at the world in and around oneself" (Hadot 2009, 10).[11]

What Type of Self-Construction?

Self-construction, I hear you say, what's new! We can't stop self-constructing! This is true: the human being—as an "unfinished" species, in the words of Arnold Gehlen, as an animal with a deficit of instinctive behaviour—cannot avoid self-constructing itself in one way or another (using the tools of language and culture).[12] The crux of the matter, then, appears to lie in this "one way or another": in the type of self-construction we enact.

We could simply submit to the mechanisms present in our society—in any society—and allow them to shape us (and never have such mechanisms been so powerful as those of neoliberal capitalism): identity defined by consumption, entertainment through an incessant barrage of audiovisual content, pre-programmed political/apolitical behaviour, the control of desires and behaviour through smartphones and big data, the celebration of children's fashion, the sterile "rebelliousness" contrived by marketing creatives ("be yourself", "the sky's the limit", etc.).

Or we can reject all this and set out on the much more arduous path of a *critical self-construction*, both individual and collective, which in fact has been the goal of Western philosophy since its origins, since the time of Heraclitus and Socrates, right through to the present day (leaving emancipatory events such as feminism and socialism in its wake).

When philosophy becomes embodied in a mass movement with significant potential for cultural impact, we call it *enlightenment*. Hence we talk of a "Greek Enlightenment" and the European Enlightenment of the seventeenth and eighteenth centuries, and currently face the problem of a "Third Enlightenment", which Hilary Putnam has been advocating for many years (Putnam 2004)[13] if only we could give thrust to the movement of critical self-construction I have been discussing. A Third Enlightenment informed by values such as liberty, equality, solidarity, sustainability and biophilia.

Decentring and Transforming the Self: Mitigating Egocentricity

I would like to quote a few lines by the French Marxist sociologist Georges Friedmann (1902–1977), who was active in the resistance against the Nazis and who was fond of evoking Pierre Hadot:

> To take flight every day! At least for a moment, which may be brief, as long as it is intense. A "spiritual exercise" every day—either alone, or in the company of someone who also wishes to better himself. Spiritual exercises. Step out of duration … try to get rid of your passions, vanities, and the itch for talk about your own name, which sometimes burns you like a chronic disease. Avoid backbiting. Get rid of pity and hatred. Love all free human beings. Become eternal by transcending yourself.
>
> This work on yourself is necessary; this ambition justified. Lots of people let themselves be wholly absorbed by militant politics and the preparation for social revolution. Rare, much more rare, are they who, in order to prepare for the revolution, are willing to make themselves worthy of it. (Friedmann (1970) in Hadot 1995, 81)

Unless I am very much mistaken, these lines were originally penned in the midst of the Resistance's "dark night of the soul" (although subsequently published in later works). They seem especially valuable in our current circumstances, in our own "dark night" of the twenty-first century, the Century of the Great Test (Riechmann 2013, 2014b). Hadot, who has spent a considerable amount of time advancing a philosophical tradition of "spiritual exercises", which are present in all major classical Greco-Roman schools of thought and which are partially appropriated by the later Latin Christianity, asks if this text is not in fact paraphrasing Marco Aurelio. *Ascesis*, understood not as asceticism in the modern sense of the word, but as the practice of a spiritual exercise, can be found throughout the classical philosophical tradition, whose main concern was not the elaboration of theoretical systems or the production of critical discourse but a special way of life that sought to produce a change in how we view the world and a metamorphosis of our personality. Hence for the Stoics and the Epicureans,

> the philosophical act is not situated merely on the cognitive level, but on that of the self and of being. It is a progress which causes us to *be* more fully, and makes us better. It is a conversion which turns our entire life upside down, changing the life of the person who goes through it. It raises the individual from an inauthentic condition of life, darkened by unconsciousness and harassed by worry [and suffering], to an authentic state of life, in which he attains self-consciousness, an exact vision of the world, inner peace and freedom. (Hadot 1995, 83)

Conversion: *Epistrophe* and *Metanoia*

According to Hadot:

> The Latin word *conversio* in fact corresponds to two Greek words with different meanings, on one hand *epistrophe*, which signifies change of orientation and implies the idea of a return (return to the origin, return to the self), on the other hand *metanoia*, which signifies change of mind, repentance, and implies the idea of a mutation and a rebirth. (Hadot 1968)

He continues:

> At all levels, the phenomenon of conversion reflects the irreducible ambiguity of human reality. On one hand, it testifies to the liberty of the human being, capable of totally transforming herself in reinterpreting her past and her future; on the other hand, it reveals that this transformation of human reality results from an invasion of forces exterior to the "me", that it is more about divine grace or some psychosocial constraint. One can say that the idea of conversion represents one of the constitutive notions of Western consciousness and conscience: in effect, one can represent the whole history of the West as a ceaseless effort at renewal by perfecting the techniques of "conversion", which is to say the techniques intended to transform human reality, either by bringing it back to its original essence (conversion–return), or by radically modifying it (conversion–mutation). (ibid.)

Here we should note the nature of the absolute, often defended by religions and universalist ideologies, and the associated phenomena of conversion. If someone believes they are in possession of a definitive truth that is total and absolute, a trap into which it is particularly easy for monotheistic religions to fall,[14] the temptation to proselytize comes practically a priori and it is all too easy for violent methods to be used to impose conversion (and annihilate opponents). Furthermore, there can be no doubt that this danger is at its greatest when this pretension to the absolute is coupled with an apparatus of power (as is the case with the many churches and political parties that have merged with states).

The Temptation to Become Gods

Another evident danger is the relativization of the mundane, which we have seen in various sapient historical traditions (e.g. Hindu, Stoic and Christian abjurers), leading to the type of selfishness without solidarity

common to those who situate themselves outside the world, disengaging from its events. Old forms of wisdom, such as Stoicism and Buddhism, provide practical tools to overcome the misfortune of the human condition by acting on the process by which the desires that make us unhappy are formed. In some senses, this "self-creation"—or better put self-construction—encourages us to "be like gods" (Kolm 1982), with all the dangers of the hubris entailed by such a formulation.

Simply put, the essence of the politico-moral "conversion" we need lies in detaching ourselves from domination: to stop living to dominate and living to live instead. Accordingly, I would now like to set out some ideas on how to bring about such a conversion.

Towards a Pedagogy of Self-Control

In order to bring about the kind of change I have been discussing, we must begin by truly accepting that we are interdependent and ecodependent inhabitants of a finite biosphere in which we are currently behaving like extraterrestrials at war with our own future. We must acknowledge the need to undergo a profound change. Industrial societies have different types of resources to overcome this civilizing crisis, but to do so they will need to reconstruct themselves from the bottom up. A few ideas follow, although it goes without saying that these are no substitute for a rigorous and democratically debated programme.

1. Start by telling the truth, by stopping deceiving ourselves, however hard it might be after decades of denial. A female president of an eco-socialist government—or the mayor of a large city or small town, a university rector, or other individuals in positions of responsibility—would begin by saying something like this: "we are at war with nature, which is the same as being at war with ourselves… And we are losing this war. This means we must undergo a profound transformation… Nothing can continue as it has been." Thus we are immediately transported into an *anti-capitalist* and *post-capitalist* dynamic.
2. Embrace a cosmopolitan *big history* perspective (it has taken 13,800 million years to reach the present day).
3. Attempt to develop a "long-term morality", based on international justice, intergenerational justice and justice that goes beyond our species (Riechmann 2012).

4. Develop exercises to broaden the imagination (per German philosopher Günther Anders) and build our empathy as part of a wider attempt to promote philosophical "spiritual exercises" (per Pierre Hadot).
5. Form institutions and devices to secure the commitment to overcome our "temporary myopia" and other cognitive biases (The Defender of Future Generations).
6. Read teachings on types of self-deceit, cognitive biases and ideological manipulation in the context of a "Third Enlightenment" (per Hilary Putnam).
7. Take drastic action against the system of mass media, such as commercial propaganda and mass sport.
8. Think in terms of new myths (Salvatore Quasimodo's idea that myths act as guardians of thought), Eros and Thanatos (Freudian myth), the Great Assembly (personal myth), Noah's ark (biblical myth), Nemesis (the myth of Albert Camus)… As well as criticizing and deconstructing other myths: Prometheus, the invisible hand, bourgeois nineteenth-century progress.
9. Review "the historic urgency of civilising re-enchantment" (Emilio Santiago Muiño). "Strive for austerity when it comes to energy and materials while striving to have more free time, richer social relationships, more meaningful feelings, marvellous experiences…" The arts, humanities and poetry have an important role to play.
10. Draw inspiration from Athenian tragedy: dramatic art as a form of political production set against the problem of hubris.
11. Acquire a smattering of physics (the second principle of thermodynamics, or the law of entropy), mathematics (the dynamics of exponential growth), economics (M-C-M' in the first book of Marx's *Capital*), with computer resources and videogames to create simulations, exercises and role plays on these subjects.
12. Promote widespread work exchanges based on the sabbatical, coupled with drastic measures to discourage tourism.

Furthermore, as an academic, it would be impossible not to supplement these ideas with a few words on what is required from universities:

1. Polytechnic, humanist education, including the combination of intellectual and manual work.

2. Intensive democratization of access to higher education, which must be more widespread and free.
3. Reorientation of research and development priorities to accurately reflect the values of sustainability, solidarity and biophilia: biomimicry, renewable energies, eco-efficiency, industrial ecology, life-cycle analysis, the closing of material life cycles, agro-ecology, green urbanism and post-capitalist political economy.
4. North/South technology exchange programmes.
5. Promotion of ecology in all programmes of study. The introduction of courses on basic ecology at all levels of higher education, basic thermodynamics and *big history* (human history in a cosmic context, going back 13,800 million years).
6. Expansion of the Erasmus programme (intra-European), together with new programmes to increase the number of North/South exchanges as part of cooperation initiatives focusing on the needs of the poorest communities (on their own terms, not those of former colonial and imperialist powers). Such an initiative could be called "Programme Lumumba", in honour of the African leader who was murdered in 1961.

Love One Another or Die

"We must love one another or die", wrote W.H. Auden in his poem "September 1, 1939" (Auden 1940).[15] The planet is no longer big enough for competitive struggles for domination: we now live in an ecologically saturated full world.[16] The Anthropocene epoch is characterized by runaway greenhouse gas emissions and Malthusian crises of natural resources. In our twenty-first century, the Century of the Great Test, Auden's words (following in the footsteps of Jesus of Nazareth) are more pertinent than ever before.[17] To continue down the path of war against nature, to devastate our future, to continue the destructive competition between groups and individuals, all this will surely lead to collapse.

We must love one another or die: let us now translate this choice, faced with the abyss that has opened up before us. We must make a qualitative leap in certain fundamental dimensions of our values (cooperation, care, equality, sustainability and biophilia) and the way our societies are organized, a leap that this chapter has framed in terms of a *conversion*; or we shall "die", that is to say suffer heavy losses, perhaps losing everything, in a collapse of civilization of Dantean proportions.

In spite of all this, it would seem that not even the most lucid of observers looking down from their watchtowers of the dominant culture give the slightest consideration to the option of "loving one another", preferring instead to wait for the unlikely Technological Redemption that will see the *anthropos* transformed into the Over- or Superman, having crossed the blazing threshold of the Singularity. Hence, in Chapter 12 of his book *Why the West Rules—for Now*, after having traced an impassioned interpretation of human history through fifteen millennia, archaeologist and historian Ian Morris reaches the conclusion that the "next forty years will be the most important in history" (2010, 608).[18] Climate change, the proliferation of weapons of mass destruction, an increasing population, hunger, global epidemics and failed states all threaten to dramatically alter the current pattern of historical change that has held sway since the start of human history. It would be rash, Morris notes, "to deny that we are approaching a massive discontinuity" (ibid., 596). The choice we face is between Singularity and "Nightfall" (collapse): between salvation through the qualitative leap of the technoscience predicted by Ray Kurzweil,[19] or the collapse of civilization. "For the Singularity to win, we need to keep the dogs of war on a leash, manage global weirding and see through a revolution in energy capture. Everything has to go right. For Nightfall to win only one thing needs go wrong. The odds look bad" (Morris 2010, 613).

Yet all the evidence points to the fact that future scenarios of a revolution in energy capture allowing us to break through the ceiling imposed by fossil fuels using nuclear power and taking advantage of renewable sources and disruptive technologies based on genetics and nanotechnology (the conditions set by Morris for the Singularity to triumph) are deceiving. In contrast, examining the situation objectively suggests we are now at the start of a future of declining energy production.[20] Hence, faced with the choice between Singularity and Collapse, to my mind, there can be no doubt we are on the verge of collapse. Capitalism has been revealed as a twentieth-century fantasy, living as if entropy did not exist and natural resources were infinite, as if technoscience was on the verge of bestowing us with immortality. In the face of such decadence, the exhortation of universal love—which without a doubt also contains its fair share of hubris, given the "crooked timber of humanity", to borrow Immanuel Kant's Enlightenment translation of the old Christian language of the original sin—seems almost sober by comparison.

Should we then give serious consideration to the choice of loving one another, however hard it might seem to make progress in this direction,

breaking with the tradition of human history from which we come? Like Antonio Gramsci, we shall call such an enterprise "intellectual and moral reform".

Intellectual and Moral Reform

We are, when all is said and done, faulty apes.[21] We frequently feel so uncomfortable in our own skin that we wish we could be something else, whatever the cost. For millennia, religions have exploited this discomfort: what if we are immaterial, immortal souls contingently shackled to a disposable body? Then came the Promethean and Faustian impulses of European modernity,[22] together with various ideas about "human improvement" and "transhumanism". I have analysed some of these "anthropofugal" movements, so-called because of their desire to flee from the human condition, and some of which have been extremely crude indeed, in Riechmann (2004). Consider, for example, the attempt by the Russian scientist Ilyia Ivanov to cross humans with large apes in the 1920s and Hitler's eugenics programme to expand the Aryan race through selective matching in the *Lebensborn* project. More recently, the tone appears to have improved somewhat with the advent of genetic engineering in the 1970s and the current boom in information technology. At present, transhumanism—Ray Kurzweil's faith in the Singularity being a case in point—is a powerful cultural current in our tragic twenty-first century, the Century of the Great Test.[23]

The proposal advanced in this reflection—the idea of "intellectual and moral reform"[24]—differs from these approaches: instead of fleeing from the human condition, it seeks to "transcend" the *anthropos* by renouncing transcendence itself, embracing immanence and the other (both human and non-human), and renouncing the will to domination.[25] Such an enterprise goes hand in hand with the requirement for an ethico-political "conversion" like the one invoked by Manuel Sacristán at the start of the 1980s, however this time round there is no need to think about the New Man and New Woman (recall Brecht's observation that the "New Man" is nothing more than the old man in new situations).[26] In my opinion, it suffices to focus instead on strengthening the best part of ourselves, to champion the old Adams and Eves, not discard them, as is unfortunately all too common in our Society of the Spectacle.

The idea is based on: (a) anchoring culture in the values of care developed by many feminine subcultures under patriarchy (Velayos et al. 2007;

Mellor 1997; Puleo 2011; Carrasco et al. 2011); (b) developing the idea of self-control in the sense of a self-limitation that allows the other to exist (Riechmann 2005, 2009), advocated since the origins of the ecologist movement itself and currently strongly present among degrowth movements, as well as other socio-cultural phenomena; (c) preserving "Neolithic anthropological substance", as advocated in Alba Rico (2013) and Alba Rico and Fernández Liria (2010); and (d) systematically promoting the values of compassion, solidarity and mutual aid as part of a "long-distance morality" Riechmann (2012, Chap. 6), bringing together the rich inheritance of the ethics of compassion developed in universalist religions such as Buddhism, Judaism, Christianity and Islam, and the ethics of solidarity developed in modern emancipatory movements that have struggled against patriarchy, class society and capitalism.[27]

The claim that changes in patterns of socialization, the organization of everyday life and how we work give rise to "new men" and "new women" should not be a controversial one. Ethnographic and historical records are testament to the existence of a wealth of different types of human beings. Furthermore, throughout human history in its entirety, hunter–gatherer cultures have provided models of how we can relate to nature through reciprocity and mutuality as opposed to domination. Will we be able to rebuild our culture around these values without renouncing some of the civilizing progress of modernity? Will we be able, based on a universalist moral ideal, to overcome the short-sightedness of tribalism and *my country, right or wrong*?

We Never Tire of the Sisyphean Task of Being Human

"What a fair seat hath he, from whence he may/ The boundless wastes and wilds of man survey!" Henry D. Thoreau was fond of citing these lines, taken from the poem "To the Lady Margaret, Countess of Cumberland" by Samuel Daniel (1562–1619).[28] Such sentiments were brilliantly and succinctly expressed in a more modern context by an old lady from a village in Andalusia (relayed to me by my friend Rafael Hernández del Águila): "Pity the entire world!"

As humans, self-control (the Greeks referred to this virtue as *ἐγκράτεια*) is not one of our strengths, yet it is self-control that makes us human, that can make us human (in the normative sense of the word). Having the

opportunity to capitalize on an advantage at the price of inflicting injury on another and choosing not to do so: this is what makes us human. Self-control means *limiting ourselves to allow the other to exist.*

The extended feeling of human misery and frailty expressed in the two lines from Samuel Daniel's poem coexists with a powerful drive to transcend ourselves, whose logical conclusion is the idea of "being like gods", either in the traditional way of self-constructing ourselves like Stoic and Buddhist sages or through the hypertechnology of transhumanism. Self-construction essentially means *creating better possibilities for ourselves*, but we should not aspire to forget what it means to be human as this would be no different to Gnostic hubris.[29]

"It so happens I am sick of being a man", writes Pablo Neruda at the start of his splendid poem "Walking Around" (Neruda 2013). Yet, weary as we grow, we should cherish what makes us human, instead of yielding to the transhuman. It is not the technical self-creation of perfection to which we should give preference, but the politico-moral self-construction of the cripple.

Will we succeed in such an enterprise? One would say that in all likelihood, we will not. The imbalance in the forces involved is too large, the seduction of "anthropofugal" proposals too great for too many socialized under neoliberal capitalism.[30] However this is the direction in which we must strive to prevent our degradation. *Your chance may be slight, so make the most of it*—the voice of Germany's alternative movement in the 1980s.

Notes

1. In this respect, I wholeheartedly recommend reading Chap. 9 ("Manufacturing the Neoliberal Subject") in Dardot and Laval (2014). There are also suggestive lines of reflection in recent work by German-based Korean philosopher Byung-Chul Han.
2. Part of this text has been published in Spanish on the *Viento Sur* website (Riechmann 2014a), alongside a response by Álvarez Galán (2014).
3. Appiah (2008) is a good example and Ogien (2011) provides an introduction for a more general audience.
4. This can also be framed, in highly materialist terms, from the perspective of neurology, by the fact that we provide sufficient support to our neocortex (as opposed to the "paleomammalian brain" and, older still, the "reptilian brain"). The Italian neurologist Rita Levi-Montalcini has highlighted the "neocortical component of the [human] brain, also present in sub-primates, but which has been developed in human beings. This component

forms the basis of our cognitive ability, which is far superior to other animals and provides us with access to knowledge, to good and bad, to culture; it relates us to the past, the present and the future… We project ourselves towards the past and the future thanks to the formidable development of the cognitive miocortex [sic] of the brain. The limbic lobe is an emotive element common to humans and all vertebrates, starting with mammals, but the human being is the only animal to have developed the neocortex component…". The Nobel laureate observes that the behaviour of our species largely continues to be governed by the reactivity of the limbic lobe: this is the region of the "paleomammalian" brain common to all mammals, which houses the basic primary impulses such as hunger, territoriality and fear. Furthermore, she appeals for each person to be given the possibility of being their best version, because "if we allow ourselves to fall prey to a catastrophic vision of the human being, we are finished" (*El País*, 15 May 2005).

5. Sacristán continued: "And I must point out—so as to allay suspicions I have strayed far, too far, from the Marxist tradition—this is present, in black and white, in Marx's works, from the *Grundrisse* onward, the fundamental idea that the point, the fulcrum, of revolution, is the transformation of the individual. The *Grundrisse* argues that the essential feature of any new society is the material transformation of its possessor into another subject. Moreover, the basis of this transformation—more analytically, more scientifically—is the idea that in a society governed predominantly not by exchange value but by use value, needs cannot increase infinitely. One can have an *indefinite* need for money, for example, or for exchange values in general, so as to be rich, to be able to do more, but it is impossible to have an *indefinite* need for objects of use, for use value" (Sacristán 2003, 367).
6. According to statistics from the World Tourism Organization, the number of international journeys from tourism has increased from 528 million in 1995 to 980 million in 2011, to 1,000 million in 2012 and to 1,078 million in 2013. The bulk of these journeys use the mode of transport with the greatest environmental impact, the plane.
7. "I have been advocating the idea of a reform of knowledge, of a reform of thought, for quite some time now. The project forms the basis of *La Méthode*. However, I am increasingly convinced that it is in fact necessary to talk of a reform of the spirit (in the sense of the *mind*), of a reform of 'something' more profound, more personal, more subjective. In short, a reform of being, of ourselves. More precisely, for me it all goes back to what I call the human trinity, that each of us is at once 'an individual', 'part of a species' and 'part of a society'.

"We are inside society, but society is also inside us, through its language, norms and ideologies; thanks to our reproductive ability, we allow our species to survive, while at the same time being part of it. Each term is recursive, generating the other and being generated by it, both 'cause' and 'effect' at the same time. The three terms I mentioned above are inseparable, complementary and overlapping.

"In this respect, it is impossible to reduce everything to mere social reform. We must abandon this notion. All attempts to reform Society based on structures have failed. Nowadays extremism, dogmatism or fanaticism can only help to bring about something worse than what they stand for. This type of revolutionary approach perverted both the revolution and the resulting society. Hence, given the need for the activist as a coordinator of society, dedicated to the people around them, the activist as known thus far would seem to be counter-productive. Clearly, given the complexity of the reality, some actions by activists from certain sectors can be beneficial in a given situation. However, on a more fundamental level, this model is no longer useful. Based on the three terms mentioned above, ('individual', 'species' and 'society'), the reform must necessarily go from being a reform of the individual to become self-reform.

"Take education, for example, only reformed spirits can embark upon the institutional reform required to produce more reformed spirits. If there is an absence of reformed spirits to begin with, the reforms will fail. For this reason, I no longer believe in universal reforms promoted by specific ministers, since the people responsible for their execution will frequently be found incapable of doing so. Adherents with limited education or who are unaware of the complexity concealed by the word 'complexity' can commit as many blunders than others, if not more.

"[…] This reform cannot only be satisfied through individual initiatives, such as entering into a Zen philosophy system for the use of Westerners, practising yoga and meditative concentration. Furthermore, we should also note that although Eastern meditation techniques based on 'creating the void' are extremely fertile, the West also has its own type of meditation based on reflecting on our daily experiences, the actions taken in a determined situation… The reform of the spirit affects everything. This is a fundamental part of something bound up with the rest of the human context. It must be tackled from all perspectives, but starting with the problem of self-examination" (Morin 2002).

8. See Sempere (2013) for an example.
9. In Spain, among the various families of the left, there is no doubt the anarchist tradition has perceived this most clearly. "Faced with the Marxist Vulgata, anarchists have insisted on the futility of transforming infrastructure in the hope this will give rise to a new superstructure: either both are

changed at the same time, including with some individuals going ahead, privately, in their own ideological transformation, or the old ways of life, in their astonishing consistency, come to neutralise, undermine and finally put an end to the new conquered structures when the indisputable is not challenged, when private property is regarded as natural and work and culture are lived as separate spheres" (Orihuela 2014, 49).

10. It goes without saying that ideas about education come first. Yet, while careful intervention in socialization and educational processes is certainly extremely important, we should recall that: (a) this bears fruit in the medium term, whereas the problems we currently face are of immediate urgency; and (b) by association, the government of liquidators, at whose hands we currently have the misfortune to suffer, is quite frankly making things worse in this area (as in others)… Consider, for example, the restructuring of philosophical teaching in Spain's law to improve the quality of education, which came into force in 2014. In the words of a communication by the Spanish Philosophy Network, "this is the most savage cut suffered by philosophical studies in the history of Spanish democracy" (*Eldiario.es*, 18 December 2012). It is precisely when there is greatest need to educate further generations on the critical spirit, moral autonomy and anticipated rationality that the Partido Popular's educational reform is riding roughshod over materials that favour these very abilities!
    Once we have forged the primary and secondary processes of socialization, I would say the only way to "break" and recompose subjectivities (e.g. the way in which pro-social and altruistic attitudes are strengthened against selfish and short-term ones) is by participating in "good" social movements, above all in movements in the ascendant phase, in what has been described as a sort of "collective enamourment". By "good" social movements, I mean movements for survival and emancipation. The shockwaves felt by an all too passive and timorous society from the 15M protests in Spain in 2011–2012 were, in this respect, of enormous value.
    In an interview, Chilean film director Patricio Guzmán, states "I will never cease to love the collective happiness we lived with Allende, when many people took to the streets for the first time in their life, when the poor invaded the city centre and celebrated a success that was beyond people's wildest dreams with music and gatherings. It was a state of collective enamourment, a legal movement, without arms, quashed by a military coup that was completely out of proportion. The might of an army descended upon us with financial backing from North America, putting an end to the longest running democracy in Latin America" (*El País*, 13 December 2012).
11. Of course, although as Europeans we look first to our own tradition, it would be foolish to ignore the fact that there are intellectual and spiritual tools for these tasks that are as valuable, if not more so, than our own to be

found in other cultures. It would be interesting, for example, to consider the ideas of the Good Life developed by various American-Indian cultures during the last two decades from the perspective of self-construction. Arguably the world's richest variety of traditions involving self-construction can be found in Buddhism. See Kolm (1982).

12. See my reflection in Chap. 4 ("On the Human Condition") of Riechmann (2012).
13. The US Jewish philosopher insists there was not just one enlightenment (that is the Enlightenment of the seventeenth and eighteenth centuries) but three: the first, linked to Socrates, Plato and Epicurus, and the third (still unrealised) that will be linked to the figure of John Dewey (Putnam 2004). In my opinion it would be extremely interesting to research the "elective affinities" between Dewey and Antonio Gramsci as part of an in-depth reconstruction of the (frustrated) enlightenment project of the twentieth century. This would need to drink not only from the streams of US pragmatism, as Putnam proposes, but also incorporate the best of Marxist traditions, together with ecological thinking and feminist reflection. I believe this would be a fertile confluence.

    For a Third Enlightenment grounded in pragmatism and Marxism, a critical revision of the extensive work of Jürgen Habermas and Karl Otto Apel over the last four decades will clearly be required, since it was grounded, at least at the outset in a similar perspective, (regardless of how diluted the Marxist components have become over the course of time).

    The Venezuelan philosopher Josu Landa, now settled in Mexico, writes that in Greek schools of philosophy, such as an Epicureanism and Stoicism (in other words, the Greek Enlightenment) "the scientific spirit operates as an impulse of human redemption, leaving irrational beliefs of a mythical–religious appearance and any other mode of non-reason to one side. It is by no means outlandish to critically reassume that attitude today and attempt to assimilate the fruits of everything worthy of the name 'science' to illuminate the *ethos* of each individual—that is to say for self-gnosis—and bring about our spiritually fertile relocation in the general order of the universe, that is to exercise a genuine and rootfast cosmopolitanism. This way of viewing the relationship between ethics and contemporary science encourages philosophy to think of how to enrich our way of being in the world based on the information offered by positivist sciences […]. This way of establishing connections with contemporary science entails a 'humanisation' of the knowledge it provides, an attitude in some senses similar to Renaissance and Enlightenment humanists, only more closely aligned with philosophical life than the pure speculation" (Landa 2012, 216). For an in-depth reflection on this issue and one that would make a

first order contribution to the possible Third Enlightenment, see Fernández Buey (2013).

14. As the Syrian-Lebanese poet Adonis notes of Judean, Christian and Muslim monotheism: "God has said everything and man must obey. In monotheism, the other does not exist. It is not acknowledged in the search for truth because I already have the truth. The root of our problems is not Islam as a religion, it is the monotheistic worldview. This is why religion must be separate from the state. So long as this remains unchanged, democracy cannot exist. I don't mean democracy as a perfect system, but as an acknowledgement of the other. And not just acknowledgement as tolerance, because tolerance hides a veneer of racism: I tolerate you because I know the truth and let you speak. The human being demands equality. Monotheism is antidemocratic" (Adonis 2014).
15. Auden's words, however, can be misunderstood. Immortality means we all must die. The British poet is not alluding to this but about becoming executioners and victims (neither "executioners nor victims" is one of Albert Camus's most valuable phrases) in a Malthusian and Hobbesian world. Pacifism, noted Manuel Sacristán many years ago, is less about not wanting to die and more about not wanting to kill.
16. The ecologist economist Herman E. Daly has been one of the most lucid proponents of the idea that we are no longer dealing with "economics in an empty world" but in a world that is "full", or saturated, ecologically speaking, as a result of the disproportionate growth of human socio-economic systems with respect to the biosphere that contains them. See Daly and Cobb (1989) and Daly (1997).
17. The Anthropocene is the epoch in which the total impact of human activities on the earth is equal to or exceeds the power of the forces of nature (geological and biological). "The specific features of global change [speed and its anthropogenic nature] have resulted in the term *Anthropocene* to refer to the current epoch of the Earth. The term is proposed […] to designate a new geological epoch in which humankind has emerged as a new force able to control the fundamental processes of the biosphere" (Duarte 2006, 24).
18. This book should be read in the context of another ambitious historical synthesis (Harari 2012). In an interview with Ernest Alós, the young Israeli historian recently explained his theory that the key to human history can be found in three revolutions: "The cognitive, which took place some 70,000 years ago and transformed what was a largely irrelevant African animal into the most powerful force on the planet. This was followed by the agricultural revolution, another giant leap. And finally, there is the [techno]scientific revolution, which may come to give men divine powers [capabilities such as the creation of life and the modification of our bodies

and minds that were traditionally regarded as divine powers]. The common thread is the continuum of power, being able to transform the environment and oneself, and that it is extremely difficult to translate this power into happiness" (*El Periódico*, 22 September 2014).

19. According to astronomer Chris Impey: "In Kurzweil's vision, computation and medical technology will converge in a capability to repair and replace our bodies from within. He argues that a central trope of science fiction—man versus machine—is wrong. Instead, we'll meld with technology and *become* the machine. We'll have many millions of blood cell-sized robots, or nanobots, swarming through our bodies patrolling for pathogens, and repairing our bones, muscles, arteries and brain cells. Kurzweil says, 'Death is a tragedy'. These indefatigable repair crews will destroy disease, rebuild organs, and remove natural limits to our intelligence. Genetic improvements will be downloaded from the Internet. It's a classic Utopian vision" (Impey 2010, 104). Spain's own prophet of the New Good of the Singularity is Juan Martínez-Barea (2014).
20. There is a wealth of literature on the subject. See Heinberg (2009) and Exner et al. (2013). Three extremely interesting studies have also been published recently in Spain: García Olivares & Ballabrera-Poy (2015); García Olivares (2014); and Capellán-Pérez et al. (2014).
21. Félix Grande uses the definition provided by a friend: "'*People are really* bad' he said simply, before adding wisely, '*and they're getting worse*.' As a person, seeing people from close up, we can be under no illusions, we are a bad breed. What's more, if it wasn't for the wall that Freud calls the reality principle, we would frequently exhibit, violent, sadistic and murderous, above all murderous, tendencies" (Grande 2003, 73). It is also worth noting the suggestion by Richard D. Precht that "the human being is the only animal that can consciously decide to be immoral […]. It is the animal with the least capacity for long-lasting happiness. An animal tyrannised by its enormous brain and its uncontainable and incomparable thoughts. It is the only animal that cries. The only animal that lusts and envies and regrets. The only animal that feels guilty. The only animal that can despair of itself. The only animal that commits suicide" (Precht 2014, 71–72).
22. See the excellent analysis in Flahault (2008).
23. A pertinent reflection can be found in Barcellona (2013).
24. Both Antonio Gramsci and José Ortega y Gasset take up this issue from Ernest Renan (1823–1892). See Renan (1972). In an article entitled "La reforma liberal" [Liberal reform] Ortega y Gasset wrote that "before economics, we need intellectual and moral reform" (*El Imparcial*, 27 August 1908).

25. It is worth noting that domination, xenophobia and hubris are the three great ethico-political issues, the three great questions, to which we have spent millennia trying to give a satisfactory answer.
26. Of course, accepting our interdependence and ecodependence also means accepting limits to our capacity for purposeful social intervention, whether in the form of "fragmentary social engineering" or the desire for a revolutionary reconstruction of society. We desire and dream, working towards social change, but without losing our way in fantasies of desirous thoughts and Promethean dreams.
27. An idea that penetrates to the heart of the possibilities to change the sociocultural paradigm. See Naredo (2013, esp. p. 123 onward).
28. See Thoreau's letter to Harrison Blake, dated 10 April 1853.
29. Cf. Hans Jonas' thesis on the Gnostic impulse of modern technoscience, summarised in Chap. 4 of Gómez-Heras (2011). I also discuss the matter in Riechmann (2004).
30. I have reflected on this disproportion in my short essay (Riechmann 2014c).

References

Adonis, interview by Javier Rodríguez Marcos. (2014, September 27). *La poesía es lo contrario de la religión,* Babelia.

Alba Rico, S. (2013). *¿Podemos seguir siendo de izquierdas?* Barcelona: Pol-len.

Alba Rico, S., & Fernández Liria, C. (2010). *El naufragio del hombre.* Hondarribia/Fuenterrabía: Hiru.

Álvarez Galán, J. (2014, January 30). Diálogo con Jorge Riechmann: Sobre la propina del café y la práctica revolucionaria. *Juanjo Àlvarez Galán*. http://vientosur.info/spip.php?article8693. Accessed 19 November 2014.

Appiah, K. A. (2008). *Experiments in ethics.* Cambridge, MA/London: Harvard University Press.

Auden, W. H. (1940). September 1, 1939. *Another Time.* London: Faber & Faber. http://www.poets.org/poetsorg/poem/september-1-1939. Accessed 26 November 2014.

Baggini, J. (2011). *The ego trick.* London: Granta.

Barcellona, P. (2013). La época de lo posthumano. *Mientras tanto, 120*, 135–160.

Capellán-Pérez, I., Mediavilla, M., de Castro, C., Carpintero, O., & Miguel, L. J. (2014). Fossil fuel depletion and socio-economic scenarios: an integrated approach. *Energy, 77*(1), 641–666.

Carrasco, C., Borderías, C., & Torns, T. (Eds.) (2011). *El trabajo de cuidados. Historia, teoría y políticas.* Madrid: Catarata.

Castoriadis, C. (1980). Reflexiones sobre el desarrollo y la racionalidad. In C. Mendès (Ed.), *El mito del desarrollo.* Barcelona: Kairós.

Daly, H. (1997). De la economía del mundo vacío a la economía del mundo lleno. In R. Goodland (Ed.), *Medio ambiente y desarrollo sostenible*: *más allá del informe Brundtland* (pp. 37–50). Madrid: Trotta.

Daly, H., & Cobb, J. J. (1989). *For the common good: Redirecting the economy toward community, the environment, and a sustainable future*. Boston: Beacon Press.

Dardot, P., & Laval, C. (2014). *The new way of the world: On neoliberal society*. London/New York: Verso.

Duarte, C. (Ed.) (2006). *Cambio global. Impacto de la actividad humana sobre el sistema Tierra*. Madrid: CSIC.

Elster, J. (1979). *Ulysses and the sirens: studies in rationality and irrationality*. Cambridge: Cambridge University Press.

Exner, A., Fleissner, P., Kranzl, L., & Zittel, W. (Eds.) (2013). *Land and resource scarcity: Capitalism, struggle and well-being in a world without fossil fuels*. London: Routledge.

Fernández Buey, F. (2013). *Para la tercera cultura*. (Edited by S.L. Arnal and J. Mir). Barcelona: Libros del Viejo Topo.

Flahault, F. (2008). *Le crépuscule de Prométhée: Contribution à une histoire de la démesure humaine*. Paris: Mille et une Nuits.

Friedmann, G. (1970). *La puissance et la sagesse*. Paris: Gallimard.

García Olivares, A. (2014). Energía renovable, fin del crecimiento y post-capitalismo. Hacia una economía simbiótica con el ecosistema. In A. Matarán, Ó. Carpintero, & J. Riechmann (Eds.), *Los inciertos pasos desde aquí hasta allá. Alternativas socioecológicas y transiciones poscapitalistas*. Granada: Universidad de Granada (CICODE).

García Olivares, A., & Ballabrera-Poy, J. (2015). Energy and mineral peaks, and a future steady-state economy. *Technological Forecasting and Social Change*, *90 Part B*, 587–598.

Gómez-Heras, J. M. G. (2011). *En armonía con la naturaleza. Reconstrucción medioambiental de la filosofía*. Madrid: Biblioteca Nueva.

Grande, F. (2003). *Genealogía del frío*. Mérida: Editora Regional de Extremadura.

Hadot, P. (1968). *Conversion,* Vol. 4, *Encyclopaedia Universalis* (pp. 979–981). Paris: Encyclopaedia Universalis France.

Hadot, P. (1995). *Philosophy as a way of life: Spiritual exercises from Socrates to Foucault*. Oxford: Blackwell.

Hadot, P. (2002). *What is ancient philosophy*. Belknap: Cambridge, MA/London.

Hadot, P. (2009). *The present alone is our happiness*: *Conversations with Jeannie Carlier and Arnold I. Davidson* (trans. Djaballah, M.). Stanford: Stanford University.

Harari, Y. N. (2012). *From animals into gods*: *A brief history of humankind*. CreateSpace Independent Publishing Platform.

Heinberg, R. (2009). *Searching for a miracle*: '*net energy*' *limits* & *the fate of industrial society*. Sebastopol: Post Carbon Institute and the International Forum on Globalization.
Husson, M. (2013). *El capitalismo en diez lecciones*. Madrid: La Oveja Roja.
Impey, C. (2010). *How it ends: From you to the universe*. New York/London: W. W. Norton.
Kolm, S.-C. (1982). *Le bonheur-liberté: Bouddhisme profond et modernité*. Paris: PUF.
Landa, J. (2012). *Éticas de crisis: cinismo, epicureísmo, estoicismo*. Barcelona (Venezuela): Fondo Editorial del Caribe.
Lebowitz, M. (2008, June 5). The spectre of socialism for the 21st century. Keynote address to the annual meeting of the Society for Socialist Studies, Vancouver . http://links.org.au/node/503 Accessed 24 November 2014.
Linz, M., Riechmann, J., & Sempere, J. (2007). *Vivir (bien) con menos. Sobre suficiencia y sostenibilidad*. Barcelona: Icaria.
Margalit, A. (1996). *The decent society* (trans Goldblum, N.). Cambridge, MA/London: Harvard University Press.
Martínez-Barea, J. (2014). *El mundo que viene*. Barcelona: Gestión 2000.
Marx, K. (1969). *Theses on Feuerbach*, Vol. 1, *Marx/Engels selected works* (pp. 13–15). Moscow: Progress Publishers.
Marx, K. (1970). *Critique of Hegel's 'philosophy of right'*. London: Cambridge University Press.
Mellor, M. (1997). *Feminism & ecology*. Cambridge: Polity.
Morin, E, interview by Laurence Baransk. (2002). Reforma del pensamiento y reforma del ser. *Iniciativa Socialista*, *63*(Winter 2001–2002).
Morris, I. (2010). *Why the west rules—For now: The patterns of history, and what they reveal about the future*. New York: Farrar, Straus and Giroux.
Naredo, J. M. (2013). *Economía, poder y política. Crisis y cambio de paradigma*. Díaz & Pons: Madrid.
Neruda, P. (2013). Walking around. *Poem Hunter*, January 13, 2013–November 26, 2014. http://www.poemhunter.com/poem/walking-around/. Accessed 26 November 2014.
Ogien, R. (2011). *L'Influence de l'odeur des croissants chauds sur la bonté humaine et autres questions de philosophie morale expérimentale*. Paris: Grasset.
Orihuela, A. (2014). *Palabras raptadas*. Madrid: Amargord.
Ospina, W. (2012). *¿Dónde está la franja amarilla?* Bogotá: Mondadori.
Precht, R. D. (2014). *El arte de no ser egoísta*. Madrid: Siruela.
Puleo, A. (2011). *Ecofeminismo*. Madrid: Cátedra.
Putnam, H. (2004). *Ethics without ontology*. Cambridge, MA/London: Harvard University Press.
Renan, E. (1972). *La reforma intelectual y moral*. Barcelona: Península.

Riechmann, J. (2004). *Gente que no quiere viajar a Marte*. Madrid: Los Libros de la Catarata.
Riechmann, J. (2005). *Un mundo vulnerable*. (Segunda edición). Madrid: Los Libros de la Catarata.
Riechmann, J. (2009). *La habitación de Pascal*. Madrid: Los Libros de la Catarata.
Riechmann, J. (2012). *Interdependientes y ecodependientes: Ensayos desde la ética ecológica (y hacia ella)*. Càtedra: Proteus.
Riechmann, J. (2013). *El siglo de la Gran Prueba*. Tegueste (Tenerife): Baile del Sol.
Riechmann, J. (2014a, January). Cambio social y transformación humana: Un café, una tostada, ¿y una propina?. *Viento Sur*. http://vientosur.info/spip.php?article8669. Accessed 19 November 2014.
Riechmann, J. (2014b). (forthcoming) La revolución (ecosocialista y ecofeminista) tendríamos que haberla hecho ayer. *Theomai* (Autumn 2014).
Riechmann, J. (2014c). *Moderar Extremistán*. Madrid: Díaz & Pons.
Sacristán, M. (1987). Comunicación a las Jornadas de Ecología y Política (1979), in *Pacifismo, ecología y política alternativa*. Barcelona: Icaria.
Sacristán, M. (2003). *M.A.R.X. Máximas, aforismos y reflexiones con algunas variables libres*. Mataró: El Viejo Topo.
Sacristán, M. (2005). *Seis conferencias sobre la tradición marxista y los nuevos problemas (edición de Salvador López Arnal)*. Mataró: El Viejo Topo.
Sempere, J. (Ed.) (2013). *Marx: el arma de la crítica*. Madrid: Catarata.
Velayos, C., Barrios, O., Figueruelo, Á., & López, T. (Eds.) (2007). *Feminismo ecológico*. Salamanca: Ediciones de la Universidad de Salamanca.

CHAPTER 7

Frugal Abundance in an Age of Limits: Envisioning a Degrowth Economy

Samuel Alexander

Introduction

This chapter considers whether, or to what extent, different forms of "austerity" exist, or could exist, in relation to material standards of living. Could an austerity externally imposed be experienced very differently from an austerity voluntarily embraced? The analysis seeks to show, somewhat paradoxically, perhaps, that although reduced consumption and production within existing capitalist economies tends to impact negatively on social well-being—representing one form of "austerity"—reduced consumption and production within different economic frameworks, and within different value systems, could open up space for a positive, enriching form of austerity. This latter form of austerity, it will be argued, has the potential to increase social and ecological well-being in an age of environmental limits (Meadows et al. 2004; Jackson 2009; Turner 2014). It is extremely important, of course, that these two austerities are not confused, and the present inquiry into the potential for enriching forms of austerity must not be interpreted as defending the neoliberal or capitalist forms of austerity being implemented in many economies today (see e.g. Hermann 2014; Pollin 2013). A distinc-

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tion will be made, therefore, between an austerity of degrowth—which will be the focus of this analysis—and a capitalist austerity.

Even a cursory inquiry into the definition of austerity highlights the various ways this term can be understood. In recent years this notion has been used almost exclusively to refer to a macro-economic policy of crisis-management provoked by the global financial crisis, where governments cut social services in an attempt to reduce budget deficits and stimulate growth (see e.g. Ivanova 2013). One online dictionary defines austerity as a "severe and rigid economy", and that is certainly how many people would experience austerity under capitalism today. Note how austerity in this sense is oblivious to the limits to growth critique. Far from trying to move beyond the growth paradigm, austerity under capitalism is defended on the grounds that it will help get the engine of growth started again.

But this is a relatively new way of understanding austerity. Prior to the global financial crisis, austerity did not refer primarily to a strict macro-economic policy that cut social services. Instead, online dictionary definitions define austerity as "simple or plain", "not fancy", "unadorned", or "a situation where money is spent only on things that are necessary". In this very different sense of austerity, the term can be understood as a synonym for frugality or simplicity of living (see Alexander and McLeod 2014), and it is this second form of austerity that will be the focus of this chapter. It is a form of austerity that is arguably necessary in an age of limits—necessary, that is, if we are to turn current economic and environmental crises into opportunities by way of a degrowth transition (Latouche 2009; Schneider et al. 2010; Kallis 2011; Alexander 2015).

Among other things, a degrowth transition will involve examining or re-examining what is truly necessary to live a dignified life, as well as letting go of so much of what is superfluous and wasteful in consumer societies today (Vale and Vale 2013; Hamilton and Denniss 2005). A strong but perhaps counter-intuitive case can be made that the wealthiest regions of the world can get by with a far lower material standard of living and yet increase quality of life (Alexander 2012a; Trainer 2012; Schor 2010; Wilkinson and Pickett 2010), and this is the paradox of simplicity that lies at the heart of what I am calling an "austerity of degrowth". A degrowth economy may be "austere" (but sufficient) in a material sense, especially in comparison to the cultures of consumption prevalent in developed regions of the world today. But such austerity could also liberate those developed or over-developed societies from the shackles of consumerist cultures (Kasser 2002), freeing them from materialistic conceptions of the good life and opening up space for seeking prosperity in various non-materialistic forms of satisfaction and meaning.

Serge Latouche (2014) writes of degrowth as being a society of "frugal abundance", but what would this look like and how would it be experienced in daily life? The degrowth movement to date has focused a great deal on the macro-economic and political dimensions of "planned economic contraction" (Alexander 2012b), but less attention has been given to the implications such contraction would have on our lives, at the personal and community levels. Consequently, this area of neglect calls for closer examination, because it is at the personal and community levels where degrowth would be experienced, first and foremost. Indeed, an inquiry into the *lived reality* of degrowth may be one of the best ways of describing and understanding what we mean by degrowth, moving beyond vague abstractions or "top down" macro-economic and political perspectives. In other words, we might gain a clearer understanding of degrowth by imagining someone mending their clothes or sharing their hammer or bicycle in conditions of scarcity, than by imagining a new financial system or political framework.

Whatever the case, this chapter focuses on the former perspective and explores how an austerity of degrowth may be experienced at the personal and social levels. This inquiry follows coherently from the various arguments in favour of degrowth that have been developing in recent years, which have offered many compelling reasons *why* we should "degrow" (see generally, Latouche 2009; Alexander 2015). But it is also important to explore more closely what degrowth would actually look like and how it might be experienced. After all, if people cannot envision the degrowth alternative with sufficient clarity, and see it as desirable, it is unlikely that a large social movement will arise to bring a degrowth economy into existence.

Framing and Contextualizing the Analysis

Before getting to the substantive analysis a few more introductory comments may help better frame and contextualize the discussion. If degrowth means—among other things—a deep and rapid transition away from high-consumption lifestyles, then we could begin an inquiry into an austerity of degrowth with a question: How would citizens in developed nations deal with an "austere" lifestyle of radical simplicity? By radical simplicity I do not mean poverty, which is involuntary and full of suffering and anxiety, and therefore universally undesirable. Rather, by radical simplicity I essentially mean a very low but biophysically sufficient material standard of living. In a world of seven billion people and counting, the transition

to a just and sustainable world necessarily implies consuming at far lower material and energy levels than are common in developed nations today (Trainer 2010). One must acknowledge, however, that from within the dominant culture of consumption, giving up consumer lifestyles would be generally perceived as something that would reduce well-being and signify a turn away from progress.

In this chapter I want to suggest that radical simplicity would not be as bad as it might first seem, provided people were ready for it and wisely negotiated its arrival, both as individuals and as communities. I am tempted to go further and suggest that radical simplicity may be exactly what consumer cultures need to shake themselves awake from their comfortable routines and habits of consumption; that radical simplicity would be in our own, immediate, self-interests (Trainer 2012). This is a promising possibility, because it seems clear enough that in an age of gross ecological overshoot (Global Footprint Network 2013; Vale and Vale 2013), degrowth as a macro-economic and political programme in wealthy nations requires and depends upon lifestyles of radically reduced consumption. But again, it must be emphasized that reduced consumption under capitalism would be very different to reduced consumption under a planned, equitable degrowth framework, in ways that I hope to explain.

It goes without saying, of course, that if a radically lower material standard of living were to be imposed upon people suddenly by force of circumstances and without anticipation and some preparation, most people would find such a dramatic change terrifying and painful—an existential disaster. Such a response would be quite natural and understandable, for many people would have their identities and worldviews shaken beyond recognition. But the subtext of this chapter is that if such dramatic lifestyle changes were to be stoically anticipated and prepared for, even embraced, people could discover that lives of reduced consumption might lead to a new form of abundance, a new form of wealth, a new connection or reconnection with nature, our communities and, indeed, ourselves. This is the possibility, at least, that makes degrowth such a tantalizing movement for deep societal transformation, for it gives rise to the possibility that there could be "an upside to down" (Homer-Dixon 2006; Odum and Odum 2001).

If this understanding of degrowth is correct (see Alexander 2012a), it would seem that high-consumption cultures could benefit greatly from anticipating and preparing for radical simplicity; benefit greatly, that is, from "prefiguring" a simpler way of life (Trainer 2010). Consumerism

and the growth paradigm that supports it have no future, a diagnosis that I will not attempt to defend here but rather take as given, the case having been made many times before (see e.g. Meadows et al. 2004; Jackson 2009; Smith and Positano 2010; Turner 2014). When consumerism's time is up, we will all be living more simply, to varying degrees, whether we want to or not. So it is important that individuals, communities and governments deal with this inevitable change positively, and embrace the changes that are likely to lie ahead of us and make the best of them. We are being challenged to make opportunities out of the crisis of capitalism, and envisioning the practical realities of this challenge is an issue that deserves increased scholarly attention.

In the following substantive sections, therefore, I attempt to describe a radical alternative economic vision, an economic vision based on notions of simplicity, frugality, moderation, sufficiency, resilience, relocalization and mindfulness. In the broadest terms, this form of economy would be one that has low energy and resource requirements relative to developed economies, but which sufficiently provides for local material needs using mostly local resources, without being relentlessly driven to expand by the growth-focused ethics of profit-maximization. What would an economy based on material sufficiency look like?

It should be acknowledged that there are a huge number of important structural issues that the following analysis does not attempt to deal with in any detail. I am referring here to issues such as property rights, banking systems, urban infrastructure, political systems, and so forth. These are all important issues to consider. But the present analysis will focus primarily on some of the socio-economic implications of degrowth at the personal and household levels, briefly discussing how our relationships to water, food, clothing, housing, energy, work, money and technology may need to evolve, on the assumption that capitalism continues to break down over coming years and decades (Bauman and Bordoni 2014; Tverberg 2012; Gilding 2011), and as emerging movements try to build an alternative degrowth economy from the grassroots up (Alexander 2013).

It should be clear that this is not an inquiry into theoretical issues, but instead an inquiry into what may be experienced as the most basic features of day-to-day life in a degrowth economy. The aim is to ground the theory as far as possible in practical considerations; to give the theoretical bones some flesh by way of an "envisioning" exercise. The intention, to be clear, is not to prescribe a blueprint that should be mechanically imposed everywhere, but rather to provoke thought about how degrowth could be

realized in various ways. If the reader disagrees with aspects of the analysis, please adapt and refine the analysis and apply it in context-appropriate ways in order to advance the discussion.

Envisioning an Austerity of Degrowth

Water

This envisioning exercise begins by considering water, it being an essential basic need. In most urban contexts the amount of roof space available to collect water would be insufficient to secure the necessary water supplies for such dense populations, especially in relatively dry climates or seasons. What this means is that most urban contexts *require* the water mains to exist, at least for the foreseeable future, for if they failed for more than a day or so most people would quickly perish. Accordingly, a degrowth economy must at least have the energy supply and stability to maintain the water mains at a sufficiently high level of regularity and safety. The water mains is the most critical piece of urban infrastructure we have, and I suspect it will be the last thing we will allow to fail. Even in a severe crisis, I think the human "will to survive" will ensure that the water mains keeps functioning.

Nevertheless, in a degrowth economy attitudes to water consumption and collection would undergo a revolution. Today, average daily household water consumption in the United States is around 370 litres per person (Wikipedia 2014); in Australia it is around 230 litres per person (Australian Bureau of Statistics 2014). By way of contrast, the United Nations (UNHCR 2014) and the World Health Organization (WHO 2013) advise that 20 litres per person, per day, is the minimum needed for the most basic subsistence requirements, which is the baseline used in refugee camps. In a degrowth economy, we could imagine that domestic water consumption might need to fall to somewhere between 50 and 70 litres per person, per day, which is enough to live a dignified existence without leaving much room for waste. Watering our productive gardens may increase this, but organic food production is more water efficient than industrial methods (see e.g. Wood et al. 2006), so ultimately this would save water overall.

In order to reduce water consumption from the mains, various steps could be taken. First of all, every household would maximize its roof water collection via water tanks. People will become proficient in creating and connecting systems of water collection and reuse—learning the skills to

do so, perhaps, at community "skill sharing" workshops organized by the local Transition Town (see Hopkins 2008). Greywater systems will become the household norm, including the use of tank water to flush the toilet. Eventually, composting toilets may be widely used in appropriate contexts, further reducing water consumption (see Jenkins 2005).

In those times when people are required to draw from the water mains, there is much room for conservation. Being conscientious of water consumption when preparing food and cleaning dishes, and never watering (or even having) lawns, are important and easily implemented conservation strategies. Perhaps the largest savings in the domestic sphere can come from how we wash our clothes and ourselves. Clothes could be washed less often and showers could be shorter and taken less regularly. In fact, if required, cleaning occasionally with a bucket of water and some soap is perfectly adequate for cleanliness and hygiene. This may seem "austere", but the critical point to note is that the same circumstances of radical simplicity would be experienced in totally different ways, depending on the mindset that was brought to experience. An austerity of degrowth may be perceived as a terrible hardship if governed by consumerist expectations, but no hardship at all if approached with a frame of mind shaped by notions of sufficiency. Fortunately, that mindset is within our control (Burch 2013), even if the material circumstances we find ourselves in may not always be. As the ancient Chinese philosopher once said: "He who knows he has enough is rich" (Vanenbroeck 1991: 116).

Food

A foundational issue for any economy is how it sources and produces its food, and this issue sits next to water on the list of essential needs. The globalized, industrial food production system currently in existence is highly unsustainable for various reasons. Not only are industrial farming techniques causing the severe and widespread erosion of nutrient-rich topsoil (which takes many hundreds of years to rejuvenate), but also the industrialized system is extremely fossil fuel dependent (see generally Brown 2011). Natural gas is needed to produce commercial fertilizers, and oil is needed to produce commercial pesticides, to fuel farm machinery and to create the plastics used in packaging. Furthermore, there are extremely long supply chains that reach all around the world and which are dependent therefore on oil for transport. In Australia, for example, a basket of food from the supermarket typically travels 70,000 kilometres

from producer to consumer, if the distance each item travels is aggregated (Salleh 2007). With respect to the UK, one study has the figure at 241,000 kilometres (Sustain 2001). This fossil fuel dependency is highly problematic not only due to its link to climate change, but also because it may not be economically sustainable as oil continues to get more expensive (Rubin 2009; Alexander 2014a).

In a degrowth economy, food production may need to be highly localized, organic, and based on permaculture (Holmgren 2002) or "biointensive" (Jeavons 2012) principles, in order to decarbonize industrial methods. One of the most significant, but often overlooked, implications of the transition away from industrial food production is the increased human labour needed for organic food production. The increased labour requirements arise primarily from the reduced reliance on energy-intensive, mechanized farm machinery, but organic fertilizer production and pest control are also typically more time intensive than industrialized techniques. Organic food production is entirely capable of feeding the world (United Nations 2013; Jeavons 2012), but to do so will require a huge increase in the provision of agricultural labour. This transition, however, will have many benefits, including reconnecting communities with the local land base upon which they depend for subsistence, and the health benefits associated with moving away from sedentary office or factory work toward the more active and outdoor work of farming (Mansen et al. 2004; Tremblay et al. 2010). Governments should do everything they can to support localized, organic agriculture, starting by putting a price on carbon. If they do not, grassroots movements should localize food production as best they can without state support.

To begin with, a degrowth economy should aim to maximize organic food production *within* the urban boundary. This would involve digging up lawns and turning them into productive vegetable gardens, and planting fruit trees in all available spaces. Nature strips could be cultivated; parks could be turned into small farms or community gardens; suitable roofs could become productive, herbs could grow on balconies and windowsills, and generally all food producing potential would be realized. Suburban backyards could keep chickens for eggs, and perhaps even small livestock, such as goats for milk and cheese. Animals are also a great source of manure for compost, and many permaculturalists build animals into their organic systems (Holmgren 2002). There is also great potential for building raised garden beds on driveways, some footpaths or roads, and redundant car parks. Mushrooms could be cultivated on the shady side of the house for protein, and household or neighbourhood aquaculture systems could provide urban centres with some of their fish supply.

Even in a degrowth economy, however, we can expect our urban households to "import" various foods in various forms, if not always from around the world, then certainly from rural or peri-urban contexts. This, in fact, would be an absolute necessity in dense urban contexts, because growing space simply does not permit anywhere near strict self-sufficiency (see MacRae et al. 2010). Even inspiring examples of urban agriculture, like Havana, in Cuba (see Friedrichs 2013; Percy et al. 2010), still require the importation of food—not only portions of its fruit and vegetables, but also its meat, minerals and other foodstuffs, such as salt.

The mainly local and organic food production would also drastically change our consumption habits. Food would be eaten "in season" in order to avoid having to import non-seasonal foods from the other side of the world. Preserving foods would be the most appropriate way to access those foods out of season. Generally, food would be unprocessed and require no disposable packaging. A robust carbon tax would significantly increase the relative price of meat (especially red meat) and consequently relative demand would significantly reduce, which is a *necessary* part of low-carbon living. This transition to low- or no-meat diets would open up huge tracts of land for human food production or "rewilding" (Monbiot 2013) that are currently used to produce grain for animals.

A degrowth economy would also vigilantly compost all its organic food wastes in order to supply the growing need for organic fertilizers, reducing the amount of so-called "waste" currently sent to landfill.

Clothing

The primary function of clothing is to keep us warm, and its secondary function, at least in most societies today, is to cover nakedness. In consumer-orientated societies, however, clothing's purpose has evolved to become primarily about expressing one's identity or social status. In a degrowth economy, by way of contrast, the fashion industry may be considered a superfluous luxury and accordingly it could be amongst the first industries to disappear. Of course, people will always want to express themselves through what they wear, so "style" would not disappear so much as evolve (see Reich 1970). A new aesthetic of sufficiency could develop, and soon enough the social expectation to look fashionable would become a quirk of history, incomprehensible to the new generation.

In a degrowth economy, we could salvage, swap and reuse clothing diligently, as well as get very good at sewing and mending. For the next few decades we could do this adequately by simply reusing and recycling

the (over)abundance of clothing already in existence. In the future, when new clothing is eventually needed, the primary aims of production would be functionality and sustainability, not profit-maximization strategies playing on the pernicious desire for ever-changing styles. Fabrics like nylon and polyester would be minimized as they are made from petrochemicals and are non-biodegradable. Functional, low-impact fabrics would be used instead, such as agricultural hemp, organic wool and organic cotton.

Housing

The issue of housing is particularly difficult and complex. Sometimes well-meaning environmentalists give the impression that we can move directly, in the next few decades, to an agrarian village scenario where everyone is living in self-built cob houses. The fact is, however, that over the next few critical decades, most people are going to find themselves living in an urban environment that already exists—suburbia. In other words, the houses and apartment blocks that already exist now, in most cases, will remain over the coming decades, no matter how inadequate they are from an ecological perspective.

Given this reality, the immediate task is making best use of existing infrastructure. David Holmgren (2012) calls this "retrofitting the suburbs for the energy descent future". This might involve things like taking in boarders, co-housing, or putting a caravan in the driveway to help resist further urban sprawl, or putting up curtains and sealing gaps in windows and doors to increase energy efficiency. Of course, much of the existing housing stock is poorly designed so there are real limits to what retrofitting can achieve. But much can be done, no doubt, to improve the ecological performance of existing housing (see e.g. Mobbs 2010).

In the long term, more people and communities would take part in the construction of their own homes to reduce costs. To limit the resources required, as well as limit the spaces needed to heat and cool, houses would be much smaller and more densely inhabited than is typically the case today. But they would be sufficient. Degrowth is about knowing how much is "enough".

Energy

In terms of energy use, the contrast between a growth economy and a degrowth economy could hardly be starker. Whereas growth-based industrial economies seek as much energy as possible at the lowest market price (see generally Moriarty and Honnery 2011), a degrowth economy would require only enough energy to provide a modest but sufficient

material standard of living for all (Alexander 2012c). This means much lower energy requirements than is common in the developed world, supplied primarily through renewable sources, although the exact levels cannot be known with any precision and are likely to be context-dependent (see Heinberg 2011). Renewable energy sources should not be relied on to sustain an energy-intensive, growth-orientated society (Moriarty & Honnery 2012; Trainer 2013a, b), and even if they could, we should not want this (Smith and Positano 2010). A society based primarily on renewable energy is a low-to-moderate energy society.

These reductions in energy would inevitably imply significantly reduced production and consumption (Ayres and Warr 2009; Hall and Klitgaard 2012; Murphy and Hall 2011; Murphy 2014)—that is, would imply degrowth. This would not necessarily be a problem, however, because as has already been made clear, consumption levels in a degrowth economy would be considerably lower than in consumer societies today, thus requiring much less energy to support them (see Odum and Odum 2001). As well as economic contraction, efficiency improvements and conservation efforts would also lessen the energy requirements of a degrowth economy. That said, "efficiency" measures would have to be subordinate to a more fundamental ethics of "sufficiency", in order to avoid the "rebound effect" (Princen 2005; Polimeni et al. 2009; Alexander 2014b).

Transport

In a degrowth economy major reductions in transport energy may need to be achieved through the relocalization of economies (De Young and Princen 2012). As many parts of the global economy get suffocated from expensive oil, or reshaped through carbon taxes (Alexander 2014a), local producers may regain the competitive advantage (Rubin 2009). Many things once imported from all around the world will now be able to be produced more economically at the local level, although presumably some global trade will remain, only far less of it (Trainer 2010).

Energy savings achieved through relocalization especially applies to food production. As already noted, industrial food systems are highly dependent on oil not only for transport, but also for things like pesticides and plastic packaging. When the costs of oil increase, and if a robust carbon tax is introduced, these methods may no longer be affordable or economic. The consequence will be more localized, organic food production, and therefore vastly reduced energy requirements for transport and

production. Some of the imported food for cities could be transported from farms lying on the periphery of urban contexts, using electric trains.

The other area of major energy savings in the transport sector, as implied above, relates to driving cars. In order to decarbonize the economy, people will need to drive much less, or not at all (Moriarty and Honnery 2008). Electric cars will not be able to escape this imperative, because producing them depends on fossil fuels, and also for most people electric cars remain unaffordable. Just as importantly, it would take several decades to replace the one billion petroleum-powered vehicles on the roads today with electric vehicles, and we do not have that much time to mitigate the effects of peak oil and climate change (Anderson and Bows 2011; Alexander 2014a).

The only solution is driving less. Various Australian studies have reported that the median distance travelled in a car is less than 5 km (Department of Transport 2009: 4), and around one-third are less than 3 km (BTRE 2002: 43). In many cases those relatively short trips could be replaced with walking, cycling or public transport. In order to make these options viable governments may need to invest heavily in a good system of electricity-powered public transport, such as light trains or trams, as well as networks of safe bike lanes.[1] Putting a price on carbon will also provide appropriate economic incentives to reduce car dependence. When necessary, carpooling should be practised.

In the longer term, however, the most significant reductions in car dependence will result from economic relocalization. If this transformation were to occur, driving would be unnecessary for many people, as their place of work would be either at home or reachable on a bicycle. Longer distances would generally be covered by public transport.

Work and Production

In a degrowth economy, the most significant change to work and production, noted immediately above, is that the household would once again become a place of production, not merely a place of consumption. Rather than hiring other people to grow our food, cook our meals, make our clothes, build our furniture, look after our children, maintain our houses, etc., we would generally take care of such things ourselves, so far as it were possible (Astyk 2012). Furthermore, households would sometimes produce goods for trade or barter, such as furniture, crockery, clothes or food, and thereby contribute to the broader local economy. Artisans might also

produce speciality goods at the household level, such as musical instruments, paintings or various tools.

Nevertheless, a degrowth economy should not be understood to mean strict self-sufficiency at the household level. It would still be desirable for much production to take place beyond the household, but the nature of what would be produced and the values motivating production would need to be very different. The provision of basic needs—such as food, clothing, shelter, tools and medicine—would be the primary focus of production, and the motivation would be to produce what was necessary and sufficient for a good life, rather than to produce luxuries or superfluous abundance. While some large factories would no doubt remain in order to provide certain materials or hi-tech equipment, small private businesses and worker cooperatives would in most cases replace the mega-corporation, with the local grocer and hardware store returning to Mainstreet, and community owned-and-operated farms providing much of the community's sustenance (Hopkins 2008; Hopkins 2013).

The greatly reduced level of production and consumption in a degrowth economy would allow for reduced working hours for most people, at least in the formal/cash economy. This would create far more time for leisure and the necessary home production.

Money, Markets and Exchange

The question of what role money, markets and exchange would play in a degrowth economy is also complex, and cannot be fully addressed here. Nevertheless, some broad comments can be made on these subjects.

First of all, it is worth noting that throughout history, human beings have exchanged goods and services with each other, either by way of barter, gift or through the use of money. These practices are going to continue although the nature of money, markets and exchange will have to evolve greatly, as will our attitudes toward them. It is likely that there will still need to be "markets" for various goods that cannot be produced within the household, and money will likely remain as the most convenient tool for "keeping accounts", so to speak. But non-monetary forms of exchange, such as gift and barter, are likely to become much more prominent modes of economic activity (Nelson and Timmerman 2011). Since profit-maximization would not be the aim of market activity in a degrowth economy, less attention would be given to producing things that fetch the highest price, and more attention would be given to producing what the community most needs.

The fact that markets of some variety would probably still remain in a degrowth economy implies that some forms of private property are likely to endure, although it is just as likely, and desirable, that more of the economy comes under local democratic control (Trainer 2010). Although the balance between private and social control of the economy could unfold in an infinite variety of ways (Alexander 2011)—a decision that will rightly be left to each democratic community—a degrowth economy must be designed so that everyone has enough, and this means taking ecosocialist (Sarkar 1999) responsibility for ensuring that the basic needs of all are universally met. This will require a significant degree of social democratic control of the economy, as basic needs would not be adequately met if resource allocation were left to market forces. The most important issue would be that everyone had access to land and affordable housing, and communities might have to experiment with how best to ensure this occurred.

With respect to existing monetary systems, one of the greatest problems is that money is currently loaned into existence as debt that accrues interest, and for such systems to function they require economic growth in order for the debts *plus* the interest to be paid back (Sorrell 2010). Interest payments imply an expansion of the money supply. A degrowth economy could not by definition have a monetary system that required growth, so it follows that interest-bearing loans could not be the primary means of money creation in such an economy (Trainer 2011). But what should replace this debt-based system—and how the transition beyond such a system would play out—are open questions that have not received the attention they deserve (but see Douthwaite 2012; Kallis et al. 2012).

Technology

In a degrowth economy, many technological conveniences we know today may largely disappear. Microwaves, vacuum cleaners, dishwashers, electronic kitchen gadgets, etc. may all become relics of history, but without causing much hardship at all. We survived without them not so long ago. But degrowth is not "anti-technology". Rather, it is a position that advocates a critical consideration of "appropriate technology" (Schumacher 1989 [1973]; Latouche 2014).

We should also remember, however, that a degrowth economy will likely emerge only in the wake of industrial civilization's deterioration. This will mean that vast quantities of industrially produced goods, tools and materials will already be in existence, and for many decades, perhaps

centuries, we would be living in what some have called the "salvage economy" (Greer 2009). Human beings will doubtless prove to be exceedingly creative in the use and reuse of existing materials and technologies. The old ethics of the Depression era may return, as people learn to "use it up, wear it out, make it do, or do without".

The clothesline could replace the clothes dryer; the bike will largely replace the car; and the television might essentially disappear, because we will have so many more important things to be doing. I suspect that washing machines and fridges will be the last things we give up, but life would go on even if they became unavailable or unaffordable. Hopefully computers will remain to do some important tasks—sharing important information and facilitating social organization—although private computers might become much less common.

There are countless other avenues that this analysis could explore: what would become of existing health and education systems, or pension schemes? How would people spend their leisure? How would a degrowth economy differ in urban centres as opposed to rural settings? And how would degrowth in the global North affect the global South? These are all issues that deserve further attention, but they go beyond the scope of the present analysis.

Conclusion

It will have become clear that the degrowth economy, as I have envisioned it, implies a fundamentally different way of life for most people in consumer societies today. While this way of life may seem "austere" in material terms compared to the high-consumption lifestyles widely celebrated in consumer cultures today, the aim has been to describe a standard of living that is low but nevertheless *sufficient* to live a rich and fulfilling life (Trainer 2012; Alexander 2015). In accordance with the ethics of voluntary simplicity (Cafaro and Gambrel 2009; Alexander 2009), the essential living strategy would involve aiming to meet basic material needs in low-impact ways, then redirecting energy and attention away from limitless materialistic pursuits, in favour of seeking the "good life" in various non-materialistic sources of satisfaction and meaning. This is the austerity of degrowth explored in this chapter.

This raises the question of how we could transition to such an economy—a question that is obviously of the highest importance (see Alexander and Rutherford 2014). Could the transition be voted in through the

parliamentary mechanisms of representative democracy? Would it require a political revolution and the introduction of some form of ecosocialism? Or would it require grassroots movements to essentially do it mostly themselves, building the new economy underneath the existing economy, without state assistance (and perhaps with a lot of resistance)? My own view is that it would be unwise, at this stage, to commit unconditionally to any one strategy given that the future is so uncertain. Different contexts may also call for differing strategies for change.

I do think, however, that the Transition Towns Movement, while not homogenous in its approach, currently has something of the right strategic balance here (Hopkins 2008; Hopkins 2013). Adopting what can be called "participatory democracy", the movement basically accepts that change must be driven at the grassroots, community level, while at the same time being prepared to press on governments (mainly local governments) to assist in the transition whenever that seems to be a good use of limited energies.

Furthermore, if the Transition Movement were ever to succeed in achieving its ambitious and diverse goals, I believe something resembling a degrowth economy may well be the result. What is important, I think, is that the debate gets drawn away from the question of how to *maintain* the existing system, toward the urgent and necessary question of what system should *replace* the existing system. In this sense the humble notion of degrowth can be seen as the revolutionary, but also necessary, proposal that it is.

Degrowth is about moving toward a society of frugal abundance, a society that is not degraded by capitalist austerity in times of crisis, but enriched by an austerity of degrowth based on an ethics of voluntary simplicity. Admittedly, this analysis may have raised as many questions as it has answered, but it is hoped that the exercise of envisioning a degrowth economy at the socio-economic levels helps advance the debate around this necessary movement for deep and rapid societal change.

Note

1. There are, however, deep structural complications underlying the requirement to stop driving so much, which should not be ignored. For many people today driving is the only way of getting to work, so the injunction to "get out of your car" may frustrate those people who would love to drive less but cannot, due to a lack of viable alternatives. Suburbia was built on the basis of cheap oil, which meant that "sprawl" was not seen as much of a

problem. But now that oil is getting more expensive (Alexander 2014b) and the climate crisis is intensifying (Anderson and Bows 2011), the long commutes are becoming increasingly problematic, not only from a cost perspective, but also from an environmental perspective.

References

Alexander, S. (Ed.) (2009). *Voluntary simplicity: The poetic alternative to consumer culture*. Whanganui: Stead and Daughters.

Alexander, S. (2011). *Property beyond growth: Toward a politics of voluntary simplicity*. Doctoral thesis, Melbourne Law School. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1941069. Accessed 10 September 2013.

Alexander, S. (2012a). The optimal material threshold: Toward an economics of sufficiency. *Real-World Economics Review, 61*, 2–21.

Alexander, S. (2012b). Planned economic contraction: The emerging case for degrowth. *Environmental Politics, 21*(3), 349–368.

Alexander, S. (2012c). Degrowth, expensive oil, and the new economics of energy. *Real-World Economics Review, 61*, 40–51.

Alexander, S. (2013). Voluntary simplicity and the social reconstruction of law: Degrowth from the grassroots up. *Environmental Values, 22*(2), 287–308.

Alexander, S. (2014a). *The new economics of oil*. MSSI Issues Paper No. 2, pp. 1–15.

Alexander, S. (2014b). *A critique of techno-optimism: Efficiency without sufficiency is lost*. MSSI Working Paper (WP 1/14), pp. 1–21.

Alexander, S. (2015). *Prosperous descent: Crisis as opportunity in an age of limits*. Melbourne: Simplicity Institute Publishing.

Alexander, S., & McLeod, A. (2014). *Simple living in history: Pioneers of the deep future*. Melbourne: Simplicity Institute Publishing.

Alexander, S., & Rutherford, J. (2014). The deep green alternative: Debating strategies of transition. *Simplicity Institute Report, 14a*, 1–24.

Anderson, K., & Bows, A. (2011). Beyond 'dangerous' climate change: Emissions scenarios for a new world. *Philosophical Transitions of the Royal Society, 369*, 3863–3882.

Astyk, S. (2012). *Making home: Adapting our homes and our lives to settle in place*. Gabriola Island: New Society Publishers.

Australian Bureau of Statistics. (2014). Water Account, Australia, 2009–2010. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/CAE301277A675941CA257956000E646E?opendocument. Accessed 2 November 2014.

Ayres, R., & Warr, B. (2009). *The economic growth engine: How energy and work drive material prosperity*. Cheltenham: Edward Elgar.

Bauman, Z., & Bordoni, C. (2014). *State of crisis*. Cambridge: Polity Press.

Brown, L. (2011). *World on the edge: How to prevent environmental and economic collapse*. New York: W. W. Norton and Co.
BTRE (Bureau of Transport and Regional Economics). (2002). Greenhouse policy options for transport. Available at: http://www.bitre.gov.au/publications/2002/files/report_105.pdf. Accessed 2 November 2014.
Burch, M. (2013). *The hidden door: Mindful sufficiency as an alternative to extinction*. Melbourne: Simplicity Institute Publishing.
Cafaro, P., & Gambrel, J. (2009). The virtue of simplicity. *Journal of Agricultural and Environmental Ethics, 23*(1), 85.
De Gues, M. (1999). *Ecological utopias: Envisioning the sustainable society*. Utrecht: International Books.
De Young, R., & Princen, T. (Eds.) (2012). *The localization reader: Adapting to the coming downshift*. Cambridge: MIT Press.
Department of Transport. (2009). *Victorian integrated survey of travel and activity 2007*. Available at: http://www.transport.vic.gov.au/__data/assets/pdf_file/0014/31280/VISTA-07-Summary-Brochure.pdf. Accessed 2 November 2014.
Douthwaite, R. (2012). Degrowth and the supply of money in an energy-constrained world. *Ecological Economics, 84*, 187–193.
Friedrichs, J. (2013). *The future is not what it used to be: Climate change and energy scarcity*. Cambridge, MA: MIT Press.
Gilding, P. (2011). *The great disruption: How the climate crisis will transform the global economy*. London: Bloomsbury.
Global Footprint Network. (2013). Resources available at: http://www.footprintnetwork.org/en/index.php/GFN/page/annual_report/. Accessed 29 October 2013.
Greer, J. M. (2009). *The ecotechnic future: Envisioning a post-peak world*. Gabriola Island: New Society Publishers.
Hall, C., & Klitgaard, K. (2012). *Energy and the wealth of nations: Understanding the biophysical economy*. New York: Springer.
Hamilton, C., & Denniss, R. (2005). *Affluenza: When too much is never enough*. Crows Nest: Allen & Unwin.
Heinberg, R. (2011). *The end of growth: Adapting to our new economic reality*. Gabriola Island: New Society Publishers.
Hermann, C. (2014). Structural adjustment and neoliberal convergence in labour markets and welfare: The impact of the crisis and austerity measures on European economics and social models. *Competition and Change, 18*(2), 111–130.
Holmgren, D. (2002). *Permaculture: Principles and pathways beyond sustainability*. Hepburn: Holmgren Design Services.
Holmgren, D. (2012). Retrofitting the suburbs for the energy descent future. *Simplicity Institute Report, 12i*, 1–8.
Homer-Dixon, T. (2006). *The upside of down: Catastrophe, creativity, and the renewal of civilisation*. Washington: Island Press.

Hopkins, R. (2008). *The transition handbook: From oil dependency to local resilience*. White River Junction: Chelsea Green Publishing.
Hopkins, R. (2013). *The power of just doing stuff*. Cambridge: UIT Cambridge, Green Books.
Ivanova, M. (2013). The Great Recession and the state of American capitalism. *Science and*
Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London: Earthscan.
Jeavons, J. (2012). *How to grow more vegetables* (8 ed.). Berkeley: Ten Speed Press.
Jenkins, J. (2005). *The humanure handbook*: *A guide to composting human manure* (3rd ed.). White River Junction: Chelsea Green Publishing.
Kallis, G. (2011). In defence of degrowth. *Ecological Economics, 70*, 873–880.
Kallis, G., Kerschner, C., & Martinez-Alier, J. (2012). The economics of degrowth. *Ecological Economics, 84*, 172–180.
Kasser, T. (2002). *The high price of materialism*. Cambridge, MA: MIT Press.
Latouche, S. (2009). *Farewell to growth*. Cambridge, UK: Polity Press.
Latouche, S. (2014). Essays on frugal abundance (1 of 4) – Degrowth: misunderstandings and controversies. *Simplicity Institute Report, 14c*, 1–22.
MacRae, R., et al. (2010). Could Toronto provide 10 % of its fresh vegetable requirements from within its own boundaries? Matching consumption requirements with growing space. *Journal of Agriculture*, *Food Systems*, *and Community Development, 1*(2): 105–127.
Mansen, J., Skerrett, P., Greenland, P., & VanItallie, T. (2004). The escalating pandemics of obesity and sedentary lifestyle: A call to action for clinicians. *Archives of Internal Medicine, 164*(3), 249–258.
Meadows, D., Randers, J., & Meadows, D. (2004). *Limits to growth: The 30-year update*. White River Junction: Chelsea Green Publishing.
Mobbs, M. (2010). *Sustainable house* (2 ed.). Sydney: UNSW Press.
Monbiot, G. (2013). *Feral: Searching for enchantment on the frontiers of rewilding*. London: Penguin.
Moriarty, P., & Honnery, D. (2008). Low-mobility: The future of transport. *Futures, 40*, 865–872.
Moriarty, P., & Honnery, D. (2011). *The rise and fall of carbon the civilisation: Resolving global environmental and resource problems*. London: Springer.
Moriarty, P., & Honnery, D. (2012). What is the global potential for renewable energy? *Renewable and Sustainable Energy Reviews, 16*(1), 244–252.
Murphy, D. (2014). The implications of the declining energy return on investment of oil production. *Philosophical Transactions of the Royal Society A, 372*(20130126), 1–19.
Murphy, D., & Hall, C. (2011). Energy return on investment, peak oil, and the end of economic growth. *Annals of the New York Academy of Sciences, 1219*, 52–72.

Nelson, A., & Timmerman, F. (2011). *Life without money: Building fair and sustainable economies*. London: Pluto Press.
Odum, E., & Odum, H. (2001). *A prosperous way down: Principles and policies*. Colorado: University Press of Colorado.
Percy, E., et al. (2010). Planning for peak oil: Learning from Cuba's "special period". *Urban Design and Planning, 163*(4), 169.
Polimeni, J., et al. (2009). *The myth of resource efficiency: The Jevons paradox*. London: Earthscan.
Pollin, R. (2013). Austerity economics and the struggle for the soul of US capitalism. *Social Research, 80*(3), 749–780.
Princen, T. (2005). *The logic of sufficiency*. Cambridge, MA: MIT Press.
Reich, C. (1970). *The greening of America*. New York: Crown Trade Paperbacks.
Rubin, J. (2009). *Why your world is about to get a whole lot smaller*. London: Virgin.
Salleh, A. (2007). Food miles can mislead. ABC Science. Available at: http://www.abc.net.au/science/articles/2007/11/28/2103395.htm. Accessed 10 January 2012.
Sarkar, S. (1999). *Eco-socialism or eco-capitalism: A critical analysis of humanity's fundamental choices*. London: Zed books.
Schneider, F., Kallis, G., & Martinez-Alier, J. (2010). Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. *Journal of Cleaner Production, 18*(6), 511–518.
Schor, J. (2010). *Plenitude: The new economics of true wealth*. New York: Penguin Press.
Schumacher, E. (1989 [1973]). *Small is beautiful: Economics as if people mattered*. New York: Harper Perennial.
Smith, J., & Positano, S. (2010). *The self-destructive affluence of the first world: The coming crises of global poverty and ecological collapse*. New York: Edwin Mellen.
Sorrell, S. (2010). Energy, economic growth, and environmental sustainability: Five propositions. *Sustainability, 2*(6), 1784–1809.
Sustain. (2001). Eating oil – Food in a changing climate. *A Sustain/Elm Farm Research Centre Report*. Available at: http://www.sustainweb.org/pdf/eatoil_sumary.PDF. Accessed 10 March 2014.
Trainer, T. (2010). *The transition to a sustainable and just world*. Sidney: Envirobook.
Trainer, T. (2011). The radical implications of zero growth economy. *Real-World Economics Review, 57*, 71–82.
Trainer, T. (2012). Your delightful day: The benefits of life in The Simpler Way. *Simplicity Institute Report, 13b*, 1–8.
Trainer, T. (2013a). Can Europe run on renewable energy? A negative case. *Energy Policy, 63*, 845–850.
Trainer, T. (2013b). Can the world run on renewable energy. *Humanomics, 29*(2), 88–104.

Tremblay, M., Colley, R., Saunders, T., Healy, G., & Owen, N. (2010). Physiological and health implications of a sedentary lifestyle. *Applied Physiology, Nutrition, and Metabolism, 35*, 725–740.

Turner, G. (2014, August). *Is collapse imminent? An updated comparison of the* Limits to Growth *with historical data*. MSSI Research Paper No.4, pp. 1–21.

Tverberg, G. (2012). Oil supply limits and the continuing financial crisis. *Energy, 37*(1), 27–34.

United Nations. (2013). Wake up before it's too late: Make agriculture truly sustainable now for food security in a changing climate. *Trade and Environment Review 2013.* Available at: http://unctad.org/en/PublicationsLibrary/ditcted2012d3_en.pdf

UNHCR. (2014). *Water, sanitation and hygiene*. Available at: http://www.unhcr.org/pages/49c3646cef.html. Accessed 2 November 2014.

Vale, R., & Vale, B. (2013). *Living within a fair share ecological footprint*. London: Earthscan.

Vanenbroeck, G. (Ed.) (1991). *Less is more: An anthology of ancient and modern voices raised in praise of simplicity*. Vermont: Inner Traditions.

Wikipedia. (2014). *Water supply and sanitation in the United States.* Available at: http://en.wikipedia.org/wiki/Water_supply_and_sanitation_in_the_United_States. Accessed 2 November 2014.

Wilkinson, R., & Pickett, K. (2010). *The spirit level: Why greater equality makes societies stronger*. London: Penguin.

Wood, R., Lenzen, M., Dey, C., & Lundie, S. (2006). A comparative study of some environmental impacts of conventional and organic farming in Australia. *Agricultural Studies, 89*(2–3), 324–348.

World Health Organization. (2013). *How much water is needed in emergencies?* Available at: http://www.who.int/water_sanitation_health/publications/2011/WHO_TN_09_How_much_water_is_needed.pdf?ua=1. Accessed 2 November 2014.

PART III

Case Studies

CHAPTER 8

Cloughjordan Ecovillage: Modelling the Transition to a Low-Carbon Society

Peadar Kirby

Introduction

As the objective of a low-carbon society by 2050 is fast becoming a key policy objective of countries around the world, there is an urgent need for public policy to be informed by examples of how this can be done. For example, a recent EU-funded research project designed to identify the obstacles to and drivers of the transition to a low-energy society undertook an analysis of 1,700 projects relating to energy transition at the local level throughout Europe, "so as to identify actual conditions that facilitate (or, conversely, hinder) a transition towards a post-carbon (or low-carbon) society" (Milescure 2014: 7). Of the 90 anticipatory experiences initially identified, 23 were selected for a more detailed examination on the basis of a number of criteria including the success of the project, "in terms of social recognition and excellent results (indicatively defined 'post-carbon') from an energy and environmental point of view" (ibid.: 15). Among those selected was Cloughjordan Ecovillage in Ireland.

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The chapter begins by describing the ecovillage and its historical genesis. It then outlines a framework which identifies the key factors that create the conditions for the transition to a low-carbon society. Subsequent sections examine in turn each of these sectors in Cloughjordan ecovillage to identify the means through which the ecovillage community seeks to transition to a low-carbon society and its success in doing so. Particular attention is devoted to the model of governance that has been put in place and how this is working in practice. The chapter ends by outlining the project to measure the ecological footprint of the ecovillage and reporting its findings. Conclusions are drawn about the lessons of the project for public policy towards transitioning to a low-carbon society at national and international level.

Cloughjordan Ecovillage

Cloughjordan Ecovillage owns a 67-acre (27-hectare) site behind the main street of the town of Cloughjordan in County Tipperary in the southern part of the Irish midlands. It is some 15 km from the M7 Dublin-Limerick motorway and some 60 km from the M6 Dublin-Galway motorway. It is on a secondary railway line, serving Dublin and Limerick, with two trains a day in each direction. It is easily accessible from the main cities of Dublin (143 km), Cork (156 km), Limerick (57 km) and Galway (94 km) (see Fig. 8.1). The origins of the project lie in a group loosely associated with the Dublin Co-Housing project and the Dublin Food Co-op in the mid-1990s that began discussing the possibility of establishing Ireland's first ecovillage. In 1999 a company called Sustainable Projects Ireland Limited (SPIL) was established as a legal entity with a board of directors but which is non-profit making and operates as a co-operative. SPIL is also a registered educational charity. Its purpose is to build an ecovillage which, according to SPIL's memorandum of association "will serve as a model for sustainable living into the twenty-first century and will serve as an education, enterprise and research service resource for all".

In selecting a site to build the ecovillage, SPIL decided that it should be contiguous to an existing population centre and not be built as a new urban settlement. It sought land appropriate for the mix of housing, amenities and wilderness areas that it planned. It was also important that it be served by public transport, to provide access to more low-carbon means of travel. To identify an appropriate site, it advertised in Ireland's main farming newspaper, *The Farmers' Journal*, visiting those villages and

Fig. 8.1 Location of Cloughjordan in the Irish midlands

towns which responded positively. By 2002, the village of Cloughjordan in north Tipperary was selected and a year-long community consultation began with residents. This included getting the children in the two primary schools to build a model of the proposed ecovillage. An Ecological Charter of basic principles for the development of the ecovillage was drawn up and agreed by members and a master plan developed and submitted for planning permission. By 2005 a 67-acre site had been bought behind the northern side of the main street and, following the granting of outline planning permission by North Tipperary County Council, infrastructure work began in 2007 financed by contributions from members of SPIL and by loans, both from an ethical fund and from a commercial bank. An EU

Concerto grant for the proposed energy centre also contributed to the project's financial viability. With the completion of infrastructure works in 2008, the first houses were constructed in 2009 and the ecovillage's first residents moved in in December 2009.

Altogether 114 residential housing units are planned including individual houses, semi-detached houses, terraces of houses and apartments, plus 16 live-work units with spaces in which to run businesses. By 2014, 85 sites had been sold and 55 housing units built with more planned; SPIL had 86 registered members in mid-2014 of whom the great majority are living in the ecovillage. When members' partners and children are included as well as people renting houses, the total number of residents comes to around 140. The residential area comprises one-third of the site. A further one-third is devoted to support services and amenities including a district heating system, an eco-enterprise centre, allotments for growing food and a community farm. Native varieties of apple trees have been planted in this area and throughout the ecovillage various varieties of herbs and fruit bushes have been planted to create an "edible landscape" (Cloughjordan Ecovillage website: www.thevillage.ie). The final one-third is devoted to woodland in which 17,000 trees were planted in 2011, mainly native species such as oak, ash, Scots pine, birch, rowan, cherry, hazel and alder. This is regarded as an amenity area for visitors and a contribution to promoting biodiversity (see Fig. 8.2). According to the ecovillage website (www.thevillage.ie) "the community's land use plan is based on the principles of environmental and ecological diversity, productive landscape and permaculture".

The 49-page Village Ecological Charter is a set of agreed standards and the means to achieve them approved by members and binding on them (SPIL 2007). This states that the primary objective of the ecovillage "is to demonstrate truly sustainable development, in as holistic a way as practicable, in order to serve as a model and an educational resource for Ireland" (SPIL 2007: 11).

Cloughjordan and its ecovillage have won a number of high-level awards. It won the National Green Award for Ireland's greenest community three years in a row from 2012 to 2014 and won a gold medal award at the 2013 International Awards for Liveable Communities (LivCom), also known as the Green Oscars, hosted by Xiamen in the People's Republic of China and supported by the UN Environment Programme (UNEP). It was ranked by readers of *The Irish Times* in a national survey as one of the ten best places to live in Ireland. It features in radio and TV programmes

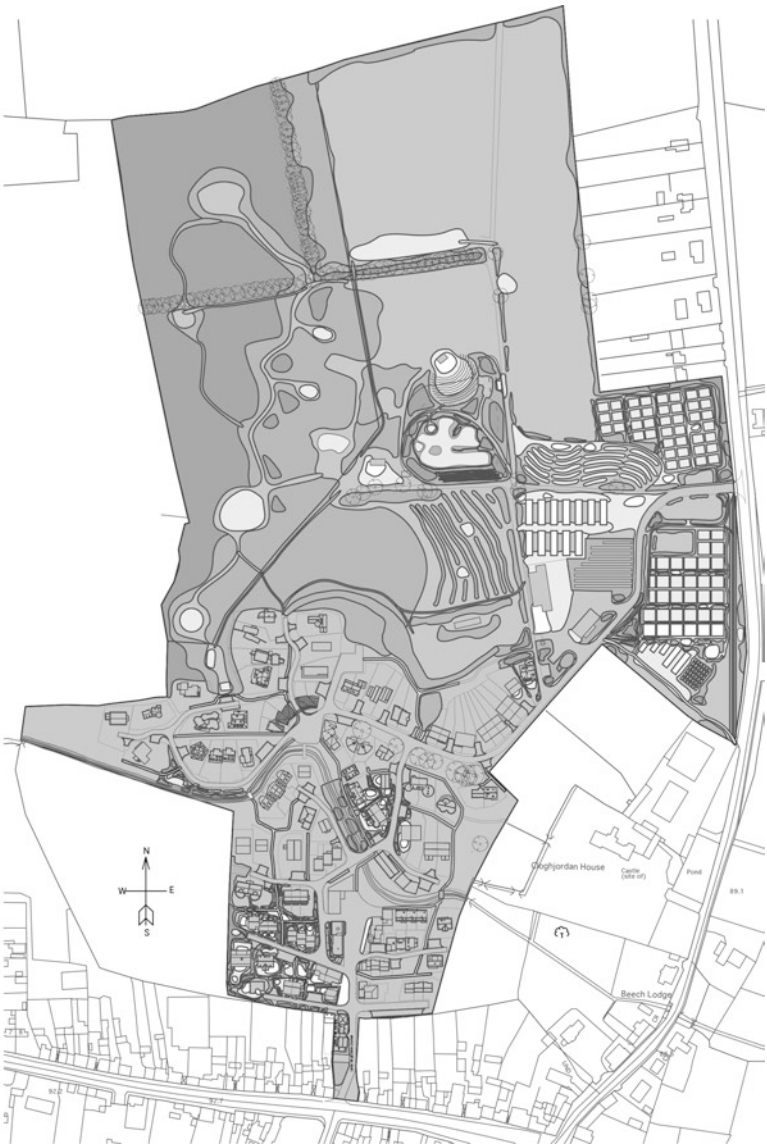

Fig. 8.2 The site of the ecovillage with the residential area in the south, the woodlands in the north-west, the community farm in the north-east and the services such as the district heating system, allotments and the enterprise centre to the south of the farm

and numerous articles have been published in the national media on the project. Most of this coverage is very positive.

As part of the Milescure research project reported above, an analysis was undertaken of all tweets since 2006 about the 90 anticipatory experiences identified. In total 753 tweets relating to Cloughjordan were identified making it the ninth most numerous, despite being in one of the smallest countries in the survey in terms of population (only two smaller countries—Croatia and Slovenia—are included). Of the total number of authors identified, Cloughjordan had the eighth most at 235 (Milescure 2013: 82, 83). A deeper qualitative analysis was done of the 23 experiences selected for examination in the project. Since three of these garnered minimal attention on Twitter, the researchers were left with a corpus of tweets on 20 projects. These were grouped under a number of headings including type of author (individual, media, government, non-profit organization, for-profit organization) and their stance towards the project (positive, neutral, negative). Of the tweets on Cloughjordan, 80% were positive and 18% negative. In terms of the source of the tweets indicating the range of people and organizations engaging with the project, 56% of those about Cloughjordan came from individuals, 20.6% from non-profit organizations, 12.9% from media sources, and 10% from for-profit organizations. Analysis of tweets about Cloughjordan shows that the "ecovillage is considered as a good place for living and visiting. A lot of personalized content, people share and search for information about education courses and events" (Milescure 2014: 118).

Ecovillages and the Transition to a Low-Carbon Society

Cloughjordan Ecovillage is a member of the Global Ecovillage Network (GEN) which defines an ecovillage as "an intentional or traditional community using local participatory processes to holistically integrate ecological, economic, social, and cultural dimensions of sustainability in order to regenerate social and natural environments". It sees them as one solution to the great problems of our times, the limits to growth and the unsustainability of our societies. It states: "Ecovillages, by endeavouring for lifestyles which are 'successfully continuable into the indefinite future', are living models of sustainability, and examples of how action can be taken immediately. They represent an effective, accessible way to combat

the degradation of our social, ecological and spiritual environments. They show us how we can move toward sustainability in the twenty-first century (Agenda 21)". In 1998, ecovillages were first officially named among the United Nations' top 100 listing of Best Practices, as excellent models of sustainable living (GEN website).

Ecovillages are therefore "living laboratories" as Litfin calls them in her book on the lessons for sustainable community that ecovillages offer (Litfin 2014: 18). Cunningham identifies essential features: "Ecovillages are commonly conceived around four pillars: sustainable building, organic farming, resilient community and alternative energy" (Cunningham 2014: 236). Yet, this seems to treat community as yet another feature alongside buildings, energy systems and farming. Gilman's definition has a very different emphasis in that he sees an ecovillage as being a "human scale, full-featured settlement in which human activities are harmlessly integrated into the natural world in a way that is supportive of healthy human development and can be successfully continued into the indefinite future" (Gilman 1991: 10). By "full-featured settlement", he means one "in which all the major functions of normal living – residence, food provision, manufacture, leisure, social life, and commerce – are plainly present and in balanced proportions" (ibid.). This takes the focus off technologies and sees the human community as the core. In examining an ecovillage as a model of the transition to a more sustainable low-carbon society, therefore, a balance must be found between the concrete examples of how technologies can be used to lower greenhouse gas (GHG) emissions and build the resilience of the community, and the quality and vibrancy of community life itself. This is described well by Litfin as she reflects on her time spend in 14 very different ecovillages around the world:

> The sense of wealth seems to rest upon the intangible kinds of sharing that are the essence of community – the sharing of knowledge and skills, joys and sorrows, births and deaths. These are the signs of community I looked for in my nine months of ecovillage living. I experienced a principle I'd been theorizing about for years: the foundation for ecological sustainability is social sustainability, person to person. In many of the ecovillages I visited, I saw concrete demonstrations that a self-replenishing social order is based on relationships of trust and reciprocity (Litfin 2014: 16–17).

For this reason, she structures her book around what she calls "E2C2: four windows into sustainability" (ibid.: 30). The two Es stand for ecology

and economy, namely how to find ways of livelihood that are in balance with the ecosphere but these rest on values and worldviews expressed by the two Cs, community and consciousness. "Ultimately, how I live outwardly will express who I am inwardly", she writes (ibid.: 31). While each ecovillage tends to highlight certain elements of E2C2, the four dimensions are interconnected. "Because ecovillages take a strongly integrative approach, E2C2 takes on a dynamic, self-reinforcing character" (ibid.: 31).

But why are ecovillages important in modelling the transition to a low-carbon society? Most scenarios for such a society devote extensive attention to how new technologies can be used to wean ourselves off fossil fuel use and drastically reduce greenhouse gas emissions. This, for example, is the message of *The New Climate Economy Report* from the Global Commission on the Economy and Climate (2014). Others acknowledge the need for behavioural change to accompany technological innovation, but it is often treated in a cursory fashion (see NESC 2012; Kirby 2013 for an assessment). In answering the question "What is a low-carbon society?", Peake acknowledges that "there tends to be an emphasis on physical artefacts or processes such as energy technologies, transport or food production in the envisioning of low-carbon communities". But, he asks: "What kind of lifestyles add up to a low-carbon community?" Instead of visions of society, what we tend to get are different visions of technological futures, he writes (Peake 2012: 25). This underlines the importance of ecovillages as laboratories of a low-carbon future society since they embed technologies within community lifestyles, experimenting with various means to achieve that objective. They offer visions of how a *society* moves to a low-carbon future and are an example of Low Impact Development (LID) in practice (Pickerill and Maxey 2009).

If, therefore, "ecovillages have a big head start in figuring out how to make sustainability work" (ibid.: 32), it is important that the lessons they offer for the wider society are captured in their integrated complexity, embedded in strong vibrant communities where people live well together with a light footprint on the planet and with resilient local economies and societies. It is this mixture of the low-carbon practices taken from the best in contemporary technologies integrated into and held by strong community bonds that lies at the core of the lessons that can be learned. The examination of Cloughjordan Ecovillage in the next section will, therefore, attempt to balance a description of its energy, building, food, water, transport, waste and livelihood practices with its community life and the values

underpinning it. The subsequent section will then examine its governance system which is an essential part of holding together successfully the complexity of the project as a whole.

Transitioning to a Low-Carbon Society: The Cloughjordan Experience

The Village Ecological Charter contains the guidelines for the development of the built and the natural environment of the ecovillage so as "to reduce the impact of the project on the natural environment and so promoting sustainable development" (SPIL 2007: 5). This includes detailed and specific targets for energy supply and use, plans for land management, water and solid waste, construction (including materials, light and air, and ventilation), and community issues such as transport, social and communal facilities, and noise and light pollution. Each will be dealt with in turn here, supplemented by discussion of food and of livelihoods. This section ends with discussion of the wider context of community.

Energy

Renewable energy supply is one of the key features of Cloughjordan Ecovillage. The entire heating and hot water for the ecovillage is supplied by a district heating system which uses no fossil fuels for its primary energy sources and emits no greenhouse gas emissions. (Electricity supply to drive the pumps and for other purposes is taken from the public mains at present but there are plans for on-site wind-power in due course.) This is the first of its kind in Ireland in a private housing development and is estimated to save 113.5 tonnes annually of carbon that would be emitted by conventional heating systems for the number of houses served. This saving will increase as more houses are built in the ecovillage. The heating plant comprises two 500-kilowatt wood-chip boilers backed up by 500 m^2 of solar (thermal) panels, the largest array in the country. The fuel is waste wood from a sawmill about an hour from the ecovillage that uses Irish-grown softwood, mostly spruce. It is hoped to source the wood locally within a few years. This plant supplies hot water to each house via a well-insulated network of piping and maintains a 17,000-litre reserve of hot water. Within each house, the hot water flows through a heat meter and a heat exchanger, which heats the water in a well-insulated 700-litre storage tank. This tank provides all the space heating and hot water needed,

so homes don't need their own boilers, stoves, electric showers or electric water heating. This method of heating homes is significantly cheaper than conventional methods.

The targets set in the Ecological Charter for energy inputs were 30% better than the national building regulations at the time and very exacting targets were set for the total heat input from all fuels (including electricity) per square metre of floor area per year (kWh/m^2.yr). To meet these, exact specifications were given for insulation as well as recommendations for cooking and other electrical appliances so as to minimize the amount of heat and energy required by each house. Some houses also have a mechanical heat recovery ventilation system, which reduces heat losses due to ventilation. Since the ecovillage was a partner in the EU-funded SERVE project (Sustainable Energy for the Rural Village Environment) and received funding to help build the district heating system from this source, the energy performance of each of the houses has been tested and those meeting the required standard received a small grant. Almost all the houses met the minimum standard set by the Ecological Charter. The few exceptions, which came close, were built of simple materials, such as cob, with low-embodied energy. The energy use of the inhabitants is monitored and houses have been supplied with a monitor for heat and electricity use. While electricity is currently taken from the national grid, SPIL advises that members source supplies from companies which are switching generation to renewables.

Land Management, Water and Waste

In developing and managing the land, the Ecological Charter specifies that the objective is "a landscape that has high productivity, biodiversity, education and amenity value". The development and maintenance of all land follows organic practices and draws on permaculture principles (Holmgren 2011). Priority is given to indigenous plants to facilitate wildlife supplemented by "non-indigenous varieties and species to create a productive, edible and useful landscape" (SPIL 2007: 30). Corridors for the movement of wildlife are built into the design of common and private areas and the composting of organic matter to regenerate the soil and avoiding toxic or other harmful substances is strongly recommended to all members. Since the upkeep of the common areas is the responsibility of all, regular periods of communal work on the land are organized (the Gaelic word "meitheal" is used for

these, recalling the traditional practice of communal work among Irish farmers). Among the amenities built and maintained in this way are communal gardens, an apple-tree walk which has some 65 native varieties of apple trees planted and a hazel copse supplying hazel nuts to the community. Fruit-bearing bushes and trees are widespread throughout the ecovillage.

The Ecological Charter specifies a target for the use of potable water of 85 litres per person a day which compares to a national average of 140 litres per person a day. Furthermore, water harvesting and recycling is recommended and some members have incorporated systems into their homes, in some cases supplying the full water needs of the household. Many homes harvest rainwater for outdoor uses. Originally it was planned to use a natural system of reedbeds and wetlands to treat waste water and sewage but this has not been possible as the local council would not grant a discharge licence and a conventional system had to be installed. However, national water authorities have more recently expressed interest in the possibility of natural treatment and these plans are again being looked at by the ecovillage. A sophisticated sustainable urban drainage system (SUDS) was incorporated into the infrastructural works and has proved very successful. Surface water from roads, roofs and the like is piped to catchment basins, in which it is naturally filtered by the soil before percolating into the ground—exactly as it did before building began. These basins are designed to overflow into the nearby stream if heavy rain continues for many days. However, this has only happened once in five years of operation, a period which saw flooding in other parts of the region while the Cloughjordan SUDS system avoided any flooding in the ecovillage.

Household waste is recycled as far as possible and organic waste composted. A composting site for the ecovillage is currently being developed. Members' activities themselves generate a dynamic of recycling within the ecovillage as the requirement for plastic or glass jars and bottles, newspapers or brown paper bags, plastic cartons or other waste materials for those engaged in producing and processing food or other products (for example soap) means that some members simply take waste products to neighbouring houses where they can be productively used. Waste that cannot be recycled within the ecovillage is currently collected by commercial waste disposal companies (clusters of households sharing one bin is a regular practice) though it is envisaged that in time the ecovillage will develop its own ways of treating such waste.

Sustainable Building

Within Cloughjordan Ecovillage, members buy sites from SPIL which have outline planning permission and build their own houses to their own designs, in keeping with the principles and specifications of the Ecological Charter. This advises the use of non-toxic materials that are safe and sustainable in manufacture, use and decay, regionally sourced and with low-embodied energy wherever possible, thereby reducing the environmental impacts of transport and manufacture. Extensive attention is devoted to issues of air-tight construction, ventilation, and maximizing natural light and heat (SPIL 2007: 40–45). However, it is acknowledged that "in the present underdeveloped state of the eco-construction industry in Ireland, some compromises might be necessary, such as the import of specialised products and the use of PVC insulation on wiring" (ibid.: 40). Adherence to these standards was to be verified by SPIL as all building plans had to be approved beforehand by the company before being submitted for planning permission to the local municipal authority.

As a result, many different building types have been used to date in constructing houses, including passive timber frame with a variety of insulations and finishes, Durisol blocks (blocks of chipped waste wood bonded with ecocement), sheep's wool, cellulose (shredded newspaper), hemp-lime (lime is a traditional Irish form of finish but the addition of hemp, a fibrous plant material, gives it strength and insulation), cob (clay, sand and straw), a Canadian stick-frame house with double stud walls (with no cold bridging) and kit houses, while natural slates or recycled plastic roof tiles and "green roofs" are widely used. These provide a colourful variety of different designs and finishes that gives the ecovillage a very distinctive look compared to other residential areas in Ireland. The high standard of materials used however and the specifications to which houses are built result in the ecovillage having some of the highest standards of building energy ratings (BER) in Ireland. In 2013, the ecovillage constituted 0.015% of all houses rated nationally yet 6.25% of all those given an A rating and 2.5% of all those given a B1 rating nationally. (As houses are only rated when sold or let, the national database is very partial and incomplete.) In examining the ecovillage according to the principles of sustainable housing, Winston concluded that it meets many of the criteria including the use of sustainable housing construction designs and materials, on-site recycling of construction materials and energy efficient buildings (Winston 2012: 99).

Community Issues

1. *Transport:* The Ecological Charter specifies that the objective of SPIL is "to make it easy to live without owning a car" (SPIL 2007: 46). To achieve this, roadways are kept narrow (4.5 metres wide) and households are allocated only one parking space close to each house. Travel by train is actively encouraged; members are active in a local train users' forum which liaises with the state-owned company Irish Rail, educational events in the ecovillage are scheduled to allow travel to and from them by train from Dublin, and discounts are offered on some ecovillage events to those who travel by train. A car-sharing club has been established allowing ten households to share three cars and the costs of maintaining them. The initial cars were lent to the club by car-owning members. Bicycles are widely used by ecovillage residents for local travel.
2. *Social and communal facilities:* A number of community buildings are included in the ecovillage plan for which planning permission was granted by the then North Tipperary County Council. However, due to financial constraints, it has not been possible to build any of these and the only communal building is an existing old building at the pedestrian entrance to the ecovillage, which is the deposit point for farm produce (see below). The ecovillage secured funding to improve this building but this was not sufficient to fit it out and modernize it for more extensive uses such as a welcome centre. This means that local church halls and the enterprise centre are used for a lot of community events and meetings while community meals take place in members' houses or, when weather permits, outdoors. Communal gardens are also a part of the site plans and these are maintained by the residents in each of the adjoining clusters of houses.
3. *Noise and light pollution:* The Ecological Charter states that "noise and light pollution should be kept as low as possible to protect wildlife and to create a calm, peaceful home zone for human residents" (ibid.: 48). This involves a shared ethic of avoiding noisy events and a set of agreed rules for pets. By and large these are working well and there are rarely complaints of excessive noise. While national regulations specify the need for public lighting, this has not been installed except for one solar-powered large LED light in a public area as one enters; as a result residents enjoy the rich starscape that is visible in the absence of strong public lighting. The absence of light pollution is widely supported by ecovillage residents.

Community-Supported Agriculture (CSA)

Members of Cloughjordan Ecovillage have established Ireland's first member-owned and operated CSA farm in Ireland and one of the few CSAs to exist in the country (Moore et al. 2014: 139). Located within the emergence of civic food networks throughout Europe, CSAs are seen to embody the three Es of ecology, ethics and equity in the distribution of voice, resources and power. Some two-thirds of the 54 households which are members of the Cloughjordan community farm live in the ecovillage and the rest live in the wider Cloughjordan community (there were 84 adult members in mid-2014). The farm began on two holdings which are farmed in a biodynamic way—a 12-acre (5-ha) site on the land of the ecovillage and a farm of 26 acres (11 ha) leased nearby. Currently the former grows 4 acres (1.6 ha) of vegetables, 1 acre (0.4 ha) of cereals, 1 acre of green manure (humus building) and 6 acres (2.43 ha) in permanent pasture while the latter is now privately run and the farm buys in milk on a contract basis. Members pay a monthly fee (around €130 for a household of typically two adults and two children) and can take what food they want from a central distribution point that is supplied three times a week, all year around. Some meat is included in the membership fee. Extra can be purchased, when available, outside of this arrangement. While two part-time co-ordinators act as the main producers and receive payment from the farm budget and are answerable to the farm board which is elected by members, they rely on WWOOFers (Worldwide Opportunities on Organic Farms) and interns as well as on the voluntary labour of members when called upon. WWOOFers offer labour in return for accommodation and meals, the provision of which is shared among the community. Children are also integrated into activities through links with the local schools. The farm engages extensively in educational activities with its members and the wider community, including raising issues about the politics of food production and distribution, safety issues (for example, a public debate was held on the subject of unpasteurized milk) and the nutritional and medicinal properties of wild plants. Members often share recipes.

Not only does the form of food production and distribution link the producer and consumer in a deeply interactive relationship, but it changes practices of consumption since members are reliant on whatever food is available according to the season, the weather and the amounts planted. Thus consumption practices adjust to availability. Frustration at the lack of produce led in 2011 to a survey of members and interactive facilitated discussions which

resulted in a new structure emerging and more involvement by members in the functioning of the farm. The restructuring has successfully resolved many of the problems of the CSA and is seen by Moore et al. as "testimony to its robustness, or, specifically, its reflexive resilience" (ibid.: 149). The farm is also seen as contributing to the resilience of the ecovillage itself, lessening reliance on commercial producers (often very distant), improving greatly the quality of food consumed, and enhancing skills and practices among members. Its sustainability rests both on its being imbedded in a wider community and also on the practices of soil regeneration, balanced agriculture and active seed saving. It thus provides a rare example of the sort of agriculture to which Feehan argues Ireland must return: "Community Supported Agriculture holds out hope for the return of integrated farming, the only kind of farming that is truly sustainable, where livestock and crops are reared together" (Feehan 2003: 518).

Livelihoods

The Cloughjordan community farm addresses one key issue of economics but it is much more focused on shared production and consumption than on the provision of livelihoods. The Ecological Charter acknowledges that key features not covered "include the development of a localised economy and, especially, of local work and business opportunities" (SPIL 2007: 46). In her visits to ecovillages around the world Litfin found them to be "laboratories for economic experimentation", reinventing economies through satisfying needs communally rather than individually and doing so on the margins of the cash economy. As a result, "many ecovillagers are living comfortably on incomes that place them well below the poverty line" since they combine "self-sufficiency, sharing, and elegant simplicity" (Litfin 2014: 79, 81). Yet, at the heart of sustainable living is the ability to generate sufficient income to live well within the ethic of sharing and mutual support.

Cloughjordan has faced this challenge. A number of those who moved to Cloughjordan to live in or on the margins of the ecovillage established businesses. These include an ecohostel with 34 beds and a wood-fired bakery, both businesses within the ecovillage, and a book and coffee shop on the main street. A group of ecovillagers established a company called VINE (Village Internet Network Engineering) to provide internet and telephone services to ecovillage residents. A number of national organizations now have their main offices in the ecovillage including the

educational non-governmental organization (NGO) Cultivate, and the Foundation for the Economics of Sustainability, FEASTA. Consultancies run from the ecovillage include event management, low-energy and sustainable building techniques, and renewable energy. A green enterprise centre WeCreate, built in the ecovillage with local, national and EU funding, hosts a Fabrication Laboratory (FabLab) established by two ecovillage members and part of the worldwide network of FabLabs allowing the manufacture of almost anything through downloading plans and using computers to make the products. It is the only community-based FabLab in Ireland. The centre offers workspaces to local businesses and colleges and also runs courses. It has been accredited as a "Discover Primary Science and Maths" centre by Science Foundation Ireland (SFI) allowing visiting schools claim credits towards SFI awards. As an educational NGO, the ecovillage organizes its own educational activities but also encourages members to do the same, thereby allowing for a rich variety of educational offerings providing income for members and for SPIL. In these ways the ecovillage is the centre of extensive economic activity generating livelihoods and drawing many visitors to the locality.

Community

Consistent with Litfin's findings in other ecovillages, building a vibrant community is central to the Cloughjordan ecovillage. Interestingly, a process in mid-2014 that sought to achieve a common statement of purpose from members of the ecovillage focused on community. The final text, agreed by members, placed as the first of its objectives "building a resilient, supportive community based on fairness and mutual respect". Yet, as Litfin writes, "community living requires enormous skill – the kind that often comes only through the school of hard knocks" (Litfin 2014: 113). What facilitates the development of community is the dense web of interconnectedness that characterizes the relationships in the ecovillage, strengthened and at times tested through a myriad of different kinds of activities, from the often tense discussions attempting to reach a community consensus on key issues to the enjoyment of community meals and parties where rich encounters take place. As described below, a special Process group exists to facilitate community interactions and the monthly community meeting puts aside a period which allows any member to voice any issue that is troubling them, including issues of grievance and pain caused within the community. A successful community, then, depends not on avoiding or

minimizing pain and tensions but rather on facilitating their expression in an atmosphere of mutual respect. A diverse membership, which includes professional facilitators, counsellors and psychotherapists helps this process.

In her research on the ideological, cultural, political, ecological and social discourses which frame the daily lives of the residents of Cloughjordan Ecovillage, Casey found that ecovillage members "are embedded in the deep structure of a community dedicated to sustainable living and education. Cloughjordan ecovillage fits the definition … of a COP [community of practice]. It is a group of diverse and committed individuals bound by a common goal and shared sense of identity, values and norms" (Casey 2012: 27). She found that "anti-consumption and localisation feature heavily in the ecovillage's discourse" (ibid.: 24) and "the members consciously participate in the local economy" (ibid.: 25) seeing it as a positive value to consume locally produced food and use local services as far as possible. This, then, constitutes something of the dimension of consciousness that Litfin finds characterizes all the ecovillages she visited. "Every ecovillager I interviewed reported having experienced extraordinary personal growth through their shared experiments", she writes (Litfin 2014: 149). It is this inner transformation that is a vitally important subjective dimension of sustainable living. As in the ecovillages that Litfin visited, Cloughjordan ecovillagers have diverse spiritual beliefs but spirituality is an important dimension for some members and found expression in the building of a Celtic labyrinth amid the woodland area.

Governing for the Transition: The Viable Systems Model (VSM)

Finding a governance structure that reflects its values is a particular challenge for any intentional community, particularly one as complex and multifaceted as an ecovillage. As Cattaneo puts it: "Normally, horizontal decision-making and deliberative non-representative processes characterize eco-communities, while some adopt consensus rather than majority decision rules" (Cattaneo 2015: 166). This is exactly what happened in Cloughjordan. By 2007, the existing organizational structure of Cloughjordan Ecovillage based on multiple committees was seen to be under strain, unable to deal effectively with the many tasks and challenges facing the project. This led members to turn for support to consultants Angela Espinosa and Jon Walker who promote the use of the VSM in co-operatives and large communities looking for alternatives to

traditional hierarchies. Following a visit by Espinosa and Walker in 2007, the community decided to restructure its governance structures according to the principles of the VSM. From July 2007 to November 2011, they made 11 visits, on each occasion offering at least one workshop on the VSM. This process helped members identify the project's primary activities (PA) and establish PA groups (PAGs) such as education, land use and site development (the three PAGs in existence at the time of writing), each of which has a number of task groups within them responsible for different aspects of the PA. These are known as System 1 groups in the VSM. Espinosa and Walker write of the change this involved in the ecovillage's self-organization:

> The most relevant change resulting from this stage, was the migration from the initial structure of 20 working groups, to a structure focused on these primary activities – supported by technical and administrative roles; this significantly diminished the complexity of their interaction and focused scarce resources (mainly people) on the most relevant tasks (Espinosa and Walker 2013: 122).

They then moved on to identifying what in the VSM are called the meta-systemic management functions, Systems 2–5, each of which fulfils essential functions in the organization. As a result a Process group was established to oversee the smooth functioning of the whole structure and to resolve problems as they arose (System 2). A Co-ordination team was established to co-ordinate all the activities of the various groups and provide a monthly reporting mechanism to members and to the Board (System 3). System 4 involves keeping a close eye on what is happening in the wider society so as to strategically relate to developments. This led to the establishment of a Navigation group to hold this function. Finally System 5 which involves oversight and direction of the whole project includes the Board of directors and the monthly members' meeting supplemented by an Identity group which deals with issues of membership and purpose. This essential structure, which emerged between 2007 and 2011 through the workshops led by Espinosa and Walker continues to be adapted to reflect the needs of the project as it develops and they remain in contact making occasional visits. A survey of members in 2011 to assess the results of implementing the VSM concluded that it helped "to develop a more coherent community, with higher connectivity and reciprocity, and with a more efficient communication network" (Espinosa and Walker 2013: 126). Espinosa and Walker

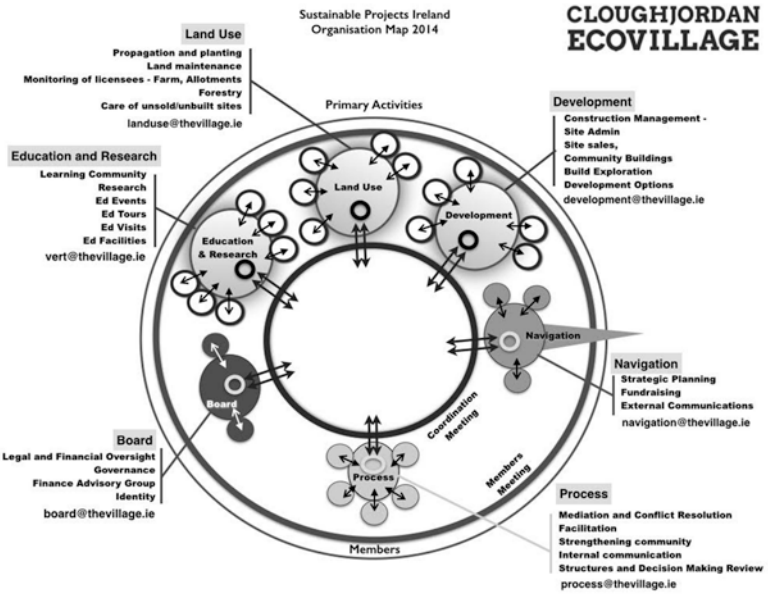

Fig. 8.3 Cloughjordan ecovillage governance structure based on the Viable Systems Model (VSM).

conclude that "the main structural problems, which were threatening the survival of the community in 2007, have now been identified and solutions found. There has been improved communications, task appropriation, and organizational effectiveness for achieving their core purpose of developing as a sustainable community" (ibid.: 128), see Fig. 8.3.

Measuring the Transition: Cloughjordan's Ecological Footprint

The evidence of the success of Cloughjordan Ecovillage in achieving the goals it sets itself of becoming a sustainable and low-carbon community requires measuring its ecological footprint and comparing it to other similar communities in its locality as well as nationally and internationally. The concept of the ecological footprint (EF) is widely used internationally to quantify the amount of carbon emitted by a household through measuring energy consumption, waste assimilation, food consumption, water

consumption, built land area and travel impacts. Through aggregating household measures, an estimate for a community can be produced. In mid-2014 a survey was distributed to all households in the ecovillage to gather data with the purpose of estimating the EF of the ecovillage. A measure developed at the Centre for Environmental Research at the University of Limerick and implemented in communities in the region by Tipperary Energy Agency (TEA) was used and the results compiled and analysed by the TEA (Carragher et al. 2011). The survey covered the following areas:

1. Household characteristics (number of dwellers; size and type of house).
2. Household energy use and its sources.
3. Household waste (amounts and disposal).
4. Food consumption and its origin.
5. Transport (modes and frequency).
6. Water use, including water-saving measures and water harvesting.

Following a meeting of ecovillage members at which the design and objectives of the survey were outlined, the questionnaire was distributed to all households; 94% returned completed questionnaires indicating a high level of interest. Based on the survey, an EF of 2 global hectares (gha) was estimated for the ecovillage, the lowest recorded for an Irish settlement. This compares to an EF of 2.9 gha for the town of Ballina in county Tipperary after a four-year campaign to reduce its footprint, 3.9 gha for a commuter community and 4.3 gha for 79 settlements throughout the country. Apart from measuring the ecovillage's EF, the results also allow the sources which constitute each of these EFs to be compared. Globally, it is estimated that the maximum EF for each human being that allows them to live within the planet's biocapacity is 1.8 gha. Based on this, ecovillage residents would currently need 1.1 planets to continue living the way they do. A plan for the systematic reduction of the ecovillage's EF with targets and periodic measurements to establish progress was being developed in 2016.

Conclusions: Harvesting the Lessons

Ecovillages are small projects and will remain so. But are they just nice places for people to visit or do they hold lessons for how society is organized at all levels, from the local to the global? Litfin argues at the end of

her book that they have something to teach us "at every scale of human existence" (Litfin 2014: 187). "Ecovillagers have managed to move out of the mainstream and orient their lives around the core purpose of sustainability. They are rethinking the values of convenience and comfort, profit and growth, and building a culture that reflects and amplifies their sense of purpose" (ibid.: 188). It is this core purpose and the implications that flow from it for the ways we organize our societies and economies that constitute the core lesson for Litfin. She then identifies five principles from the ecovillage experience that could be scaled up to the level of neighbourhoods, towns and cities, national societies, businesses and the global community. These are:

1. Systemic thinking: Replacing "prevailing piecemeal approaches to city planning, national policy making, and international institutions" with a focus on the whole and its sustainability.
2. Subsidiarity: Meeting human needs "with the lowest possible resource consumption and waste disposal" which will require localizing material production and consumption while remaining active global citizens.
3. Sharing: Turning from an ethic of individual possessiveness to an ethic of sharing everything, from our land and cars to our skills, our governance structures and our life stories. This will require far greater transparency and full-cost accounting at all levels of society.
4. Design: If we are to create the kind of society that can be powered by renewables, then society could learn from ecovillage design strategy "one that prioritises quality of relationships over quantity of stuff, at every level".
5. The power of yes: "Focusing on the most practical issues of life, ecovillages embody a kind of hands-on, do-it-yourself politics. They are creating parallel structures for self-governance within the prevailing social order while demonstrating how to live well with less" (Litfin 2014: 188–189).

Essentially therefore ecovillages alert the wider society to the scale of the challenges facing us all if we are swiftly to transition to a low-carbon society. They show forcefully that technological contributions to meeting this objective must be embedded in social structures, value systems and active intentionality, in other words they show that the challenge is essentially a social and economic one rather than just a technological one. In a world still far too obsessed with technical solutions to complex social challenges, ecovillages offer a loud wake-up call that needs to be heard and heeded.

References

Carragher, V., O'Regan, B. & Moles, R. (2011). *Development of a community-based ecological footprint*, CER, University of Limerick (available at http://erc.epa.ie/safer/iso19115/displayISO19115.jsp?isolD=3024).

Casey, K. (2012). *A case study of Cloughjordan Ecovillage*. MSc dissertation, University of Limerick.

Cattaneo, C. (2015). Eco-communities. In G. D'Alisa, F. Demaria, & G. Kallis (Eds.), *Degrowth: A vocabulary for a new era* (pp. 165–168). London: Routledge.

Cunningham, P. A. (2014). Exploring the efficacy of consensus-based decision-making: A pilot study of the Cloughjordan Ecovillage, Ireland. *International Journal of Housing Markets and Analysis, 7*(2), 233–253.

Espinosa, A., & Walker, J. (2013). Complexity management in practice: A Viable System Model intervention in an Irish eco-community. *European Journal of Operational Research, 225*(1), 118–129.

Feehan, J. (2003). *Farming in Ireland: History, heritage and environment*. Dublin: University College Dublin Faculty of Agriculture. GEN website: http://gen.ecovillage.org/en/what_is_an_ecovillage. Accessed 19 September 2014

Gilman, R. (1991). The eco-village challenge. *Living Together*, Context Institute, Issue 29, Summer 1991.

Holmgren, D. (2011). *Permaculture: Principles and pathways beyond sustainability*. Hartford: Chelsea Green.

Kirby, P. (2013). Policy optimism: NESC, climate change and achieving decarbonisation. *Administration, 61*(2), 75–90.

Litfin, K. T. (2014). *Ecovillages: Lessons for sustainable community*. Cambridge: Polity Press.

Milescure-2050. (2013). *Deliverable 2.1*: *Report on integrated analysis of local anticipatory experiences in energy transition in Europe*, Milescure-2050 (available at www.milesecure2050.eu).

Milescure-2050. (2014). *Deliverable 2.2*: *Report on comparative analysis*, Milescure-2050 (available at www.milesecure2050.eu).

Moore, O., McCarthy, O., Byrne, N., & Ward, M. (2014). Reflexive resilience and community supported agriculture: The case that emerged from a place. *Journal of Agriculture, Food Systems, and Community Development, 4*(3), 137–153.

NESC. (2012). *Ireland and the Climate Change Challenge: Connecting 'how much' with 'how to'*. Dublin: NESC.

Peake, S. (2012). What is a low-carbon society? In H. Herring (Ed.), *Living in a low-carbon society in 2050* (pp. 15–27). Basingstoke: Palgrave Macmillan.

Pickerill, J., & Maxey, L. (2009). *Low impact development: The future in our hands*. Leeds: Footprints Workers Co-operative.

SPIL. (2007). *The village ecological charter*, version 5, Cloughjordan: SPIL.

The Global Commission on the Economy and Climate. (2014). *Better growth, better climate: The new climate economy report*. Washington, DC: World Resources Institute.

Winston, N. (2012). Sustainable housing: A case study of the Cloughjordan ecovillage, Ireland. *Advances in Ecopolitics*, issue on *Enterprising Communities: Grassroots Sustainability Innovations*, *9*, 85–103.

CHAPTER 9

Challenges for Wind Turbines in the Energy Transition: The Example of an Offshore Wind Farm in France

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Faced with the globalization of environmental problems, two positions meet head on; the first seeking to act on a global scale (as proposed by geo-engineering, to fight against global warming), and the second, that of stopping the development of techniques producing effects on a spatial or temporal scale that we do not know how to control.

In this latter case it is a question of delimiting our actions to a local scale, where experimentation is possible, mistakes are not irreversible and where the variety of responses gives rise to political, economic and social initiatives in keeping with specificities of the local environment.

Somewhere between the global and the local scale would be the "Think global, act local" scale, as enunciated at the first environmental summit in 1972, which insisted even then on the need to come back to a local scale, without necessarily calling into question the logic of the system in general.

Using a study of a marine wind farm off the coast of Caen in France we are going to reflect on the scales of the energy transition.

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Even though it emanates from a national policy and is destined to contribute to the national grid, it concerns a local resource (wind), local infrastructures (technological and ports), and skills that are specific to the region and its historic relationship to the sea. It seems additionally to generate a local dynamic with respect to renewable marine energies.

However, this project also highlights the limitations of "think global" which has difficulty accommodating the energy end users and stimulating lifestyle and practice changes. Even when it is associated with "act local", it only reconnects indirectly and then often clumsily, the thinking with the acting, the global with the local, the environment ("global environment") with multiple local environments.

The offshore wind farm project attempts to involve local interests by associating, during preliminary phase dialogues and during a public debate, a maximum number of participants on the ground with the major local issues: fishing, tourism, biodiversity, the memory of the Allied landings in 1944 and the protection of local heritage. But this only allowed the piecing together of issues that were previously not covered in the project design. And in doing this, everything that concerns the practice or usage of the energy generated was left to one side, as we will see.

This case illustrates well the gap that exists in the way in which the energy transition is conceived: between the technical choices on the one hand and the evolution of lifestyles on the other, this latter being nevertheless judged to be indispensable. The former is more concerned with technical efficiency than the impact on the behaviour of the end user, and it ultimately falls to information campaigns to improve awareness. Nevertheless, as the socio-anthropology of technology shows (Gras 1993; Latour 2000), technical objects or systems are not neutral but materialize a link (more or less distant) with nature and with others and induce behaviours and practices which are capable of encouraging, or on the contrary, hindering the evolution of ways of life.

A Project Centred Solely on Production

Energy for the Large Electricity Network

Since 2000, the goal of expanding wind energy in France was to be achieved by feed-in tariffs guaranteeing kilowatt/hour prices for suppliers. But this policy has not had the expected effect for various reasons (Szarka 2007), one of them being opposition due to the impact on the landscape (Nadaï and Labussière 2009).

Numerous offshore wind farms are now seen as a key answer to this problem and to the climate-energy plan adopted by the European Union in 2008, which stipulated the need to reduce greenhouse gas emissions by 20% (as compared to 1990), to lower the overall energy consumption through energy efficiency by 20% and to achieve 20% renewable energy within the energy mix by 2020, (the 20/20/20 targets).

The French energy policy, which remains very committed to defending a large electric power system, seeks to respond to this objective by favouring the development of large wind farms.[1] Based on this policy, the construction of six offshore wind farms are planned off the Brittany and Normandy coasts.

Our analysis will focus on the study of the most advanced project, that of the Bay of the Seine, off Courseulles-sur-Mer, Calvados. The construction of 75 wind turbines are planned, 6 MW each, (450 MW total) with the wind farm installation to be situated 10 kms off the coast in an area of 50 square kms. The construction of the wind farm will be over the period of 2015–2020 with progressive exploitation starting in 2018.

The project is the result of a compromise between the technical, socio-economic, environmental and landscape requirements specific to the territory.[2]

It has been redefined in the course of dialogues with the different stakeholders (elected representatives, administrators, fishermen, tourism professionals, and other local associations) between 2009 and 2011. It has taken into account the constraints of fishing (as expressed during a "fishing work group" and during meetings with individual fishermen), the need to distance the project zone from the line of sight of Arromanches conservation area, the need to limit the visibility of the wind farm from the coast, and the imperative to avoid the zone where the wrecked vessels from the D-Day landings lie.

The project has therefore been redefined, but just in its outline, firstly because the site of the wind farm has already been agreed upon by the state but also because the possible sites in this zone are restricted due to the numerous different uses of the sea, (fishing—the Bay of the Seine represents the second largest deposit of scallops in France; maritime circulation from Caen Ouistreham and Le Havre; pleasure boating; military activities; extraction of marine aggregates; shellfish farming; dumping zone for dredging sludge from Rouen—in the Le Havre estuary and a nature reserve—Natura 2000; etc.).

A fisherman interviewed expressed this "cluttering up" of the sea to which was now going to be added a wind farm: "It's not just the wind farm. The whole area is exploited, our fishing zone is getting further and further reduced".

This heavy usage of the sea is especially interesting to highlight as it is a reality that goes unnoticed by most of the local residents, certain of whom see the wind farm as a violation of a space as yet unoccupied permanently by humans, (who would occupy it only temporarily for circulation).[3] The wind farm is thus sometimes denounced as a new form of industrialization of the sea.

The Limitations of the Dialogue

Even if it brings together the stakeholders (or a large number of them) this industrial project leaves out a fundamental actor (or at least one who ought to be) in this energy transition: the end user.

The local consumer will not perceive any benefits from this new energy source, neither economically (the costs remain subsidized),[4] nor in his or her access to electricity (no repercussions from the presence or absence of wind to the availability of electricity—as it is the goal of the centralized network). There will be no impact on their practices or habits, something which is actually advanced as a strong point by the project managers. The project thus affirms the "advantages" of the centralized production system upon which it rests: availability of energy in any place at any time, as required, and one price whatever the conditions of production or access to electricity. But it is at the cost of keeping the end user distant and detached from the constraints of production (both technical and natural).

Therefore, in this project the end user still does not appear in his quality as a "respondent", to quote Sophie Poirot-Delpech, i.e. in his capacity to "invent, modify or refuse that which is imposed, or taken for granted" (1998, 89). Those who are taken into account, listened to and able to partially influence the project do so as actors in the territory (be it in the local economy, or in the local, social or political structure), but not in the role of future end user of the electricity produced. This latter does not appear as a stakeholder on the ground but as a consumer in the central network. The user has, as a result, no place in the discussions that aim to introduce the local issues in a global-scale project.

The technical (and political) plan envisaged here to respond to energy and environmental problems continues, however, to place a barrier between

the user and the energy so it therefore remains an abstract concept for consumers. The user continues not to perceive the energy that he consumes, although he uses increasingly more electrical devices (Wilhite et al. 1996). He is only indirectly related to the electricity used through his electricity bill. In this context he cannot make a direct link between his consumption of energy and the availability of this resource, nor between his lifestyle and the environmental impact it causes. It is this distancing or even rupture between the individual and the environment that goes to the heart of the problem faced by our society today (Raineau 2014).

The large electrical network controls and regulates the flow of electricity via a centralized management to which the end users have no access, primarily because they are ignorant of how the network functions, which remains opaque. This distancing, or even rupture, between the user and the energy production system is reinforced by the invisibility of the energy: this has become something so imperceptible that the consumer sees nothing of the electricity behind the service that permits him to communicate, cook, illuminate his surroundings or facilitate his leisure time. In addition, the infrastructures of the large electric networks are (as much as possible) hidden underground, rendering energy an abstract notion, to the point that we no longer think about it, even though we are more than ever dependent upon it (Hughes 1983; Gras 1993).

It acquires a material dimension when it reveals itself on a local level within the infrastructure of the large networks, as in the case of wind farms. Here the scale on which this energy system operates is clear for all to see when it becomes both visible and tangible through the sheer size of the equipment in place. In this context we understand that the simple visibility of those infrastructures is considered detrimental to the community that has to put up with it, and is therefore often financially compensated. The operators of wind farms are obliged therefore to pay a specific tax over and above corporate tax. This can be up to €14,113 per MW, which represents €6,350,850 per year for the wind farm at Courseulles, (the output of which is expected to be 450 MW per year). In this way, communities are to be compensated according to the degree of visibility from their respective coastlines. The invisibility, the distancing and even the imperceptibility of energy are not only ancillary effects of the large networks but fundamental parts of them. The visibility of the technical apparatus of energy production therefore requires compensation.

Wind turbines do not therefore change in any way our relationship to energy and the environment; the production and distribution methods of

the energy do not help change expectations. It is an energy that is detached, for us the consumer, from its natural origins and from the environmental impact created by its consumption.

Nevertheless, in the case of the wind farm project that we are studying, the local presence of the wind, a characteristic of the territory concerned, challenges certain local actors, in a way unprecedented in the modern energy system. Here, the choice of site is very different to that of a classical power station: it is principally the local characteristics of the wind that determine the site of the wind farm, as this source of energy cannot be found elsewhere. It is doubtless this feature that has led locals, during public debates, to question the link between this source and their future energy consumption. Will the energy that they consume come primarily from these wind turbines? The project manager assures them "No". And this is presented as an essential quality of the project, as the local inhabitants' energy consumption can therefore remain totally independent from the presence or absence of wind and the inhabitants will not have to pay more for their electricity.

Other speakers at the public debate asked why there had not been mention of energy economising or saving in any of the exchanges, given that it was to do with the energy transition. Why were they only talking about production and not about consumption?

A resident of Courseulles declared at the last public meeting, "We are talking about new energy sources, wind, hydroelectric, economic fall-outs, employment, but not about economizing energy".[5]

In response to this remark the moderator of the debate expressed his regret that, effectively, "We've been debating a specific project (the wind farm at Courseulles) but we haven't related the energy transition to this debate. We haven't talked about economizing energy."

These two remarks confirm the gap that exists in this energy transition, between the lifestyles and technical choices. Thus consumption and production are confined to distinct social and political domains. The turbine takes care of the "production" side by allowing the substitution of carbon dioxide-emitting fossil fuels (coal, gas, oil and now shale gas) by renewable resources. Of the three axes of the energy transition, (sobriety, efficiency and renewable energies) the wind farm in the Bay of the Seine seeks to fulfil the latter, the two others being achieved by other means. It is in this manner that it is being presented by the Green Party in the public debate: "The future offshore wind farm at Courseulles making up the third aspect of this trio". (Stakeholder's report No. 9).

We need to find another way to reduce our energy consumption at the same time, (65% of 2010 levels by 2050, according to the Negawatt scenario.)

Mastering energy consumption, when it is not a purely technical affair (insulating buildings, creating equipment that needs less energy, smart counters, etc.) will be a question of increasing awareness and the sensitivity of the general public to the issue.

Alternative Energy

The choice of a technique for producing energy is not a neutral issue and should not be based solely on criteria of efficiency. It expresses a social imaginary and a representation of nature, and involves lifestyles, practices, desires and moral values (on this point see Latour 2000).

Thus sobriety, efficiency and renewable energies are not three axes of the energy transition but one, linked to the technical choices. The main advantage of renewable energies, by their nature local since neither storable nor transferrable, was not to provide a substitute energy in an unchanged energy system but to create a new dynamic on a social, political and economic level (Raineau 2011). Developed in a decentralized way, they have the power to change our relationship to the environment and also to transform consumption patterns. They open the possibility of reshaping the link between lifestyles, practices and the environment, a link that was broken by the large-scale nature of the centralized networks. The promise of renewable energies is therefore not so much to furnish us with a "new" energy source as to create a dynamic of change.

However, as demonstrated by Aurélien Evrard, when they are developed on a centralized model, renewable energies no longer appear as an alternative model to the current energy system. "Thus" he writes, "having at first been a political alternative, renewable energies will have become just another energy source" (Evrard 2013, 20).

As a substitution energy to fossil fuels (and to nuclear power), the wind turbine exposes itself to strong criticism: its relatively smaller density obliges it to have an obtrusive presence in the territory, and the intermittent production of electricity makes the energy flow harder to manage by the central network.[6]

Why then, if the wind turbine can at best only be on the fringes of a centralized energy system and if it has lost all its promise of kickstarting a transformation of this system, is it defended by the most ardent opponents

of the conventional production of electricity, who plead for a decentralization of the system and the development of local networks?[7] To this effect, the French Green Party (EELV) in its stakeholder's report prepared for the public debate, alternates arguments in favour of the wind farm in Courseulles and affirming the need to develop "smaller sized projects" and to "support the production of renewable energy projects of a smaller scale (e.g. at the intercommunity level) with the involvement of local citizens as much in the development of the project as in the financing". And they add that the "energy independence of the territories", judged as indispensable in the transition, is "made difficult by the centralization of the electrical network, (large production units, distancing from sites of consumption, necessity of colossal transport infrastructures) of which the new Cotentin-Maine ultra high tension line is the worst symbol in lower Normandy"? (Stakeholder's report No. 9, July 2013.)

How could renewable energies be developed in a complementary way on a centralized and decentralized mode if one and the other have recourse to infrastructures, models of society, institutions, social organizations and political and economic models which are radically opposed to one another, and to top it all, if they are in competition?

One needs to look elsewhere for this complementarity, over and above everything that sets them in opposition and appears to make them contradictory.

Wind Power Versus Nuclear Power

Giving a New Meaning to Progress

The renewable energies that are put forward today "for" an energy transition, have their political origin "in opposition to" nuclear power, (from the end of the 1960s), as we are reminded by Aurélien Evrard (2013). Conceived of on a decentralized model, they have ended up as an alternative model, setting nuclear power apart from the energy of the future. Today, when exploited in the centralized system, as in the case of the large marine wind turbine, they no longer seem to hold the ambition of reforming the system and appear as a simple "technological solution". Nevertheless, "large" and "small" renewables seem to find themselves on the same side, in opposition to nuclear. The large wind turbine, by encroaching on the terrain of its adversary is attempting to weaken nuclear power's position. Its objective here would be to show that there is a technically perfected

alternative to respond to the climate challenge. But it plays another more symbolic role in its physical presence in the territory.

Of course the offshore wind turbine cannot easily displace its rival but it is trying nevertheless to weaken its image. Thereafter it would be up to the renewable energies to really stake a claim in the future of energy production and make nuclear power a thing of the past, not by fighting against the system that has allowed it to get established, but by penetrating it as a system of power. In the scale and strength that the wind turbine expresses, there is a will to impose (and oppose) materially and symbolically its place.

If on the one hand, by being sited as far as possible from the coast, the project is trying to remain discreet in the landscape,[8] on the other, it seems to want to impose itself by affirming its material weight. The weight, size and scale of the turbines and the area that the wind farm will take up in the sea are highlighted by opponents of the project to emphasise its impact on the landscape. These facts are however used in a positive manner by the promotors as an illustration of the scale of the project: a total power of 450 MW, the 75 wind turbines are 175 m high, with nacelles weighing 450 tonnes and blades of 73.5 m, (Stakeholder's report No. 11).

It is important to express here the material presence in the territory, by way of the infrastructures that will be necessary. We are often reminded that the construction and delivery of the wind turbines will require substantial infrastructures and notably rearranging the ports in order to produce, stock and transport the pieces from Cherbourg and these are presented as assets for the region (mainly in terms of employment but also of scale).

The technological innovation that these turbines represent is in other cases actively promoted in order to present the project as a new stage of progress in this field, (Stakeholder's report No. 16). The offshore wind farm has been able to declare itself a competitor to nuclear power and comparable to it on energetic, economic and political levels.[9] Its supporters affirm its strength and pioneering character in the transition towards a renewable energy mix.

Wind turbines and nuclear power are in any case placed back to back by stakeholders on the ground, be they pro- or anti-nuclear militants, or non-militants. The yardstick is still clearly nuclear power (cost effectiveness and energy efficiency, ground space occupied for power output) and the wind turbine is attacked on these grounds. It is moreover interesting to see that when

promoting it in the form of a large industrial project and backed by political will, the turbine is attacked with a rhetoric comparable to that used by the anti-nuclear campaigners. The presence of "ultra powerful" lobbies, the "exorbitant costs"—financed by the consumer, the financial aid without which these enormous investments could not have been realized—form the arguments of the anti-wind turbine camp.

"It's monstrous, it's monstrous. It's a power station! They are not wind turbines, they're generators. It's not a wind farm, it's a power station, a factory. Power stations like nuclear power stations. It's an industry. We are not fighting against the wind turbine, we're fighting against corruption": these are the comments of a woman engaged in an association against coastal wind farms.

A member of an association for the memory of 6 June 1944 adds in a similar way: "The project such as it is, is the affair of a select few."

The large corporations engaged in these projects (EDF; Danish company DONG Energy Wind Power; Alstom for the turbine manufacture) profit from exceptional public support. The guaranteed kilowatt/hour purchase price[10] is presented by the opponents as a non-competitive advantage conceded to large industries rather than as the financing of a public service. This grant, according to the opponents, financed by the said "public contribution to electricity"—CSPE—is passed on to the household electricity bill (which is widely criticised).

Certain opponents suggest that one should combat the offshore wind farm project in the same manner one combats nuclear power, (for the same anti-democratic reasons). But many add, while taking up the former arguments, "It is a lie to believe that we will replace the nuclear power stations with wind farms", or "We are not pro-nuclear but you have to admit that to date we have nothing better… and the millions that we are putting into wind energy could have been put into research into nuclear… because it's true that it still causes problems…but…".

We find among the opposition a very strong and passionate commitment, with believing themselves be powerless "individuals" representing the citizens in general, against the big lobbies who arrange things for themselves with politicians which goes against the public interest. The sight of, or the possibility of seeing these wind turbines, is for them an intolerable idea as it is an anti-democratic symbol of corruption and violation of the territory. One can understand the aesthetic argument in this context.

Taken as a simple source of alternative energy, the offshore wind turbine raises another incomprehending question: why come and install electricity

production infrastructures here, given that Normandy has already lots of others: "We already have three nuclear power stations—Paluel and Penly in Seine-Maritime, Flamanville in the Manche, (plus EPR in construction), we're not short of energy. Why add a wind farm?" expressed a fisherman. But other individuals, mainly anti-nuclear, hope that the project will create a new local dynamic permitting the building of another social and economic identity for the region.

Sea Against Fire

In connection with the wind power project, local politicians declare a desire to create a local dynamic in favour of renewable marine energies. The wind farm will stimulate a new identity for the region as a producer of renewable energies from the sea. The offshore wind turbine is often qualified as renewable marine energy (RME) and seems therefore linked more to the sea than to the wind. It acquires meaning within the broader project embracing tidal turbine energy (from ocean currents), wave energy (coming from the movement of the waves), ocean thermal energy (from the difference in temperature between surface and deep waters), osmotic power (from the difference in salinity between sea water and fresh water in estuaries). To this can be added marine biomass (energy from marine flora), not yet envisaged for the region.

All these RMEs are still at a research stage but each of them represents a strong energy-producing potential. Tidal turbines are most often referred to as the hope for the region in the wake of the wind turbine. The strong tidal currents of the Raz de Barfleur and the Raz Blanchard, where a prototype is being studied, represent the first potential tidal turbine site in France and the second in Europe.

The wind turbine as a marine energy affirms its local character, supported by the resources, infrastructures (ports and technology) and the skills specific to the region and its historic relationship to the sea. But above all, it no longer appears simply as an alternative energy but as a motor for a new dynamic towards an energy system composed of a multiplicity of sources of renewable energies. In this way it engages a dynamic moving beyond the "fire" which currently dominates our energy system and has done so for more than a century and a half, as shown by Alain Gras,[11] in favour of a system where a diversity of complementary renewable energies would exist.

"The wind farm projects constitute the first phase of industrial deployment of lower Normandy towards a green economy, of which the logical complement would be the development of the tidal turbine." (Stakeholder's report "West Normandy Marine Energies").

The wind turbine as a wind energy bases its legitimacy on the fact that it is an energy that does not emit any carbon dioxide and can thus place itself in opposition to fossil fuels. But the wind turbine as a marine energy associating with other hydroelectric energies stands up against the fire of nuclear power.

Conclusion

Supporters of renewable energies have always been opposed to nuclear power, which they purport symbolizes, in its extreme version, the most harmful aspects of the centralized power generation system: its opacity and the distant relationship to nature it induces. And yet, renewable energies are now being developed in the centralized system and contribute to give it new life, as we saw with the case of the offshore wind farm in Normandy. We explained this paradox by showing that the aim of renewable energies' advocates was above all to harm their rivals from within. But it is not yet possible to know whether, by permitting this centralized system to adapt, it would ensure the maintenance of its supremacy, (leaving the problem of the rupture between the user and the environment), or if, by giving credibility and an image of progress to the wind turbine, it will contribute to the development of renewable energies also on a decentralized model.

In other words, will it reinforce the idea that renewable energies are "only" substitution energies and hide the real issues in the transition (those of offering us a different relationship towards energy)? Or, will the local dynamic lead the stakeholders to reassess the energy question and to feed the desire to reappropriate its resources? In short, how can the large wind turbine (global response) make energy a local issue?

Notes

1. For developments in French energy policy, see Nadaï 2007. For a comparison with Britain and Denmark, see Szarka 2004.
2. The dominant winds for positioning the wind turbines, avoiding the effects of turbulence by maintaining a sufficient distance between the

turbines, waves and marine currents for the foundations, constrains connection to the electricity network.

3. Kempton et al. (2005) also showed it in the case of Cape Cod in the United States.
4. The sum of €25 per year will be added to the electricity bill of every household in France to finance the wind farm.
5. As it is, the local community can choose to spend how it wants the taxes earned from the wind farm (the man who asked the question in the public debate suggested it be used to help pay for insulating the homes of those in the lower income bracket).
6. As denounced by a dossier in *Sciences et Vie* 2008 on renewable energies. Sciama and Chevassus also estimate that: "whilst one needs 10 Ha for a nuclear power plant to create 1.5 GW, the same power output from wind turbines requires 18700 Ha" (Sciama and Chevassus 2008, 56). See also Menyah and Wolde-Rufael 2010.
7. Militants that we met on other fieldwork, in Brittany, where an on-shore wind farm was being studied.
8. Depending on their position in relation to the project, the Stakeholders claim that the turbines will be more or less visible. (Some claim they will be like matchsticks on the horizon whereas others see them as monstrosities impossible to ignore from no matter which angle one looks within the Bay of the Seine: "The area off the coast will be equivalent to the surface area of Paris", one opponent explained to me).
9. Four factories are planned in Cherbourg and St Nazaire to build the main elements of the wind turbines, and a research and development centre in the Loire. There are 1,000 direct jobs expected and 4,000 indirect (to which will be added more posts in the construction ports and in wind farm maintenance).
10. Currently €130/MWh.
11. With a steam machine (fuelled by fossil fuels and also by nuclear). See Gras 2007.

References

Evrard, A. (2013). *Contre Vents et Marées: Politiques des énergies renouvelables en Europe*. Paris: Presses de la Fondation nationale des Sciences Politiques.

Gras, A. (1993). *Grandeur et dépendance: Sociologie des macro-systèmes techniques*. Paris: PUF.

Gras, A. (2007). *Le Choix du feu. Aux origines de la crise climatique*. Paris: Fayard.

Hughes, T. (1983). *Networks of power*. Baltimore: The Johns Hopkins University Press.

Kempton, W., Firestone, J., Lilley, J., Rouleau, T., & Whitaker, P. (2005). The offshore wind power debate: Views from Cape Cod. *Coastal Management, 33*(2), 119–149.

Latour, B. (2000). Morale et technique: la fin des moyens. *Réseaux, 18*(100), 39–58. (Translated by Couze Venn, Morality and technology. The end of the means. http://www.bruno-latour.fr/sites/default/files/downloads/80-MORAL-TECHNOLOGY-GB.pdf).

Menyah, K., & Wolde-Rufael, Y. (2010). CO_2 emissions, nuclear energy, renewable energy and economic growth in the US. *Energy Policy, 38*(6), 2911–2915.

Nadaï, A. (2007). 'Planning', 'siting' and the local acceptance of wind power: Some lessons from the French case. *Energy Policy, 35*(5), 2715–2726.

Nadaï, A., & Labussière, O. (2009). Wind power planning in France (Aveyron), from state regulation to local planning. *Land Use Policy, 26*(3), 744–754.

Poirot-Delpech, S. L. 1998. Les techno-sciences, d'un laboratoire à l'autre. *Socio-anthropologie 3* [Online since 15 January 2003, connection on 20 June 2016. URL: http://socio-anthropologie.revues.org/22]

Raineau, L. (2011). Vers une transition énergétique? *Natures, Sciences, Sociétés, 19*(2), 133–143.

Raineau, L. (2014). Innover autrement. La technique face à la crise environnementale. In *Habitat et transition énergétique*, edited by F. Rochon, pp. 49–69. Paris: L'Harmathan.

Sciama, Y., & Chevassus, N. (2008). Le dossier noir des énergies vertes.*Science et Vie, 1086*, 54–75.

Szarka, J. (2004). Wind power discourse coalitions and climate change: Breaking the stalemate. *European Environment, 14*(6), 317–330.

Szarka, J. (2007). Why is there no wind rush in France. *European Environment, 17*(5), 321–333.

Wilhite, H., Nagakami, H., Masuda, T., Yamaga, Y., & Haneda, H. (1996). A cross cultural analysis of household energy use behavior in Japan and Norway. *Energy policy, 24*, 795–803.

CHAPTER 10

Social Partners, Environmental Issues and New Challenges in the Post-Carbon Society

Victor Climent Sanjuán

Social Partners and Environmental Issues

Over the past two decades, the perception, attitude and strategies of social partners with regard to the ecological crisis have undergone a substantial change resulting in greater environmental awareness. However, this process affects economic players unevenly and entails significant contradictions between discourse and everyday life in each individual organization. The development of "environmental awareness" in social partners is a recent phenomenon with few valid references at present, and in reality implementing it is not always easy. But it is also true that the environmental dialogue between entrepreneurial stakeholders and social agents shows a positive trend towards consolidation of an environmental culture that already permeates the social partners' present and future strategies in a definitive way.

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Employers and the Environmental Challenge

From the 1980s to date, the main business strategies in the environmental area have been part of a process of adaptation of Spanish companies to successive regulatory frameworks and to the implementation of new production methods primarily aimed at increasing efficiency and saving resources (Climent & Giner 2001). Basically, employers agree that over the past two decades Spanish companies have seen a positive trend that has allowed them to shift from a position of total ignorance of ecology to another, much more controlled situation in which employers are aware that the adaptation of their companies to new national and European regulations is irreversible and sets a trend for the future based on the integration of "eco-efficiency" into business administration. However, despite this consensus, important differences leading to varying paces and speeds still coexist in the business world. Thus, while some business sectors—the most innovative—quickly and gradually put new eco-efficient strategies in place in their production systems, others limit themselves to compliance with regulations, with the sole objective of avoiding fines. In general, the employers' discourse shows their growing internalization of the ecological dimension, though they disagree with the punitive policy developed by the Administration because, in their view, is not the best way of finding solutions to environmental issues. Employers believe it necessary to pool efforts in the pursuit of goals and end results and, to that end, they support an instrumental view of the problem consisting of providing support to companies, training and, above all, time to find adequate solutions that can be implemented practically in a competitive framework.

Business reality in Spain shows that Spanish companies still lack business initiative, and therefore changes in production processes are mainly implemented out of regulatory pressure, competition and the fact that the environment requires a new business dimension. In this regard, it should be noted that greater business sensitivity to environmental issues is essentially based on two basic elements: the legal framework and the new competitive scenario (Climent 1999).

Environmental regulations passed in the last 20 years have had a significant influence on business strategies, not only because of their sanctioning nature but also because they have opened up a clear

avenue, that is an environmental strategy for the future that all companies must adopt sooner or later unless they want to be excluded from the market. In this sense, the vast majority of companies have made significant progress in environmental matters by implementing, on the one hand, end-of-pipe solutions. That means that by using existing technologies they have managed to significantly reduce emissions particularly into the air or in aquatic environments. And, on the other hand, they have adequately managed industrial waste following the sequence: "treatment-storage-discharge-purification-filtering" of pollutants.

At first glance, this process does not seem to be particularly important but it is a decisive step in normalizing environmental management in companies. On the one hand, it is a firm step towards proper management of industrial waste and, on the other, it helps transfer some environmental costs to the price of the end product, which previously had always been externalized.

This waste management and practice, which does not probably reach all companies and which is very strongly influenced by general economic conditions, is a very important step that must necessarily lead to more ambitious objectives like the implementation of preventative strategies to deal with contaminating processes at their origin. At this point, daily practices in companies vary to a great extent depending on the industry and the size of the enterprise. On the one hand, many companies have implemented preventative solutions that go beyond "sorting" and "managing" refuse and waste, and have made profound changes in their production systems to minimize emissions and waste at source. This has been possible thanks to technological developments and new production management systems that incorporate a new corporate culture as far as the environment is concerned. However, other less productive, less internationalized companies which are very sensitive to the economic climate have limited themselves to focusing, not without great difficulty, on strict compliance with regulations. This makes us think that for many companies the implementation of productive processes aimed at obtaining a "greener" production is only feasible if the pay-offs are big enough or if their running costs are reduced. Therefore, asking them to do more than what they are legally requested is impractical if they are not moti-

vated by a clear subsidy or bonus policy. And although the number of companies willing to introduce cleaner technologies into their production systems is growing, in the end this process can only be sped up if there is financial compensation, that is, if it brings a competitive advantage to the company or if the Administration passes new laws aimed at reducing pollution levels.

Moreover, the application of a sound environmental management policy means lower expenditure in primary and energy resources and a better use of them. That is, it enables more efficient production by companies, which in turn leads to lower overheads. Companies do appreciate this and see it as one of the most influential arguments when it comes to developing good environmental practices. That said, for larger companies, in addition to production efficiency, there are other more relevant and specific factors in the design of their environmental management policy.

Firstly, good environmental management is often associated with business competitiveness but in the world of business negative aspects seem to outweigh positive ones. An adequate environmental management policy can be a positive factor for competitiveness and even for increasing sales, but what is clear is that environmental mismanagement necessarily means trouble which, in the medium and long term may cause the company to be held liable, financially, administratively and even criminally. Secondly, the corporate image and new business opportunities afforded by the green economy are increasingly important factors in marketing strategies. For large companies, their corporate image is a vital element closely linked to competitiveness. Companies need to have a good image because their main markets are in developed countries; any environmental problem covered by the media could result in a substantial loss in their market share (Barbier 2010). This scenario has a deterrent effect on large firms, requiring them to combine image, competitiveness and environmental management.

In this context, application of sound environmental management not only favours higher business competitiveness but also becomes a major barrier to the market. The gradual introduction of eco-efficiency and the search for new technological methods that can reduce the emission of pollutants are goals prompted by a very specific substantiation that first accepts the existence of a problem to be solved and then generates a set of new business expectations that are shaping a new competitive framework

based on a dual strategy. The first strategy resides in the business behind the production and marketing of new "cleaner" technologies. The second one is derived from the implementation of various environmental regulations which, in addition to delving into the preservation of the environment, facilitate the staging of a new competitive device that operates as a process of exclusion and which, in the mid term, has helped exclude those companies that failed to meet the new ecocompetitive prerogatives from the market.

In this regard, environmental regulations have caused companies who were unable to adjust to new production scenarios to vanish. However, many other companies have managed to adapt to the new ecoproductive situation, not for "image" reasons but due to a "market transition" process. In other words, over the past 20 years many Spanish and Catalan companies have significantly enhanced their export capacity, which has forced them to improve their production systems in order to adapt themselves to more demanding environmental frameworks in other regions around the world. In the same context, large multinational companies have very quickly adapted their production processes to the new environmental standards. And this regulation has been extended to all the small- and medium-sized enterprises working with the corporate group (auxiliary industry) forcing them to adapt to the rules of the parent company in order not to be excluded.

At a discursive level, as from the late 1990s, employers have totally come to terms with the fact that clean production is synonymous with increased business efficiency and that environmental costs should be integrated into their overall cost structure, which can be lower or higher depending on the legal context in which the company operates. But employers' representatives are also aware that not all companies are in a position to make the investments required by law. Consequently, they argue that it is impossible to equate the production problems of big companies with those of small ones, and so they request the Administration to make legislative and budgetary efforts to ensure the viability of companies and the jobs they offer. In other words, the employers' premise is that we are all (companies and consumers) responsible for environmental degradation, and therefore they hold the Administration responsible for making the highest investment without this necessarily implying new environmental taxes with repercussions on the final cost of products. In short, the way forward is to implement a realistic policy, with an investment effort

intended to avoid waning competitiveness in enterprises and to postpone, until a more suitable time, the overall integration of environmental costs into the product's life cycle.

Trade Unions and the Environmental Challenge

In recent years, trade unions have undergone a relevant process of internalization of the ecological dimension which has led them to develop a relatively militant discourse in the environmental arena. In general, unions perceive the severity of the crisis more intensely than employers and they are more convinced that the solution to environmental issues goes beyond the scope of resource management or technology. They are aware that these elements play an important role in preserving habitats but consider them insufficient to deal with ecological problems. As a long-term solution, they propose to develop an environmental sector that incorporates cleaner technologies and production processes, and invite the public sector to become more involved in the search for political solutions.

The trade unions' environmental discourse is incipient and sometimes contradictory. In general terms, their discourse is transformative, as it puts the blame for the huge environmental degradation on the current model of production and consumption, and tends to, consciously or unconsciously, support the theses defended by environmental organizations. However, the discourse is sometimes full of contradictions whose origins are to be found in the productivist culture that characterizes trade unions the main result of which is that these approaches are only very occasionally voiced in specific protest platforms.

Among such contradictions, employment is, without a doubt, the unions' top priority and at the same time the factor that generates the greatest gap between their environmental discourse and their union practice. Trade unions totally reject allegations by environmentalist groups that accuse them of having contributed, to a greater or lesser extent, to the externalization of the ecological costs of production, and argue that workers are not responsible for the technologies used in production processes and the management model implemented by companies. Such decisions are made by company managers, who ultimately are solely responsible for investments and strategies. To some extent, they are right, but not altogether.

Historically, trade union negotiating has been limited to traditional matters such as employment, salaries, promotion, or health and safety at work, while the environmental issue was either non-existent or irrelevant. It is true that many protests and demonstrations throughout the twentieth century were prompted by pollution and poor industrial waste management, but they were directly related to appalling living conditions and insalubrity in working-class districts. Indeed, trade unions, like employers, ignored the perverse effects of environmental pollution for decades. And although they kept a much lower profile than employers, it is evident that they were part of a "productivity deal" that encouraged and requested public authorities to implement a policy based on the exponential growth of the economy. For a long time, trade unions and their silence added to the companies' disinterest in the environment, and constrained the social analysis of workers' needs to a strictly labour-related sphere, disregarding important aspects of workers themselves such as the right of citizens to a clean and healthy environment.

However, as of the 1990s, trade unions started to be more aware of the environment, firmly incorporating it among the contents on their agenda. In this respect, it is true that unions have joined a process of internalization of ecological issues, but its practical implications are still far from noticeable. Spain's current labour situation—with intolerable unemployment rates and high temporary employment—largely conditions trade union strategies, thus causing them to refrain from exerting a more active environmental influence within companies so as to avoid measures that might be detrimental to employment. This reality is more palpable in small businesses, where staff atomization and weak union presence makes their intervention in any business sphere much more complex. And, since in the current crisis context, the workers' highest priority is to keep their jobs and working conditions (salary, working hours, etc.), trade unions have stopped pressing the management in order not to run the obvious risk of creating "misunderstandings" among workers themselves. In fact, they are limiting their "environmental" influence to a few green initiatives within companies, and they have opted for political solutions related to participation in public organizations, from where they seek to exert more pressure and control over environmental malpractice.

As a final conclusion, it should be noted that in the trade union movement some tension has been observed between the growing "greening" of their discourse and everyday trade union practice, which can sometimes cause confusion in organization objectives, mixing legitimate defence of

employment with ecological impunity. Fortunately, these extreme situations are rare but they do reveal the existence of a contradictory framework that demonstrates the need to adapt the unions' discourse to new prospects that demand greater synergies between labour and environmental protection. In other words, the maintenance or creation of "quality" jobs will be increasingly related to a future ecocompetitive scenario that includes, as top priorities, greater environmental protection, more efficient production and a drastic reduction in emissions of pollutants. In the long term, the non-translation of these principles into trade union practice may result in irreparable damage to the environment and higher unemployment rates, entailing a much more costly solution for society as a whole in the future.

The Post-Carbon Society: A Long-Term Reality?

International literature assuring that the era of cheap oil has come to an end abounds. In fact, the theory developed in the 1970s by geophysicist Hubbert on *peak oil* concludes that all oilfields reach a maximum level of production that decreases as rapidly as it increases (Hall & Day 2009). It is true that most authors do not agree on whether peak oil has been reached in global production, i.e. the point of maximum production. In this regard, forecasts by the major oil companies and governments clearly point to a decline in affordable oil extraction and an increase in unconventional oil, whose exploitation is carried out under very complex or deep-sea conditions (VVAA 2004, EDUCO 2011). This fact, together with the emergence of new gas extraction techniques like *fracking*, seems to reassure the financial markets for the time being, and many governments continue to rely on fossil fuels in the mid term (from 20 to 30 years at least). However, other experts warn that future oil shortages and the necessary *energy transition to a post-carbon society* are not only an economic or technological problem but, above all, an essentially ecological and global-governance challenge (Ortega 2014a, b, c). They claim that the current productivist society, with the incorporation of new emerging economies,[1] can hardly be sustained with today's natural resources and growing emissions.

In this sense, it is only reasonable to state that an energy transition must lean on two pillars: social change and a new consumption model, and, more particularly, the development of technological platforms that allow renewable energy to be stored in an "*intelligent*" way (Garcia 2004). That is, it is not only a question of setting up more wind farms (land or sea ones), solar power

plants or any other type, but also matching supply and demand, creating storage systems that ensure "*continuous*" power 24 hours a day, without the need to depend on natural contingencies (wind, sun, waves, etc.). Therefore, the paradigm is basically about technology and governance. This means that the problem of renewable energy does not exclusively lie on the supply or the demand but, above all, on the management—via storage—of the discontinuous generation of such energy (Uría 2013). Let us explore the main reflections and conclusions of social partners in relation to the energy transition to a post-carbon society.

Social Partners' Perception of a Post-Carbon Society

Faced with the new economic prospects and especially the social changes that a future post-carbon society may hold, social partners are very cautious in their forecasts.

For employers, structural changes in the energy model are not likely to take place in 30 or 40 years' time. And yet, the same sources predict a sharp increase in energy efficiency accompanied by a major renewal in vehicle fleets and modes of transport (Sempere & Tello 2008). Therefore, the disappearance and replacement of oil by a model based on renewable or alternative energies will basically depend on two variables: the evolution of fossil fuel reserves and prices, and the development capacity and efficiency of new alternative energies. According to the latest annual reports by the International Energy Agency, if this energy shift does not occur, most multinational companies will not change their strategy and will continue devoting considerable effort and resources to finding new gas and oil sites in increasingly costly and unexpected extraction locations.

The emergence of fracking has brought about a revolution and further commitment by the USA to fossil fuels, which may set back the "decarbonization" process of our society several decades. This new technique, in which rock is fractured by a hydraulically pressurized liquid to obtain natural gas, has substantially lowered the USA's energy bill and has given way to a train of thought about future self-sufficiency, especially for road traffic (International Energy Agency 2013). In this new scenario, gas will become the fuel for power plants, goods and passenger transport and for short journeys. Despite the environmental dangers posed by this new technique—whose presence in Europe is still irrelevant—for many companies and governments it is a much cleaner energy than oil and, of course, than coal; besides, it is also

a relatively inexpensive "solution" to meeting our energy requirements in the short and medium terms.

Based on this reality, many countries can be expected to continue using fossil fuels, especially gas, in the coming decades. And we should not forget the economic strength of emerging economies like China, India, Brazil and Mexico, which will substantially increase energy demands worldwide. Globally, this means that renewable energy consumption will grow but also that of nuclear power, coal, oil and, of course, gas. Will this situation be sustainable in the mid term? It will very much depend on energy efficiency, current and future reserves, and the price of fossil fuels.

With regard to renewable energy, business prospects are not pessimistic at all. It is a sector with a bright future and, in one way or the other, it will eventually replace oil in the long run (30–40 years). This will largely depend on the technological ability to find new oil reserves at market prices and the amortization period of large power plants fuelled by coal, oil or gas. However, the same sources say that renewable energies are still too underdeveloped to be able to replace conventional energy sources. First, a process of electrification of society must take place, one especially reaching the transport of goods and people; to that end, it is essential to develop engines and accumulators with the same reliability and efficiency as the combustion engine. Moreover, renewable energies suffer from discontinuity and are heavily dependent on environmental factors. This means that until it is possible to store accumulated energy in huge "tanks or batteries" to guarantee availability at all times, the energy model will never rely on renewable power on an exclusive basis. For this reason, in the mid term employers and major electricity companies will go for an energy mix consisting of combined-cycle power stations, renewable energy and nuclear power plants, the latter being responsible for ensuring "continuity" in the electric power supply.

In Spain, the process of replacing existing power plants with renewable energy production may be slower than in the rest of Europe. The latest energy reform passed by the government in 2013 is a step backwards in the introduction of renewable energy. In the employers' view, the decline in premiums and other sanctioning measures are not in line with a project for the future but with a solution to a problem of the past. The golden decade that Spain saw between 1997 and 2007, with strong economic growth and large investments, came to an abrupt end as a result of not only the bursting of the real estate bubble but also the existence of unjustified investment with direct repercussions on the crisis of public

and private debt, which in turn gave rise to new bubbles in infrastructure (roads, airports, high-speed train lines, etc.) and energy. In the latter case, the investments made, especially in combined-cycle power plants or in renewable energy, meant doubling our electricity production capacity and—in a context of crisis—this created a serious imbalance between supply and demand. To this production excess we must add renewable energy premiums, a factor which—according to business sources—generated a massive electricity deficit totalling more than €30,000 million.

How did we reach this point? For employers, this huge deficit was mainly caused by two reasons. The recent construction of numerous combined-cycle power plants that at present are hardly operating but that do need to be kept in perfect operating conditions in case electricity needs to be produced at any given time. And the high premiums to renewables approved by Zapatero's government. Also, unlike what happens in other countries, all power plants in Spain are compelled to discharge their production into the grid. Logically, if it is renewable production then it will be entitled to premiums (significantly reduced now) based on the amount of energy produced. As expected, this policy resulted in the existence of thousands of producers who earn premiums for generating renewable energy and who significantly contribute to the excess in electricity production. However, this fact is a paradox; if a household, a business or a small town generates their own wind or solar power and wants to secure their power supply independently from the traditional system, they cannot do so because they are required by law to feed their energy into the "general grid" and to purchase the energy they need from producers and traders authorized by the government. In other words, what Spain's energy policy is telling us is that *before thinking about future projects, the existing massive debt must be settled and consumption must reach levels similar to those of production.*

A possible solution to this excessive production capacity could be to export electricity to other countries. But Spain is an "energy island" with very few interconnections with Europe and therefore can hardly export any electricity or gas. Clearly, this is a major political problem that concerns our relations with France and the USA, but at present the capacity of interconnection in Spain, according to employers' sources, barely reaches 5% of the production capacity, which further worsens the electrical oversupply in our energy system.

From the trade unions' viewpoint, the debate on the transition to a post-carbon society is still a far way off. From an historical standpoint, trade

unions have had little impact on the environmental debate and although their awareness in the last two decades is undeniable, the current economic recession has curbed and shifted their priorities towards more traditional aspects of unionism. However, we must admit that at an international level and especially in Europe, unions have developed an innovative environmental discourse that places emphasis on two fundamental aspects. On the one hand, companies must include environmental costs in their running costs structure and, on the other, it is absolutely necessary for European governments to boost a new green taxation system. For unions, it is important that these new taxes are not designed as mere tax-collecting instruments; instead, they should be part of a new fiscal model with global features where bonuses are also given to the best practices developed by companies and individuals. It is not a matter of collecting more (that too), but rather implementing tax guidelines to help improve the efficiency and environmental soundness of production and consumption. However, the same trade union sources admit that these proposals are not always clearly put forward in workers' committees and that workers themselves usually set other priorities (employment, stability, wages, working time...), more in line with traditional union objectives.

Regarding a post-carbon society, the trade unions' discourse is rather vague. They are aware of the progressive depletion of fossil fuels but do not dare suggest a forecast for the future. Basically, their commitment is based on four factors: the need to increase the efficiency and sustainable design of production processes in companies, consumption rationalisation, the design of a new mobility model—especially in large cities—and a strong boost for renewables at the expense of conventional energy. However, from a European perspective, the unions' speech as to a post-oil society is stronger and emphasizes the design of a fair industrial transition that is able to foster economic sectors with environmental viability, without forgetting financial support for other sectors, for them to be reconverted or closed as a result of new environmental requirements. Efficiency must be boosted and concepts such as planned obsolescence of industrial products dropped. In this regard, the political will of the public administration will play a key role in this transformation process leading to a new greener and fairer economic model and one that can ensure quality jobs.

Note

1. Basically China, India, Brazil and Mexico.

References

Barbier, E. (2010). *A global green new deal: Rethinking the economic recovery*. Cambridge: Cambridge University Press.

Climent, V. (1999). *Producción y crisis ecológica: Los agentes sociales ante la problemática ambiental*. Barcelona: Universitat de Barcelona.

Climent, V. (2006). Sociedad del riesgo, producción y sostenibilidad. *Papers, 82*, 121–140.

Climent, V. & Giner, S. (2001). Empresa y problemática ambiental. *Revista Internacional de Sociología, 29*, 115–132.

EDUCO. (2011). *El fin del petróleo*. Educo organización.

Garcia, E. (2004). *Medio ambiente y sociedad: La civilización industrial y los límites del planeta*. Madrid: Alianza Editorial.

Hall, C. A. S., and J. W. Day. (2009). Revisiting the limits to growth after peak oil. *American Scientist, 97* May–June, 230–237.

International Energy Agency. (2013). *Redrawing the energy climate map. Outlook Special Report*. Paris: IEA.

Ortega, J. (2014a). Cumbre del clima 2014 en Naciones Unidas. Blog Diario de Futuro. *La Vanguardia*.

Ortega, J. (2014b). ¿Puede la tecnología salvarnos? Buen vivir, decrecimiento y energías renovables. Blog Diario de Futuro. *La Vanguardia*.

Ortega, J. (2014c). La energía a través de las redes: viejos conceptos delirantes y nuevos conceptos refrescantes. Blog Diario de Futuro. *La Vanguardia*.

Sempere, J. & Tello, E. (dirs). (2008). *El final de la era del petróleo barato*. Barcelona: Icaria.

Uría, A. (coor). (2013). *De la economía verde a las sociedades verdes*. Madrid: La Catarata.

VVAA. (2004). *Riscs, incertesa, i Estat regulador. Debats de la Fundació n°5*. Barcelona: Fundació Rafael Campalans.

CHAPTER 11

Landfill Culture: Some Implications to Degrowth

Ignasi Lerma Montero

Introduction

Rubbish speaks. Rubbish speaks of our civilizing development model, of our economic growth and the features of our production system, of consumer habits and the dissociation between natural cyclic processes and human linear processes intended to transform matter and energy, and it also speaks of the socio-economic policies behind them and their orientation. To some extent, they are just one more sign—a circumstantial epitome—of the unsustainability of growth.

Waste can be understood as the residue or remaining portion of a whole, something which results from the breakdown or destruction of something; in fact, the Earth's material mass itself is cooling residue from remote nuclear processes. Waste from industrial and socio-economic metabolism must be understood as any unusable material left over after a job, function or operation has been completed, which however, retains the ability to disrupt natural systems and interfere with them as one of its inherent properties. As part of such waste, Municipal Solid Waste (MSW) represents the unusable (or

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underused) and rejected fraction of the material resources mobilized by the sophisticated urban and/or industrial ecosystem (Folch 2011). As administratively conceived by the new Act 22/2011 on Waste and Contaminated Land—already adapted to EU law and intended to regulate waste management by means of measures targeting prevention and mitigation of adverse effects on human health and the environment, as well as improved efficiency in the use of resources—MSW comprises waste "generated in households, shops, offices and services, and waste not classified as hazardous which, given its nature, may be equated to waste produced by the aforementioned places or activities". Its composition includes the following materials: glass, paper and cardboard, organic waste, textiles, metals, wood (mostly in the form of furniture) and rubble from small works or home repairs. As a matter of fact, MSW encompasses waste from a number of very heterogeneous activities, health care included, and so together with genuine household waste, it incorporates much of the waste generated by small and medium sized enterprises and industries in urban areas (De la Morena 2013).

In terms of the unsustainability of the current development and growth model, two additional features need to be considered in MSW: on the one hand, it is the result of the production-consumption process of a model that does not include the negative environmental externalities (Martínez Alier and Schlüpmann 1991; Naredo 1993; Aguilera and Alcántara 1994; García 1995a) and which implies overlooking real costs on the balance sheet, or at most considering them in a biased way; on the other, in terms of waste generation, accountability and responsibility are continuously blurred—which is typical of increasingly complex forms of social organization—but on the basis of existing power structures (Ovejero 1989), with nobody actually being held accountable and therefore preventing a sigmoid curve (Hadeler 1982) from being potentially planned in this area.

Today's ecological crisis is directly linked to our economic development model, based on continuous growth (Daly et al. 1997; Schnaiberg & Gould 2000; Garcia 2004). Together with its current system of post-Fordist industrial production (Gorz 1997; Lipietz 1988; Alonso 1999) and its high entropy generation (Georgescu-Roegen 1975), our consumption model plays a determining central role (Alonso 2006). While the human species is intrinsically characterized by exosomatic consumption (Martínez Alier & Schlüpmann 1991; García 1995b) to meet their basic needs, patterns of consumption based on positional goods (Hirsch 1976; Alonso 2005) must be added, as well as requirements arising from

a capitalist production system in which maximum profitability is the cornerstone of the consumption model (Altvater 1994; Riechmann 1998; Fernández & Riechmann 2006) and in which room is easily made for throwaway practices (Silva 2007) and where the priority as far as waste is concerned is disposal and not reduction. Overall, this model augments the ongoing consumption of resources and the increase in waste, and it generates an illusion of unlimited growth and of life as detached from its biophysical basis, life taking place in cultural bubbles that allow people to feel relatively independent from the inconvenience of the reality they create (Garcia 2006; Riechmann 2012).

Although the volume of MSW is relatively small compared to other waste types,[1] it is increasingly important as a result of its steady rise in recent years due to population growth and consumer habits. Moreover, demographic concentration in urban areas means that sustainable waste management methods are a necessity including, as an essential element, prevention and waste treatment or disposal.

The solution implemented, its environmental and social costs, and all the energy and material costs introduced in the elaboration process emerge as relevant issues. This waste depicts both sides of the same coin, the previous and subsequent phase of the same process: production-consumption. Hence, the importance of reduction, minimization, reuse and recycling is directly linked to sustainability and degrowth and, consequently to the future of the planet and the human species (Almenar 1993; Jiménez 2001; Ludevid 1997).

Waste Policy and Management Practices as the Basis of Landfill Culture

Considering the objectives laid out in subsequent *Planes Nacionales Integrales de Residuos—PNIR* (National Comprehensive Waste Management Plans) or their regional equivalents, *PIR*—all of them consistent with sector provisions and different EU frameworks or strategies for waste prevention and recycling as of the late 1980s, the situation does not seem to have improved all that much or at all for that matter.

Apparently, the waste policy implemented so far has focused on the second area of the social problems caused by waste, i.e. waste treatment and management once waste has been generated. The first level, waste prevention[2]—potentially with more eco-social benefits—has been relegated insofar as action leading to slowing down resource consumption

is concerned and subsequently the treadmill of production (Schnaiberg & Gould 2000). Conversely, the second level—management—is fostered, since it introduces mechanisms that accelerate the treadmill and therefore growth, in turn postponing social conflicts related with tackling the problem by either "burying" or "dissolving" it.

In any case, the current situation shows evidence of the non-existence—from the outset of the MSW problem—of efficient intervention or regulation by public authorities in putting mechanisms of interaction in place, via public debate and social and economic commitment, among all stakeholders (producers, manufacturers, distributors, services, users-consumers, the administration itself) throughout the sequence of MSW generation and management.

Consequently, given the heterogeneity of the stakeholders, the lack of real channels of interaction and engagement between them, and administrative laissez-faire, a kind of "external cascading effect" takes place, leading to socially suboptimal decisions in the different phases of the sequence and in which accountability gradually fades away. Thus, from raw material extraction and processing for consumer goods production to waste generation and perhaps waste recovery using some valorization techniques, MSW is passed on from one agent to the next in a chain which is not necessarily linked in a rational way. None of these agents has per se incentives to consider the effects of their activities on the following links along the chain.

At the production and marketing stage, the volume and composition of the waste generated are determined. These decisions are typically made without taking the consequences in subsequent phases into account. In terms of volume, if generating less waste has no direct beneficial effects on the bottom line, then this cannot be expected to favour reduction at the source, which, as noted above, should be one of the priorities in comprehensive waste management. Moreover, the material composition of products can be crucial to facilitating subsequent recycling processes (interaction between production technology and recycling technology). In turn, consumers play a key role in sorting waste at source, but as this is a nuisance and a cost in terms of inconvenience (sometimes fairly noticeable), if they are not compensated for it (perception of improvement), consumers cannot be expected to make much of an effort. If the companies responsible for waste transport and treatment are governed by purely individual economic criteria, they cannot be expected to consider the environmental consequences of using one method or another into

their decisions. Recycling means savings in disposal or incineration costs, which has an impact on public administration (or, where applicable, on the company responsible for disposal) and not on waste generators. Besides, recycling generates an environmental benefit which is not directly perceived by individual producers and consumers. Under these circumstances the market can only be expected to make poor, relatively inefficient recycling efforts (André and Cerdá 2006).

In turn, the political and administrative rhetoric builds up its panoply by setting a number of goals, which are always repeated and postponed, programme after programme. In Spain's case, the current PNIR 2008–2015 aims "*to further a proper waste management policy, reducing generation and promoting adequate treatment: prevention, reuse, recycling, capitalization and disposal. It also seeks to involve all public administrations, consumers and users, for them to live up to their responsibility, encouraging the creation of infrastructures that ensure suitable waste treatment and management in the places nearest to generation sources*". In line with Strategy 2020 and the "Roadmap to a Resource-Efficient Europe", the plan lays down the following goals:

1. Comprehensive Approach and Integrated Management: policy towards zero discharge.
2. Commitment to sorting at source. Implementation of prevention, reduction and recycling programmes.
3. Self-sufficiency and proximity in waste management. Processing waste closer to the sites where it is produced.
4. Coordination of relevant bodies, as an instrument for innovation; ongoing improvement and generation of synergies in waste management.
5. Establishment of a system of awareness-raising and communication with citizens.
6. Visibility of costs, transparency, regional balance and social justice.

In short, the objective pursued for the term of the Plan that will expire next year is to modify the hierarchy of waste management options. Five options are considered:

1. Prevention.
2. Reuse preparation.
3. Recycling.

4. Other recovery types, including energy recovery.
5. Disposal (PNIR 2007).

Today, the most widely used method of waste management is disposal, prevention being the very last choice. In theory, this pyramid, having disposal as its wide basis and prevention as its sharp end, should be inverted.

But according to the latest data published by the National Institute of Statistics and Eurostat, the picture is rather bleak and contradicts programmatic expectations, even though a quantitative reduction for the last period is clear. The sharp drop in MSW is directly linked to waning consumption following the onset of the 2007 economic crisis and the subsequent slowdown in growth.

Figures from the *Survey on waste collection and treatment* for 2011 show that 23.3 million tonnes worth of municipal waste was collected, which accounts for a 17.5% reduction in absolute terms compared to 28.2 million tonnes collected in 2007, when the crisis began.

In population terms, for the period 2007–2011 the decrease in MSW per inhabitant went from 1.58 kg/day to 1.32 kg/day, which as of 2011 placed Spain below the European average as shown in Fig. 11.1, but note that data for Spain are estimates. Over those years, Spain fell from 9th position in kg/inhabitant per year to 16th position (Fig. 11.2).

For the purposes of this chapter, data on the evolution of waste in Spain by type of collection is also significant. From the 23.3 million tonnes collected in 2011, 18.8 million tonnes were mixed waste, that is residual waste fraction plus unsorted waste generated by shops, offices, services and street cleaning, and only 4.5 million tonnes were collected from what we know as "recycling containers" (glass, paper and cardboard containers,

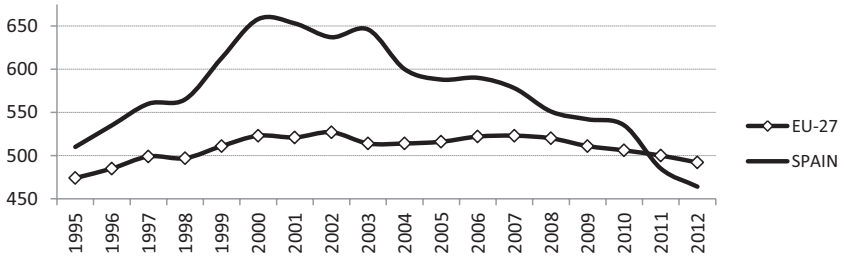

Fig. 11.1 Generation of MSW (kg/inhabitant), comparison Spain-EU27. (Source: Author's own elaboration based on Eurostat 2012 data)

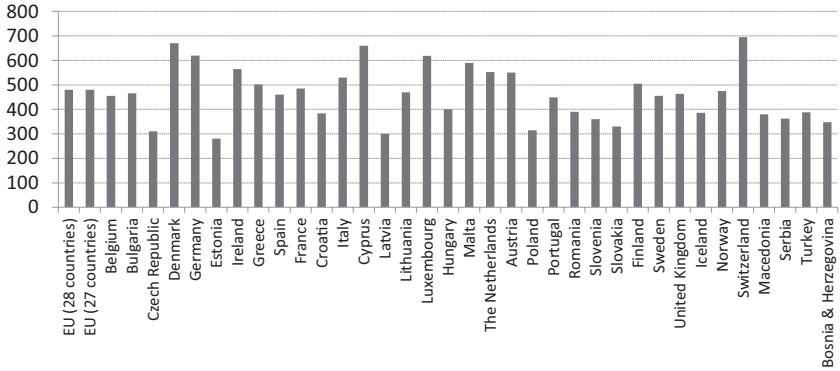

Fig. 11.2 Total waste kg/inhabitant/country 2012. (Source: Author's own elaboration based on Eurostat 2012 data)

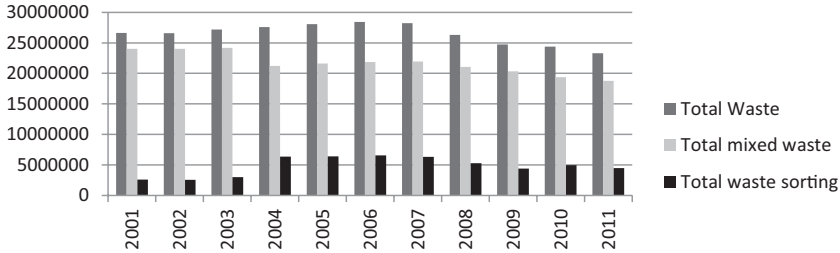

Fig. 11.3 Waste evolution in Spain by collection type. (Source: Author's own elaboration based on data from INE 2011)

batteries, clothes, etc.) as well as waste disposed of in Household Waste Recycling Centres. This shows the low percentage of waste sorting in our country, which in recent years has decreased by 3.6% (Fig. 11.3).

Another important aspect is the composition of the MSW: synthetic materials and packaging waste account for a greater share in the dustbin, with a steady increase, reflecting a continuum in consumer habits and in the items that make up this consumption. As shown in Fig. 11.4, 30% of MSW can be considered packaging waste.

Yet, almost half of our dustbin is filled with fermentable organic matter while the other half consists of paper and cardboard, 18.7%; plastics, 14%; glass, 6.9%; and the rest includes textiles, rubber, leather, inert mate-

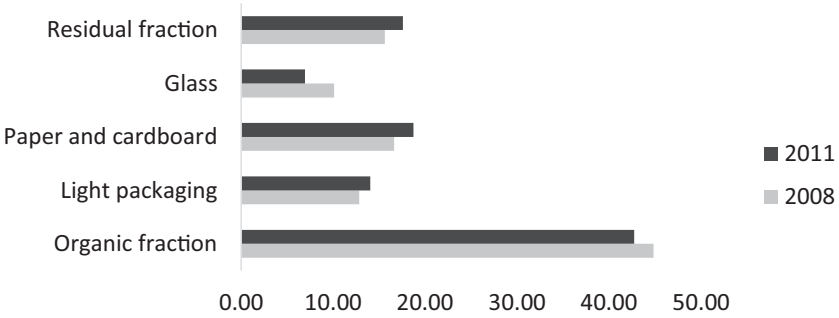

Fig. 11.4 Composition of standard household waste, Spain, 2008–2011. (Source: Author's own elaboration based on data from INE 2011)

rials, bulky items, batteries, etc. An important conclusion can be drawn from this: half of the rubbish bin could be composted, and yet only two million tonnes of this valuable organic waste by-product is collected in our country. The reason is none other than the separation in homes of the "residual fraction", which includes not only organic waste but other materials such as napkins, wood, textiles and some packaging, batteries, plastics, metals, etc. making it impossible to convert organic waste into quality compost, since only fermentable matter sorted at source can be processed.

In this regard, just a few cities in the autonomous regions of Catalonia and the Basque Country have started collecting organic waste through a dedicated bin liner, the fifth bag. Other towns (between 270 and 350 municipalities in Spain) have implemented an efficient *door-to-door* collection system which has proved satisfactory despite initial reluctance, as it has not only reduced household waste per capita and increased recycling but also contributed to education and social innovation, combining ethics and individual and collective actions with greater user involvement induced by institutional public measures (Casado da Rocha 2013).

Landfill culture seems to have settled down in Spain on the basis of an exiguous institutional interest in developing MSW policies and practices involving education for more sensible consumption. Thus, according to the data, the treatment given to MSW is significant: two-thirds of our waste in Spain ends up in landfill, as shown by Fig. 11.5.

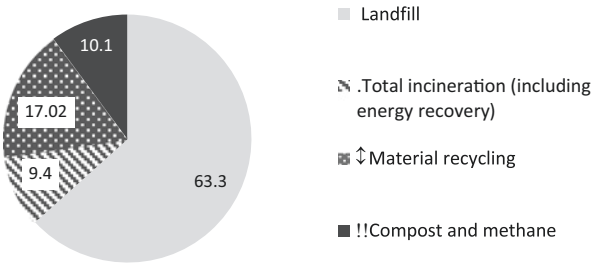

Fig. 11.5 MSW treatment by method, Spain, 2012. (Source: Author's own elaboration based on Eurostat 2012 data)

So basically, "*We are burying valuable materials such as organic matter in landfill sites or burning them in incinerators, when they are fundamental for our soil, or failing to reuse metal and plastic packaging which is perfectly reusable or recyclable. It is absolutely ludicrous to dispose of such resources*" (Ecologistas en Acción 2013:11).

The recent Waste and Contaminated Land Act, which is a transposition of the EU Waste Framework Directive, sets recycling half of the waste as the aim to accomplish for this period. A mission impossible for our country unless the whole waste management process is changed from scratch (Fig. 11.6).

Although they apparently point to a laissez-faire political attitude, these data also prompt an analysis of their causes and of the practices underlying the MSW policy itself and its management. In this regard, policies are determined by three interconnected elements that define them structurally and that, to a great extent, are embedded into the matrix of waste-related socio-ecological disputes.

First of all, there is the "non-existent" waste policy, which could be described as chaotic; as pointed out earlier, the principles, criteria and basic objectives laid down in the Comprehensive Waste Management Plan are systematically breached. This situation is worsened by the absence of effective waste treatment and recovery, as waste recovery requires prior implementation of an adequate sorting system for fermentable organic matter and recyclable materials, as well as any other sorting systems ensuring the separation of recoverable materials in waste. Landfill has therefore become the dominant practice, giving way to the almost total saturation of many dumping sites, to demands for new ones or the extension of existing ones, and to promote a favourable context for justifying incineration plants.

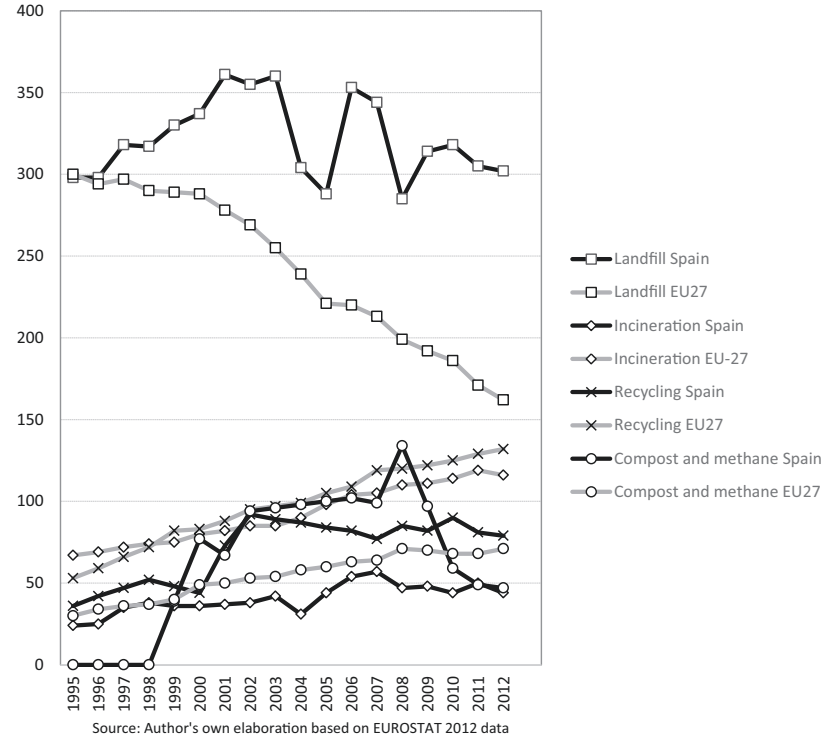

Fig. 11.6 Evolution of MSW treatment (kg/inhabitant) by type. Comparison Spain-EU27 (Source: Author's own elaboration based on Eurostat 2012 data)

Secondly, this culture of disposal—and I would personally describe it as a culture that has lost its bearings—is strongly determined to consolidate a waste management and treatment system based on the "trash business". The companies operating in refuse collection, landfill management and incineration have a yearly turnover of more than €4,500 million, according to the *Asociación de Empresas de Limpieza Pública* (ASELIP). In spite of revenue losses of 3.5 % as a result of the crisis, their 2012 invoicing for the domestic market (including street cleaning) amounted to €5,150 million. The garbage business in Spain involves approximately 140 companies, four large corporate groups virtually monopolizing contracts since 1991: FCC, Urbaser (ACS), Sufi-Sacyr (Valoriza) and Cespa (Ferrovial). One aspect to

bear in mind in this context is that of waste management fraud, as regards not only frequent and repeated double-weighing practices—with municipal politicians, businesspeople and technicians involved—but also oligopolistic trends in pricing, payment of commissions, kickbacks, bribery and influence peddling, fairly common in return for contract extensions or new concessions in licence allocation processes for treatment plants and landfill sites, as illustrated by the so-called Brugal case, a true exponent of the reach of corruption and its spreading from the building sector to that of waste.

Thirdly, concealment, opacity and the lack of participation must be noted as elements that rule over actions by the administration in this area. This has given way to multiple eco-social conflicts, mainly from NIMBYs (Not In My Back Yard), between citizens and local governments (Freudenburg & Pastor 1992), between citizens and local and regional authorities and between local and regional administrations, mostly prompted by attempts to set up new rubbish tips, by breaches of agreements between administrations, and by failing to submit mandatory reports and suitability and impact surveys for the facilities.

Thus, far from addressing the ecological and social dimension of the complete cycle of waste generation, its possible minimization or the harshness of its impact, everything seems to indicate that productivist consensus dictates the criteria behind the waste policy. Though it could be argued that the intervention of the administration in this area was originally based on a strategy aimed at exempting itself from the ownership or authorship of the solid waste problem and blatantly (in public) transferring it on to industry, it was superseded by the strategy of keeping ownership secret (in private) in exchange for sharing responsibility in handling the problem with the industry (Solé 1998). This has led to a structure of interest intermediation between the public and private sectors that is not based on preventing waste, but rather on allowing waste on the basis of growing consumerism generated by that same industry, and where measures aimed at reduction are not intended to avoid environmental damage or raise environmental awareness but to collect and recycle on the basis of sheer profit.

In short, the "trash business" spreads the culture of disposal, expressing itself in each individual phase: collection, hauling, "treatment" and landfill (Villalba 2009). Thus, concerning waste collection, the interest private operators have resides in collecting waste as quickly and economically as possible, both in terms of investment and labour, which translates into strategies that hinder waste sorting at source. In addition, the companies' greater profitability is directly related to their size and this leads to central-

izing services for large geographic areas, with important repercussions on the transport item (more than 70% of the MSW budget goes to collection and transport). As for treatment, it is expensive especially when there is no sorting at source and this task needs to be carried out at the plant, mostly by hand, so it is kept at a minimum just to comply with requirements, if they are complied with at all.

Notes

1. For example, del Val (2004) has estimated for Spain that one person produces on average 42 kg of waste per day (including solid and liquid waste and waste released into the air) while that person only generates 1.5 kg MSW a day.
2. Waste prevention understood as a set of actions taken considering the type of product and the stages of conception, design, production, distribution and consumption to avoid waste generation, and aimed at reducing environmental impact or minimizing impact on human health. Prevention contributes to degrowth by minimizing and saving energy and raw material consumption and by reducing damage to ecosystems caused by waste. In prevention development, the role of public administrations is crucial, both in the performance of their environmental protection duties and as drivers of a more efficient and socially inclusive economy.

References

Aguilera, F., & Alcántara, V. (Comp.) (1994). *De la economía ambiental a la economía ecológica*. Barcelona: FUHEM-Icaria.

Almenar, R. (1993). Cap a una societat sostenible. *Medi ambient, tecnología i cultura, 5*, 9–28.

Alonso, L. E. (1999). *Trabajo y ciudadanía. Estudios sobre la crisis de la sociedad salarial*. Madrid: Trotta.

Alonso, L. E. (2005). *La era del consumo*. Madrid: Siglo XXI.

Alonso, L. E. (2006). A post-fordist consumption norm? Social fragmentation, individualization and new inequalities. In L. E. Alonso and M. Martínez Lucio (Eds.), *Employment relations in a changing society. Assessing the post-Fordist paradigm* (pp. 153–168). Basingstoke: Palgrave-Macmillan.

Altvater, E. (1994). *El precio del bienestar. Expolio del medio ambiente y nuevo (des) orden ecológico*. Valencia: Alfons El Magnànim-IVEI.

André, F., & Cerdá, E. (2006). Gestión de residuos sólidos urbanos: análisis económico y políticas públicas. *Cuadernos Económicos de ICE*, *71*, 71–91.

Casado da Rocha, A. (2013). Niveles éticos y gestión de residuos: Evaluando el sistema de recogida selectiva puerta a puerta. *Dilemata*, *5*(13), 209–229.

Daly, H., Schütze, C., Beck, U., & Dahl, J. (1997). *Crisis ecológica y sociedad*. Alzira: Germania.

De la Morena, J. (coord.) (2003). *Manual para la gestión de los residuos urbanos*. Madrid: La Ley-Actualidad.

Del Val, A. (2004). *El libro del reciclaje: Manual para la recuperación y aprovechamniento de las basuras*. Barcelona: Integral.

Ecologistas en Acción. (2013). *Un yacimiento en la basura: Análisis de los vertederos de residuos domésticos en España*. Report, November 2013, http://www.ecologistasenaccion.es/article 26932.html

Eurostat. (2012). Municipal waste generation and treatment, by type of treatment mode, http://epp-eurostat-ec.europa.eu/portal/page/portal/indicators

Fernández, F., & Riechmann, J. (2006). Termodinámica: ¿Por qué los muertos no resucitan y el reciclaje perfecto es imposible? In F. Fernández & J. Riechmann (Eds.), *Ni tribunos: Ideas y materiales para un programa ecosocialista*. Madrid: Editorial SXXI.

Folch, R. (2011). *La quimera de créixer*. Barcelona: La Magrana.

Freudenburg, W. R., & Pastor, S. K. (1992). NIMBYs and LULUs: Stalking the syndromes. *The Journal of Social Issues, 48*, 39–61.

García, E. (1995a). *El trampolí fàustic: ciència, mite i poder en el desenvolupament sostenible*. Alzira: Editorial Germania.

Garcia, E. (1995b). Notas sobre desarrollo sustentable y propósito consciente. *Ecología política*, *10*, 45–58.

Garcia, E. (2004). *Medio ambiente y sociedad. La civilización industrial y los límites del planeta*. Madrid: Alianza editorial.

Garcia, E. (2006). Consumo y medio ambiente en el País Valenciano (1980–2000). *Papers, 82*, 97–120.

Georgescu-Roegen, N. (1975). Energía y mitos económicos. *El Trimestre Económico, XLII*(168), 779–836.

Gorz, A. (1997). *Metamorfosis del trabajo*. Madrid: Sistema.

Gould, K. A., Schnaiberg, A., & Weinberg, A. S. (1996). *Local environmental struggles: Citizen activism in the treadmill of production*. New York: Cambridge University Press.

Hadeler, K.-P. (1982). *Matemáticas para biólogos*. Barcelona: Reverté.

Hirsch, F. (1976). *Los límites sociales al crecimiento*. México: Fondo de Cultura Económica.

INE. (2011). *Estadísticas de medio ambiente: Encuesta sobre recogida de RSU*. Madrid: Instituto Nacional de Estadística.

Jiménez, L. M. (2001). *Medio ambiente y desarrollo alternativo*. Madrid: Sistema.

Lipietz, A. (1988). El mundo del Postfordismo. *Ensayos de Economía, 7*(12).
Ludevid, M. (1997). *El cambio global en el medio ambiente*. Barcelona: Marcombo.
Martínez Alier, J., & Schlüpmann, K. (1991). *La ecología y la economía*. Madrid: Fondo de Cultura Económica de España.
Naredo, J. (1993). *Hacia una ciencia de los recursos naturales*. Madrid: Siglo XXI.
Ovejero, F. (1989). *Intereses de todos, acciones de cada uno*. Madrid: Siglo XXI.
PNIR. (2007). *II Plan nacional de Residuos Urbanos (2008–2015)*. Madrid: Ministerio Medio Ambiente, rural y marino.
Riechmann, J. (coord.) (1998). *Necesitar*, *desear*, *vivir. Sobre necesidades humanas*, *desarrollo humano*, *crecimiento económico y sustentabilidad*. Madrid: Los libros de la Catarata.
Riechmann, J. (2012). *Interdependientes y ecodependientes. Ensayos desde la ética ecológica y (hacia ella)*. Cànoves: Proteus.
Schnaiberg, A., & Gould, K. A. (2000). *Environment and society: The enduring conflict*. Caldwell: The Blackburn Press.
Schnaiberg, A., Weinberg, A. A., & Pellow, D. (1998). Politizando la rueda de la producción: Los programas de reciclaje de residuos sólidos en Estados Unidos. *Revista Internacional de Sociología*, tercera época, *19–20*, 181–222.
Silva, D. (2007). El arte de tirar lo que no vale, *El economista*, 19 October 2007.
Solé, C. (dir.) (1998). *Medio ambiente*: *prevención y control de residuos sólidos urbanos*. Bilbao: Fundación BBV.
Villalba, A. (2009). Los residuos. Los residuos sólidos urbanos y política de residuos. Materiales didácticos, (mimeo).

CHAPTER 12

Social Actions Transformed in a Post-Carbon Transition: The Case of Barcelona

Jesús Vicens

Transition initiatives such as the participation energy programme (PEP), community urban agriculture (CUA), change market, cooperatives and fab labs, amongst others, reflect an experiential knowledge creation (EKC) process, based on trust, in both explicit (formal) and tacit (common) dimensions, towards supporting innovation through social actions derived from the interaction of people. Barcelona as a neighbourhood has been used to validate this, through the Transition Town movement list and Barcelona professionals linked to the transitions movement. Research for this chapter is based on the capacity of communities to generate knowledge creation processes and innovative initiatives and sought to answer the question: Which social actions in these neighbourhoods afford the transition to a post-carbon society and mitigate the effects of global warming?[1]

The neighbourhood of Sant Martí–La Verneda in Barcelona was the site of the research. Neighbourhoods are seen as the contexts for new knowledge creation and innovation in the territorial organization of cities. There is an interaction and a conversion between the two main dimensions of knowledge—tacit: knowledge which is subjective and experience based, related to specific contexts; and explicit: knowledge which is objective and

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rational, (systemised), expressed in words, numbers or formulae in free contexts. (Nonaka and Toyama 2003). Both are types of common knowledge. Two hypotheses guided the research:

H1: Transition actions are based on experiential knowledge creation, that strengthens them when in the midst of derivative crises of unsustainable production and consumption processes, such that they reject conventional strategies.
H2: Experiential knowledge is in a continual process of change, refining optimum responses to any circumstance that empowers people.

Neighbourhood Study

The neighbourhood of Sant Martí–La Verneda, has 55,000 inhabitants, and is in the 10th district of Barcelona, which has 200,000 dwellers. There are different entities in the neighbourhood working actively to achieve the transition to becoming a post-carbon society. It has been recognized by the international Transition Town movement since 2009. This movement, founded in Totnes in 2005 by Rob Hopkins, is an ecological and social movement with communitarian roots, directed towards building resilience that could face challenges to oil supplies, climate change and economic instability. A group of people in Sant Martí–La Verneda is actively putting pressure on institutions and generating a consciousness to finding energy solutions that are low in carbon. They propose changes to consumerist lifestyles, proposing alternatives with more emphasis on human qualities and attention to ecosystem services. This makes it possible for the neighbourhood to be considered a participant in the transition movement. The research focuses on leaders, both women and men, committed to working with different bodies to develop an understanding of the need for transitioning to a low-carbon society. Aware of living in a socially difficult historical moment, they dedicate time to their community helping build resilience in the neighbourhood.

Transition to a Post-Carbon Society

Each of the interviewees highlights two components in their definition of what transition is: one is a change in the energy model and energy sources; the second is a change in habits that can reduce consumption, as a result of the scarcity of natural resources.

Themes of energy and limits in natural resources are the gateway to transition. However, without deeper cultural and social changes in relation to "ways of living", the transition remains limited to energy efficiency and renewable technologies. The Transition Town movement (Hopkins 2008) cites changes necessary within the culture. That is, to reach a culture of sufficiency and consistency (Sachs & Santarius 2007:1–17); to consume no more than is necessary, self-sufficiency; to use resources and materials according to a continuous exploitation model, consistency. This is nature's way.

Those interviewed show the need for changing institutional power relations in favour of a horizontal energy structure, and an economy that is directed towards a sustainable society, based in the hands of people to generate employment. A key aspect is to democratize energy systems, functions, sources and the model itself. Social movements and networks point towards this last phase. The PEP is the transitions' vertebral axis in the neighbourhood study and facilitates the introduction of these values.

Initiatives that favour this transition are: proximity and the local economy, energy self-generation in the home, electric cars and car-sharing, a reduction in inequalities by way of participative democracy when taking political decisions, responsibility for the use of resources, consumer cooperatives, urban gardens, exchange markets and social currency: initiatives which highlight the character of a community. Each initiative requires a human dimension indicating the significance of people. In order to democratize those issues—energy, food, mobility, local trade, currency and resources management—to becoming participative decisions, means a vast array of changes in direction. They seek new social roots in the process of building a different world, ecologically and socially.

The interviewees were aware of the difficulties of this process; nevertheless they were in no doubt that this was the path to a post-carbon transition, whether it could be reached sooner or later. This conviction is strengthened given the volunteering nature of these citizens' actions, and likewise the synergy between local people in the neighbourhood and the citizens' entities.

There is a psychological resistance to change and a short-sightedness in confronting the challenges faced by a carbon-exhausted society. We are already in a complex situation due to problems of energy and having reached a peak in oil production. Despite continuing to drill in order to extract more reserves, the ecological and economic impacts on fossil fuels make sustainability unavoidable as a way of resolving the problem (Tainter 2011: 89–95; Stern 2007). The basic problem is the real economy, caused by a scarcity of resources that fuels increasing financial crises.

"To observe the world as a place of money is to stop seeing it as it actually is—a place where one can live together as living beings in an environment. A shift in perceptions is necessary, and we are late in coming to this task." This is the response of Ricard Álvarez (46 years old), a leader of the transition movement in the neighbourhood, to the question of how crises influence transition initiatives.

When a wider consciousness emerges, as happened with the "15-M" or "Indignados" movement in Madrid, and the "Occupy" movement in New York, in 2011, this then extends out into the whole world, generating an important setback for the influence of the liberal economy (Renner 2012: 34–40). This occurs with each new social movement. Local institutions can favour sustainable ways of living. For example: in public mobility, which can change the face of the city; in urban agriculture, that generates food security; or in solar panels and photovoltaic energy in buildings offering them self-sufficiency.

One of the interviewees, Oriol Torras (33 years old), an engineer said: "In the last 40 years of capitalism, extreme egotism has been promoted. This is talked about on a global scale, while mistrust of others is likewise promoted"…"The global view that by helping somebody, this can then benefit society, and eventually inwards for one's self, doesn't exist. We are being short-sighted."

The main obstacle found in the interviewees' responses, is the difficulty in relating an absence of resources with the collapse of that way of life used to consume them (Costanza et al. 2007: 522–527). Seeing a neighbourhood with fewer cars and with more urban gardens shows how this difficulty can be overcome. Some of the interviewees agree on the need to establish limits on things: knowing that we can live with less and that this lesser amount is better for one's quality of life—for example, healthier city air and better quality nourishment—and is ecological and derived from the community. "Less is more" (Sempere 2009).

Interviewees mentioned that social movements which have inspired transition emerge from people. Social actions lie beyond specific behaviour, with their complex networks and interdisciplinary coordination. Mid-sized and small entities combine to practice that which unifies them. In the neighbourhood of Sant Martí–La Verneda, for example, the PEP attempts to resort to popular imagination whereby energy is for obtaining electricity, and then reach the psychological question that "the festival of unlimited consumption, has come to an end"…, "a change in energy must go hand in hand with a change in consciousness, which then effects habits, modes of life and its values", in the words of Ricard Álvarez.

Another interviewee, Roger Torrell (38 years old), the president of the coordinating body of the neighbourhood, said: "Social movements reach people more than do institutional messages: for example, the point about bicycling has gathered force, or movements in favour of public transport"…, "street actions by social movements are more attractive, conveying a more attractive image of these changes and helping to explain them".

Another interviewee highlighted the cooperative 'Som Energia', providing domestic energy consumption from renewable sources. It has grown to more than 21,300 members (it started with 800) in four years (web: somenergia.coop). This cooperative has begun a debate about energy and energy mindsets, running concurrent training courses. The 15-M movement, the Occupy movement and the initiative "Platform for a New Energy Model" are inspiring those changes and stimulating debates about the energy transition.

The project of mini-generators in buildings, says the president of the coordinating body, "that are not visible from the PEP, we support from the neighbourhood entities coordination group. It looks strange not to install them when a building is built"… "Costs may be high, but they are coming down, and there are incentives in place". "Energy savings might defray the installation expenses."

The interviewees view the PEP as an axis that brings them together around energy issues. But, at the same time they see it as a space promoting people's interactions and social experiments such as exchange fairs or social currencies. They express diversity, differences, complexities and possibilities as being something enriching. Here one is reminded of the innovative relationship between apparent chaos and non-structured multiple phenomena in a given period, that generates thermodynamic energy, and another subsequent order (Prigogine and Stengers 1984). Whether as molecules or human communities, the permanent relationship between order and chaos is innovative and creative. This is perceived on some occasions in the Sant Martí–La Verneda neighbourhood, and also in other neighbourhoods in Barcelona, mainly when the 15-M movement was obliged to leave the city centre and move into other districts.

Interviewees were asked to take a further reflective step and concentrate, not so much on the resources and their efficiency, but rather on ecosystem services—forests, atmosphere, wetlands, oceans—so as to detect environmental quality and well-being. Which urgent changes have to be made to preserve them? The responses showed greater awareness than expected. Conceptualizing ecosystem services is more difficult than conceptualizing natural resources. It requires the habit of thinking in a

complex manner and presupposes difficulties in perception (Adam 1998: 23–59). The whole of Neolithic human history, not just the modern world, is structured in a way external to ecological systems and their functions (Rifkin 2012: 117–125). Modern life creates a lifestyle that equates levels of living with consumerism, ignoring the ecosystems' origins, the importance of natural rhythms, and especially the services provided by natural systems (Adam 1998: 61–98). The question posed sought to find out about the assimilation of transition with the biosphere and ecological systems. It is easier to perceive scarcity of resources—trees, water, metals, fisheries—and the relation of these to the production of goods, than to perceive the relationship between services and qualities of life. That is, clean air due to the chemical composition of the atmosphere itself, aquifers that are not contaminated due to tree roots in a forest, climate regulation by carbon dioxide, oxygen and other gases, and reef biodiversity as a space for nesting. The responses given showed a good level of comprehension and also a mutual relationship between ecological services and the socio-economic organization of a society.

Ricard Álvarez, PEP promoter, considers: "I have lived in a grave situation all my life. Studies about biodiversity, global warming and the oceans may lead one to think the worst. Yet we are able to generate resilience, be creative and to apply those solutions to the neighbourhood, while looking for ways to push ahead with community solutions." The PEP is moving in that direction.

Montse Álvarez (50 years old), a teacher of Sant Pau School who is interested in environmental education, points to ecosystem services that are necessary: "Changes in attitudes. Don't think that we are the very centre of nature and don't abuse the services it provides, because those services are just as much for other species as for our own survival. We need to maintain a balance—I receive, but I can give as well. That comes from consciousness-raising and personal changes, and being united amongst ourselves"… "We have to take action to make this known to people who might never have thought about it, to bring about awareness of the importance of nature's balance."

She emphasizes the importance of raising these issues in schools and families and that we must depend on nature as we did a million years ago. To consume all available resources and reduce services offered by the ecology is a short-sightedness that puts us in a risk zone socially, and of losing food and energy security.

Roger Torrell, asked about the urgent changes necessary to preserve ecosystem services, replied: "In an urban ambit, the most urgent matter is to preserve clean air, and reduce pollution. Because as part of climate change, the air in cities seriously affects people's health, and its quality is very important"… "In terms of natural areas, there might be matters relating to water, and strategically to pollution of the seas."

Oriol Torras, engineer to the PEP, replies with a sentence of President John Fitzgerald Kennedy: "Ask not what your country can do for you, and ask instead what you can do for your country." He says: "We could say the same about the ecosystems: don't think 'what can these services give me?' instead 'what can I do for the ecosystems?' All we do today is exploit them, such as with intensive sea fishing, exploitation of oil and gas, fracking (hydraulic fracking). We give some services to the ecosystem, in order to receive theirs. If forests regenerate, then one can collect biomass, without much energy… What can I do for society, what can I do for an ecosystem, for the planet? It may be difficult to see what, but each one of us can help push the planet in one direction."

Transition in the Neighbourhood of Sant Martí–La Verneda

The second subject for the interviewees, that of the neighbourhood's transition, provides specific information regarding the transition, and levels of cohesion as a social movement. One question was the perception that the interviewees had of whether the transition is something given at the level of discourse, or if there are interventions which show an awareness of approaching energy difficulties. The former places us at the start of a debate. The latter places us in the presence of solutions that might mitigate consequences, and generate security for the neighbourhood.

Ricard says: "The neighbourhood is in transition in the same way as the Transition Town movement. Yet if we are talking about the balance between available resources and the right to a decent human life, this awareness is incipient"… "In the initiative we're carrying out with the PEP, we don't know where to transform the most invisible things. There are some people who are aware and address certain concerns about these topics." The interviewee speaks of some aspects that are at an incipient stage of transition, while others are at a stage of maturity. He points out that: "In the numbers of people and visibility, transcendence and quantity, the neighbourhood is still incipient; but in an invisible way and as a network, this model of transition is acquiring maturity".

Montse emphasizes the value of taking small actions, such as the relationships between different associations and bodies. “Building small actions from different associations in the neighbourhood, a collaborative relationship amongst neighbours is created. There are many associations within the neighbourhood and a broad network to pass resources from one to another.” It is generally the same people who are committed to taking action, however she does not place as much importance on this fact as on the repercussions that this can have on the whole neighbourhood: “It may be the same people, yet they do continue to participate. It is very important that the small things are there in place, because what we are offering is a model. It is another option for a relationship. We help ourselves in the network, exchanging knowledge and experiences.”

Merche Lasheras (42 years old), leader of the Community Network Sant Martí–La Verneda, mentions that transition is reflected in the local economy. She is a member of the “local economy” working group, in the PEP. “It all began with the exchange market: firstly, exchanging objects, then later on, knowledge and services. Each neighbour has some specific ability or knowledge: for example someone knows how to speak English or how to cook cakes. An exchange through a network or a list takes place. It’s a way of covering needs without using money, even though we then adopted an internal currency using minutes. This means that if somebody has spent 30 minutes carrying out some service, then others must pay likewise.” She emphasized that a more just society is created through using these methods. Justice is an important value in the transition movement. There is a feeling of scarcity and a need for sufficiency, and the demand for a balanced distribution of resources and services. Equity is at the centre of the concept of sustainable development, from the Brundtland Report, *Our Common Future* (World Commission on Environment and Development 1987).

When faced with the question as to whether the neighbourhood’s transition is incipient or has matured, Oriol replied that it is moving somewhere between the two. “I still think there’s a lot to do. There’s a lot of movement going on in the local civic centre. For example the room is full of people for the talks about the loans, or retirement. But the talks about the Participation Energy Programme require more effort”. The civic centre is a symbol of a “democratic transition”. It is nowadays a space within the district city hall, serving neighbourhood bodies. Social interaction is bubbling away there. It is the seat of the PEP and where the different entities coordinate. It is a space where the different associations exchange

resources. It is where they learn to communicate and to engage. It is a base for any larger scale social intervention. "It's where ties and bonds are created, forged. We discuss which model to follow. Different working groups operate such as the SICS [Social Innovation and Communication Systems], the community network for the exchange market, it's where collaboration with different bodies takes place, such as the Eco-Union, or where 'excess' meals are prepared—food collected from markets for a meal that might bring together around 200 people".

Roger, considers that consumer cooperatives which seek ethical and local consumption are the aspects that give the neighbourhood its transitional nature. However in the Sant Martí–La Verneda case study, the PEP, containing a group of bodies aimed at promoting energy exchange in the neighbourhood, is the cohesive axis.

They refuse to identify any individual leaders. Instead they emphasize that nobody in particular has any special importance, nor any one body or association: rather, each and every one is a leader and participant. They are proud of the movement, of all the different faces, of the pluralism of ideas, showing that they can live happily with the complexity all this represents. The PEP is aimed at energy auditing, making savings, with a general focus on energy, but it also integrates different working groups: for example, the one devoted to urban agriculture, or the one for an exchange economy. They make quick connections between food and energy. "Every year, two or three awareness initiatives have taken place, such as the project of self-generators, and the urban gardens."

Participative Energy Plan

It is in the neighbourhood's social spaces where people carry out this transition. There are technical and professional aspects, such as volunteers auditing for energy consumption and communication and psychological components, concerning worries and doubts that affect people's lives, such as the financial crises, loss of work places and mortgages. The most notable aspect is a space where initiatives are tried out, testing the social structure, such as, for example, the exchange economy, where no buying and selling takes place. It is free collaboration with nothing else other than exchanging things.

The interviewees agree that people approach the PEP with their wishes. Merche Lasheras, a leader of the community network in areas of the local economy and solidarity, says: "If we say to people that we don't sell anything, only exchange, they are surprised. They give up a Saturday

morning without thinking about money, it is a way of doing without money, you add life to objects, reduce waste. We're in a relationship, and we generate an awareness that if something isn't of interest to you, it might be useful or interesting to other people."

To make an agora for the exchange economy, a place where people relate to one another, is to humanize the economy once again. It is to be reminded that its structure and institution is a means of attaining a better quality of life and well-being. It might appear to be a utopian vision, but it is at once an intelligent response to a crisis situation that is perceived as having no outcome. People are sceptical of macro-economic growth indicators. The perception of crisis means that any new experiment, however strange or difficult it might appear, generates greater conviction than governmental indications of economic recovery. Urban gardens and energy auditing, show a strong desire to redirect basic aspects of consumption, like food or energy, so as to avoid expensive food prices and electricity bills.

As Ricard says: "The PEP is an organic initiative, not well structured, with little organization, yet with a good atmosphere. It's an open place where anyone can join in, where many city and neighbourhood bodies have shown an interest. It is a testing ground, where we look at one another to see how we do things, where there is collaboration among people with different viewpoints, and where we address questions in a holistic way."

One interviewee emphasizes that the PEP's basis, the transition, is to try out, test and experiment since this is no superficial crisis. Instead it is structural, requiring changes to large sectors of the economy such as energy, CIT (Communication and Information Technology), the hydrogen and electric mobility sector, and public transport (Rifkin 2012). This marks a shift in culture. The impact on awareness is that power could be in the hands of people not of institutions.

Each one of us, with access to communication and information technologies is enough to "occupy" urban space and turn both neighbourhood and city into community "domes". Ricard: "My position as an apprentice, with some visibility, and as an interlocutor both with the administration and with other bodies, it is to make connections"… "This process transcends individual people and classic leadership styles; our location is flat, horizontal and we prefer to talk of elders."

The emphasis on becoming aware and on education is observed through energy auditing. Montse explains: "In schools, the auditing has served to make us aware of consumption. Those accomplished at home have made us aware, bringing some changes that might reduce consumption. Those families that offer to take part in the study are those who are already con-

scious. The question now is how to transcend those already aware people and to reach the entire neighbourhood—we have to explain and extend."

There is a project in the PEP to make roofs with a potential for energy. Merche: "All these initiatives are displayed to people in the neighbourhood. They are a good tool for reflection and consciousness. We publicize within the neighbourhood and call people together to share the results."

Urban Gardens

Community urban gardens have been growing in success. Domestic free spaces are used to introduce small farming. It is actually becoming an activity that produces food, an occupation for unemployed people, providing contact with nature, and perceiving that they are also a sink for carbon dioxide (Karanja and Njenga 2011: 109–117). Although the most relevant aspect of urban gardens is perhaps in thinking again about the significance and design of a city, these gardens, together with "zero energy buildings" and ecological transport, change the physiognomy of cities. They turn their users into actors of a different urban configuration, closer to people and to recovering public spaces. In the case of Barcelona, where space is scarce, the fact that urban gardens take over terrain involves a change in mentality. The discussion around the city's model then extends and becomes more interesting, just at the time when Barcelona is a "world city" (Carné and Ivancic 2008: 129–144). Models posed of the "smart city" and "community transition" cause tensions in the neighbourhood of Sant Martí–La Verneda, where, together with "22@", the next-door neighbourhood, there are free spaces.

The neighbourhood we studied inherits an agricultural tradition that runs parallel with an industrial tradition. This gives it a particular identity in terms of the morphology of historical memory. Ricard Álvarez says that many neighbourhood projects come from people who are interested in cultivation. And nowadays there are lots of opportunities as a consequence of the work crisis.

"We are in favour of the community transition model, as a city for people, not for the technological city of the App, which tells one how a pea should be developed. In spite of the technological aspects of smart cities, we become switched off from the underlying problem: not knowing other people, or the resources others can provide us with"…"Agriculture can give us this sense of relationship and connection. Though food production for an entire city has to be well programmed at the bio-regional level together with the Generalitat [the Government of Catalonia], it presupposes an agricultural model of proximity."

There is a big rural house, "Can Cadena" in the neighbourhood, which is a symbol of an agricultural past, and today is designated as being a garden zone for senior citizens. It also accomplishes a pedagogical function, as neighbourhood schools can visit it. They have farm animals and students can feed and wash them. It is a key referent in both the neighbourhood and city. It is a rural house that has been restored and is maintained in the neighbourhood's park. But there are other spaces to cultivate, says the school teacher. "City Hall has conceded a large space to the district to make a community garden. It looked as though it would be impossible, but it's been possible due to pressure from neighbourhood bodies. It also represents a change from within the administration, which is something that we acknowledge."

Community gardens are managed by the people themselves, by the neighbourhood's community. Access is available for anyone interested, not just senior citizens who have a civic bent, outside the administration's management. It has meant a step forward in self-management and community empowerment. The people themselves decided what to do with the food, whether to sell some of it and then reinvest the money for the neighbourhood, or to give it to those people who are without access to it, or some other options. It means one more step in terms of local policies for urban gardens (Zaar 2011).

However, the link with schools gives urban gardens an educational dimension with all their different aspects: food, contact with nature, human relations, shared activities and a reversal in carbon dioxide levels. They are aspects that turn cultivation into both a model city and a social activity. "A lot of schools in the neighbourhood have gardens because they are on the '21st Agenda'. The 'La Pau' school where I work has thought of enlarging its garden. It is an activity that is very popular: working the land connects with what it means to work for oneself and to work for one's living"…"The garden space allows one to touch the land, smell it, to see how things grow and die, to observe life's cycles." (Montse). Working in the school gardens is important, not only for its curricular content, but also and above all, for the inner experience it provides. It connects with something rooted in consciousness.

Social Justice and the Impacts of Redistribution

The ecological and climatic crisis entails features and injustices that impact more intensely on the most vulnerable groups of the population (Beck 2008). These issues were raised with those interviewed to find out what changes

would be required to ways of living so as to mitigate consequences, and the ways that consumption has to be transformed based on other, non-material values. A spectrum of responses for reducing impacts and injustices is evident. Ricard Álvarez, emphasizes that our way of understanding resources, whatever they might be, is managerial. But we are still far from tackling the deteriorating ecosystem created as a result of environmental damage and our impact on the climate, obscuring its cause in an obsolete economic system. Both left and right ideologies have come late to reflecting on these matters. He sees this general attitude as being a way of doing politics that is out of date.

His concern centres on the changes required at collective and personal levels. This is where the transition movement can focus its attention. He considers that change in justice and lifestyles is necessary, though complex. Experience tells us that one can make changes within personal spheres, such as reducing carbon footprints: kinds of food, transport, and consumption of materials can result in a larger or smaller carbon footprint. Meat (Lappé 2011: 93–96), cars (Harti 2009: 111–114) and packaging (Brown 2002: 125–148), have a greater carbon impact than vegetables, bicycling or recycling. Another dimension is the personal sphere where changes can be made, transitioning into another society in an attitude of solidarity, thinking of the person beside us, who might lack certain things. We can do a great deal here. We can also make changes in the collective sphere. We can make our actions visible, we must make changes ourselves. When we engage in actions such as an exchange market, a reduction in energy consumption, or using a social currency, the collective whole is empowered.

Montse Álvarez differentiates between the real needs of people, of what is actually necessary, and artificially generated, superfluous needs. It is a difficult issue on which to reach agreement. Becoming personally aware of this difference is a clue, she says, towards making changes in consumption lifestyles. “We have to become conscious of real needs then everything else will be easier to adjust.” Whether it is society or people, needs have to be revised. Becoming aware, especially that we have an environment where resources are limited, is the starting point for change. “Take only what is necessary, and give back what we can in return. If there is no personal awareness, then you are deceiving yourself.”

Merche Lasheras provides a micro-social dimension to the consciousness of people. When people in the neighbourhood see that a family member or someone else is not well, they can take action. A network of people,

"The Communitarian Net of Sant Martí–La Verneda", is active in solidarity, if for example, someone is suffering through a poverty of energy. Does mutual help emerge naturally, when you are aware of a particular neighbour's deprivation, or it is something that has to be learned and practised? She replied that the problem is "not knowing"… "People say that they already have enough to deal with their own situation so that's why they don't go any further. That's what not knowing ourselves is."

Oriol, the engineer interviewed, who is active in the neighbourhood PEP, recognizes when talking about a social distribution of energy, that a post-carbon society necessarily involves a redistribution of energy and a reconfiguration of social justice. There should be no one individual who has so much power that they can influence judicial order, or company law sectors, to prejudice the common good. Visibility for enterprises that have social and environmental responsibility must be favoured as they will become a key to the common good. "People can bring down an enterprise—they hold the key for the common good."

He says that the Catalan economy has an important added value: cooperatives. This is where the future of production and wealth lies. This is where the work pyramid is flatter in structure and there is closer proximity between workers and directors, while relations are stronger. Although cooperatives may not be visible, it is interesting as a way of working. There are also consumer cooperatives (Roseland and Soots 2007: 152–169).

There is a probable "factor 20" of which Lovins speaks in his work "Rethinking production" (Lovins 2008: 39–54), where materials could be used up to 20 times, efficient for 20 times, based on the principle, "waste equals a resource". If we are to conduct a discussion on how to redistribute footprints in the face of consumer reduction, the interviewee states that in a decarbonized society, recycling will reduce our dependence on oil, although there will still be a footprint in raw materials. He considers "there's no reason to reduce energy consumption, because all consumption could be carried out through renewable energy. The energy from the sun is unlimited, but raw materials are finite. Now the bottleneck is in oil, fossil energies. Plastics are the ones that will disappear; however, they are 99% recyclable, so the bottleneck will disappear. Now there's also a bottleneck in rare materials to produce all the technologies we have."

Roger Torrell says that in the face of a better, more just distribution of the impacts made, alternatives must be favoured in order to avoid elitist situations, and not just to punish the use of petrol. "Transition is the advancement of social justice, and for this to take place means avoiding

measures that can be appropriated by lobbies and, thereby generating more injustice." The social dimension is important in this transition, a central part of energy motivation. Transition movements which are aware of this, conceive of ways of life to confront the current conventional energy system. "The principal changes must be made to generate energy in the home which involve savings for people, while also promoting public transport and reducing the use of private cars. Those changes have savings effects, benefitting society. Everyone will join in, that's why I see the same dynamics, in the creation of a bubble".

Degrowth

One of the most difficult points of the current debate on economic policy is that of degrowth, while it is both innovative and provides clarity: to grow or to degrow? Degrowth in some economic sectors will be an imperative in terms of exhausting the supply of materials. To grow in other sectors will be an opportunity, based on understanding that it is not the material object which provides satisfaction, but the service it provides. Degrowth usually generates passionate discussions related to its impact on economic development and sustainability and so was raised in the interviews.

"Degrowth is inevitable and I welcome it joyfully. I find satisfying especially the equation 'to live with less equals living better', to live, enjoy and to continue at a different pace." Ricard Álvarez here poses a fundamental aspect of growth: the accumulation of consumption and the acceleration of production to bring products to the market place. "Degrowth means not being locked into a continuous 'I want more' mentality. The rhythm of economy on a human scale is adequate." Montse responds similarly, saying: "All economic sectors have to be revised such that one lives within a human scale, with a holistic vision of life, to consider what is or is not necessary."

The group that leads the neighbourhood's transition understands more easily that the quality of an economy is about the services that are on offer, not continuous production. Introducing discussion about degrowth (Latouche 2009), shows the need to change economic paradigms and to understand that it is not the products that satisfy needs, rather the service that one receives from them—whether it be mobility around urban spaces, domestic appliances, or access to information (Capra 2002: 200–227). When a citizen expresses the view that degrowth is inevitable, he or she displays clear-sightedness in the face of an out-of-date situation, of an economy aimed at producing more and more, even when faced with

ever scarcer materials, and on the accumulation of goods and people's dissatisfaction.

To equate living with less, with living better means a profound change in perceptions of values. Happiness is not placed as part of accumulation, rather it is related to services, to others, and to oneself. "Degrowth is for me about personal growth. It means living with what's really important and necessary as a person, without been attracted by fashion trends. It is connecting with what is deeply human" (Montse). The growth which is enlarged is personal growth, as is knowledge, culture, human relations and contact with nature. There are different scopes where one can grow in satisfaction and richness, it does not involve ever more use of natural resources or materials. It does not mean destroying the environment and polluting the Earth. This makes ties between consumption and psychology, between limits and education, belonging to a community and personal learning from transition to a society using less carbon. Carbon is in all the products we consume.

Roger takes a different view when he says, "This generates a contradiction for me. I like the word degrowth. If we degrow, will there be sufficient economic activity and will it generate enough jobs?" The identification between growth and economic activity is the paradigm of an economy of goods. Degrowth in relation to reductions in consumption and the use of materials and energy is a paradigm shift towards an economy of services. Degrowth in materials and resources can assist a growth in employment. When we see growth indicators in the conventional economy, they paradoxically go together with a loss of employment. When the emphasis is on services, employment increases. To identify the creation of jobs with growth creates confusion. The multinational Wal-Mart is a good example. In the places in the USA where it is established, filling job placements has gone down and where it is not, it has either been maintained or increased (Roseland and Soots 2007: 152–169)). And yet local economies show a growth in employment (Assadourian 2012: 65–91).

Conclusion

The transition movement is somewhat small when taken worldwide, and the power of global economic lobbies may look to be unstoppable. Yet, reference to another paradigm made visible by the transition movement, and the consequences of global warming in daily life through efforts to obtain benefits from natural systems, place all the questions posed in this

case study on the agenda, both for civil society and for local neighbourhood bodies, as well as for the very future of governance.

The most difficult point, central to groups in the Sant Martí–La Verneda neighbourhood, who wish to make the transition into a post-carbon society, is to deactivate the cognitive molecules, to use a biological metaphor. These make us vulnerable in the face of big corporations, reinforcing once more how our behaviour is ultimately important, in the sense of being involved in social and economic structures. And the real vulnerability comes from the limits of the Earth itself. On the other hand, the empowerment of local community can be reciprocal here: By changing the mental chromosomes we are changing the game. This is shown clearly in those members who take the lead through different ways of living, in order to survive and attain well-being.

Note

1. For data collection, eight semi-structured interviews (70 minutes, on average) were carried out, audio recorded and transcribed. The Nonaka and Takeuchi (1995) model of knowledge creation was used to analyse data.

References

Adam, B. (1998). *Timescapes of modernity. The environment and invisible hazards.* London/New York: Routledge.

Assadourian, E. (2012). The path to degrowth in overdeveloped countries. In *State of the world 2012. Moving toward sustainable prosperity* (pp. 22–37). Washington: Island Press.

Beck, U. (2008). Desigualdad global, vulnerabilidad local. In *La sociedad del riesgo mundial* (pp. 219–254). Barcelona: Paidós.

Brown, L. R. (2001). *Eco-economy: Building an economy for the earth.* New York: Norton.

Capra, F. (2002). Changing the game. In *The hidden connections: A science for sustainable living* (pp. 200–227). London: Harper Collins.

Carné, J. & Ivancic, A. (2008). The Barcelona model: 1979–2004 and beyond. In *World cities and urban form. Fragmented, polycentric, sustainable?* (pp. 129–144). New York: Routledge.

Costanza, R. L., Graumlich, L., Steffen, W., Crumley, C., Deraing, J., Hibbard, K., et al. (2007). Sustainability or Collapse: What can we learn from integrating the history of human and the rest of nature? *Ambio 36*(7), 522–527.

Hopkins, R. (2008). *The transition handbook: From oil dependence to local resilience.* Vermont: Chelsea Green Publishing.

Harti, J. (2009). Electric vehicles and renewable energy potential. In *State of the world 2009. Into a warming world* (pp. 11–114). New York/London: W.W. Norton & Company.

IPCC. (2014). *Climate change 2014. Mitigation of climate change. Working Group III contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. New York: Cambridge University Press.

Karanja, N. & Njenga, M. (2011). Feeding the cities. In *State of the world 2011. Innovations that nourish the planet* (pp. 109–117). New York/London: W.W. Norton & Company.

Lappé, A. (2011). Coping with climate change and building resilience. The climate crisis on our plates. In *State of the world 2011. Innovations that nourish the planet* (pp. 93–96). New York/London: W.W. Norton & Company.

Latouche, S. (2009). *La apuesta por el decrecimiento: ¿cómo salir del imaginario dominante?* Barcelona: Icaria.

Lovins, L. H. (2008). Rethinking production. In The Worldwatch Institute, *State of the world 2008: Innovations for a sustainable economy*, pp. 32–44. New York: W. W. Norton.

Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company*. Oxford: Oxford University Press.

Nonaka, I., & Toyama, R. (2003). The knowledge-creating theory revisited: knowledge creation as a synthesizing process. *Knowledge Management Research and Practice, 1*(1), 2–10.

Prigogine, I., & Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*. London: Bantam Books.

Renner, M. (2012). Making the green economy work for everybody. In *State of the world 2012. Moving toward sustainable prosperity* (pp. 3–21). Washington: Island Press.

Rifkin, J. (2012). *La tercera revolución industrial*. Barcelona: Paidós.

Roseland, M., & Soots, L. (2007). Strengthening local economies. In L. Starke (Ed.), *State of the world: Our urban future*, pp. 152–171. New York: W. W. Norton.

Sachs, W. & Santarius, T. (2007). *Fair future: Resource conflicts, security and global justice*. London: Zed books.

Sempere, J. (2009). *Mejor con menos: necesidades, explosión consumista y crisis ecológica*. Crítica: Barcelona.

Stern, N. (2007). *El Informe Stern. La verdad sobre el cambio climático*. Barcelona, Paidós.

Tainter, J. A. (2011). Energy, complexity, and sustainability: A historical perspective. *Environmental innovation and societal transitions, 1*(1), 89–95.

World Commission On Environment and Development. (1987). *Our common future*. Oxford: Oxford University Press.

Zaar, M. H. (2011). Agricultura urbana: algunas reflexiones sobre su origen e importancia actual. *Biblio 3W. Revista bibliográfica de Geografía y Ciencias Sociales*, *XVI*(94). http://www.ub.es/geocrit/b3w-944.htm

Erratum to: Social Partners, Environmental Issues and New Challenges in the Post-Carbon Society

Victor Climent Sanjuán

Erratum to:
Chapter 10 in: E. Garcia et al. (eds.), *Transitioning to a Post-Carbon Society*, DOI 10.1057/978-1-349-95176-5_10

The original version of this chapter contained an error which have been corrected. The correction is given below:

The author name was published as 'Climent Sanjuán' and this has been corrected as 'Victor Climent Sanjuán'.

The updated original online version for this chapter can be found at DOI 10.1057/978-1-349-95176-5_10

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Conclusion

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In our Introduction, we referred to a document in which the German Advisory Council on Global Change (WBGU 2011: 5) compares the scope of the social changes required to face the ecological crisis, to the neolithic and industrial revolutions. It is a comparison that puts the post-carbon transition on the same level as the great crises of human civilization, which paved the way for agricultural and industrial societies. Far from being an isolated opinion, comments and evaluations in this respect abound. To cite another example, in July 2015, Chris Field, co-chair of the scientific conference "Our Common Future under Climate Change" (CFCC15: 2015a), one of the large preparatory expert meetings ahead of the United Nations Conference on Climate Change in Paris, summarized the situation thus: "we are moving to a post-carbon era". Similarly, the ambitious target set by the world's states at Paris of keeping global warming "to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels",

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will require coordinated actions on a scale well beyond anything contemplated to date. Terms like "civilization" and "era" are big words, ripe for eloquent rhetoric by world leaders, all uniting around a common cause, the battle to save the planet.

The Nature of the Transition

Yet there is an imbalance between the grand way in which imminent social changes are commonly described and the inventory of measures invoked to allow them to be managed gradually and avoid a traumatic implementation. Returning to the Common Future conference, the Outcome Statement claims that the transition "will require a range of actions, including investing in research, development, and technology transfer; phasing out subsidies on fossil energy; and pricing carbon" (CFCC15b). The problem is that social change accompanied by a certain amount of R&D (or, for that matter, a lot of R&D) and some economic policy measures (audacious though they may be) does not seem to be of the same magnitude as that suggested by rhetoric such as the dawn of a new era or civilization. Small measures for such big words.

This book has sought to help address this imbalance, exploring some of the paths it will be necessary to travel to fully understand the multifarious aspects and dimensions of the transition. Climate change is one manifestation of an ecological crisis, an example of reciprocal cause and effect, with multiple layers of feedback, of a crisis of civilization. In this respect, the "post-carbon transition" is a name for the vast and multidimensional process of social change that must necessarily lead to new social relations and new economic, political and cultural institutions as part of a process that will most certainly include technological change and economic policy measures. However, it will also involve much more.

One of the central arguments of this book, which we would like to emphasize here, is that the social changes that are accompanying, and will accompany, climate change and peak oil over time cannot be reduced to the replacement of one group of technologies by another or the implementation of specific changes to economic policy. This is not to say that technological change will play a minor or insignificant role. In fact, quite the contrary. Industrial civilization began in a world of renewable energies, with the water wheel. The steam engine made possible the large-scale use of coal, laying the foundations for an enormous expansion and the advent of fossilist civilization (Altvater 1994). As Wiseman and Alexander argue in Chapter 4, there are many signs this civilization reached its climax

towards the end of the twentieth century. There are also many reasons to believe we will need to dramatically reduce our use of fossil fuels over the coming decades, both as a result of their increasing scarcity and to mitigate the effects of global warming. Such an outlook underscores the urgency of developing renewable energy technology, since it is extremely likely that humankind will once again need to live off the sun, as we did for millennia. There can be no question this will imply more modest lifestyles and demographic dynamics, together with less expansive economies than in recent decades. In this respect, technological change is not the key to ensuring nothing else changes, but rather the essential instrument to preserving civilized life in a world in which nothing will be the same. As Alain Gras reminds us in Chapter 1, no large-scale technological transition can be separated from anthropological mutations.

At this point, we should perhaps defend our choice of the terms "post-carbon society" and "post-carbon transition". Is this not a concession to the very technological reductionism we are criticizing? Is this language not too sober and prosaic? If we are convinced the end of fossilism implies the transition to a new era, a new civilization, why not systematically use this other language? Why not immediately employ terms like "sustainability", "resilience", "degrowth" and "anthropocene" to define and characterize our object of study? There are two main reasons. Firstly, the reduction in the use of fossil fuels is the surest and most predictable part of the transition, the part that is, so to speak, imposed by nature and thus least dependent on political options, economic calculations and mutations to our systems of values. It may not explain all that will happen, but it will form an inevitable part of any path travelled by our societies in the twenty-first century. Secondly, this approach does not only allow abstract and vocationally universal normative developments but also makes possible descriptions based on extremely direct empirical examples. The term post-carbon society can be defined as one in which the use of fossil fuels decreases over time. Examining the data, it is relatively easy to detect the phenomena to which we should pay attention and which can reveal significant aspects of the transition, as shown by some of the case studies in Part III.

Politics and the Transition

As Sempere (Chap. 2) and Garcia and Martinez-Iglesias (Chap. 3) make clear, the transition faces many obstacles, not least beliefs and experiences of a link between the reduction in consumption, on the one hand, and

poverty and a worse quality of life, on the other. In this respect, all political attempts to address climate change and plan the transition in an ordered way are conditioned (and severely limited) by the need to reach agreements that are acceptable to the majority of the public and the dominant interest groups, particularly the economic ones. The literature discussing these issues (e.g. Giddens 2009) illustrates the extent to which this imposes limitations on political leaders in negotiations though the Paris climate summit (the 21st Conference of the Parties) in December 2015 also showed how some world leaders are beginning to face the scale of the challenge facing humanity. For us, events such as the Paris climate summit have served to create a momentum generating around all sorts of ideas and activities on many levels. This occurred previously with the Rio Summit in 1992, which resulted in a profusion of Agenda 21 initiatives at all levels and across all sectors. Furthermore, as was the case then, in 2015, there are a number of factors at play, including the end of the Obama presidency,[1] which favour solemn and impressive declarations. However, the experience with Agenda 21, how actions have lagged far behind words during the last two decades, is telling when it comes to the limits and conditions of political plans. As Pope Francis makes clear in his encyclical letter Laudato Si':

> It is remarkable how weak international political responses have been. The failure of global summits on the environment makes it plain that our politics are subject to technology and finance. There are too many special interests, and economic interests easily end up trumping the common good and manipulating information so that their own plans will not be affected. (para. 54)

There is, however, another political limitation, one that is more radical and runs deeper. It was first suggested with respect to the ecological crisis quite some time ago by Kenneth Boulding, one of the leading figures in this field, remembered, above all, for introducing the metaphor of spaceship Earth to explain how the natural limits of the planet condition the economy, making indefinite growth impossible (Boulding 1966). However, less well known is his remark some years later when he revisited the issue: the biggest defect in the spaceship analogy is that it suggests (like a spaceship) the biosphere can be governed by a commander, whereas in reality the system is about as far removed as possible from a

[1] See https://www.whitehouse.gov/climate-change (accessed 30 September 2015).

planned economy and is inherently reluctant to be subjected to a plan and a centre of command (Boulding 1993). This limitation not only runs deeper because it concerns decision-making processes but also because it concerns the scientific examples that are used. Programmes and models for the "transition to sustainability" are also a frequent temptation for theoretically ambitious academics with suitable training (Motesharrei et al. 2014; Holtz et al. 2015). While there can be no doubt such models are useful and some, moreover, are theoretically admirable, the inherent uncertainty of history means social change will not follow the paths traced out by a programme. This is true of social change in general, but is even more so when it comes to the extraordinary type of social changes that are bound up with a crisis of civilization.

In the words of the great ecological economist Georgescu-Roegen:

> …anyone who believes that he can draw a blueprint for the ecological salvation of the human species does not understand the nature of evolution, or even of history—which is that of a permanent struggle in continuously novel forms, not that of a predictable, controllable physico-chemical process, such as boiling an egg or launching a rocket to the moon. (1975: 369)

Similarly, Sigmund Freud noted that "the philosophy of today has retained some essential features of the animistic mode of thought (…) the belief that the real events in the world take the course which our thinking seeks to impose on them" (2010: 4764). Why then, in spite of these and many other similar reminders, do we repeatedly fall back on making plans, drawing up programmes and setting objectives? The answer is simple: as human beings, this is just how we are, we cannot work any other way. Social action is intentional, guided by a perception of things and a purpose (Weber 1978: 4) and, as William Thomas, a key member of the first Chicago school of sociology, notes, behaviour is preceded by a definition of the situation (Thomas 2002 [1923]). The political plans, theoretical models and programmes of action for the post-carbon transition fulfil this function and are both inevitable and essential. What matters, however, is that we are aware of their limits. Falling prey to the illusion that a civilizational transition will follow the paths defined by a political programme or replicate the features anticipated by a theoretical model would be an excessive display of anthropocentric pride, doomed to frustration. This is a common theme of Parts I and II of this book, which focus on the need for behavioural change and personal transformation in the context of "powerdown" and degrowth.

From Technology to Ethics

One of the common themes running through this book is a focus on values, lifestyles and social practices, highlighting vital aspects that go beyond the usual emphasis on technology and science. The post-carbon transition is not a process in which petrol cars will be replaced by electric ones, but one in which few things will remain the same. In this respect, this book shares the aim of overcoming techno-economic reductionism with other works, such as Dunlap and Brulle (2015), Homer-Dixon (2010), Westley et al. (2011), Urry (2013), Osti and Pellizzoni (2014), Murphy (2015), and Heinberg (2015). Our contribution is, in more ways than one, a dialogue with these other works, coinciding on many points and differing on others. It is undoubtedly an open process.

In the absence of a programme of perfect effectiveness and predictive capacity, it will be necessary to accept that the transition will also include criteria and rules for living well. It will be necessary to develop codes for the sort of "virtuous behaviour" advocated by Riechmann in Chapter 6, while dealing with the related tensions, commitments and conflicts. It is impossible to do without these psychological and moral aspects for the simple reason that it is unrealistic to expect a set of political decisions and technical opinions to fit reality so closely as to be self-sufficient. In his book *Small is Beautiful*, Schumacher invokes Gandhi to criticize those who attempt to evade uncomfortable ethical questions "by dreaming of systems so perfect that no one will need to be good" (2010: 24),[2] highlighting a series of critical observations formulated by the father of Indian independence with respect to socialism and other projects for social organization.

In practical terms, the post-carbon transition is already giving rise to its own moral discourses, and the voices joining this chorus are increasingly solemn, including an encyclical letter issued by Pope Francis (2015) calling for an "ecological conversion" (para. 217):

> There is a tendency to believe that every increase in power means 'an increase of "progress" itself', an advance in 'security, usefulness, welfare and vigour; … an assimilation of new values into the stream of culture', as if reality, goodness and truth automatically flow from technological and economic power as such. The fact is that 'contemporary man [sic] has not been trained

[2] In fact, the words appear to be taken from T. S. Eliot's poem "Choruses from 'The Rock'" (1934).

> to use power well' [quote from the German theologian Romano Guardini], because our immense technological development has not been accompanied by a development in human responsibility, values and conscience. Each age tends to have only a meagre awareness of its own limitations. It is possible that we do not grasp the gravity of the challenges now before us. (para. 105)

In this respect, in addition to political and scientific meetings, the preparations for the Paris summit also included a "Summit of Conscience", bringing together spiritual leaders from a wide range of credos and backgrounds.[3]

Social Experimentalism

Finally, this book also refers to a factor we believe to be extremely important: if we are to accept that we have reached the climax of a civilization whose descendent phase will see everything placed in question, it is also reasonable to posit that the signs must be visible at present. The idea that it is a process that will start from some zero in the relatively near future is simply implausible. If a crisis of this magnitude is approaching, at least some of the signs must already be visible. In this respect, the Paris summit showed that the world is aware, albeit dimly, that we have already reached this point.

The contributions to this book have explored the implications of this factor in at least two directions: firstly, the analysis of practical experiences and specific cases; secondly, the connections between the post-carbon transition and the economic convulsions that have taken place since 2007.

The world abounds with local, community and sector experiences that are at least partly motivated by a desire to reduce unsustainability and adapt to the conditions of post-fossilism. Such experiences are everywhere to be found: some embody an alternative intention and perceive themselves as harbingers of a different society, while others seek to adjust or adapt existing institutions to ensure their viability. Some have enjoyed a degree of success, while others have succumbed to objective difficulties or the weight of their own contradictions. However, all these experiences can be examined in terms of how and to what point the paths they trace respond to the conditioning factors of the transition. In a certain sense, they are all caught between two worlds: as Laurence Raineau shows in

[3] See http://www.whydoicare.org/en/summit-of-the-consciences-for-the-climate

Chapter 9, the development of wind energy cannot be explained solely in terms of the expectations of financial profits by large electricity companies in the diversified operation of energy sources. Without the pressures and demands of the ecologist social movement, at best this development would have occurred at a later date. It is also clear to us that there would be much fewer wind turbines in the world if their development was solely dependent on the criteria of decentralization and local self-sufficiency that were, and remain, the ideal for this energy technology. The conflicts derived from this double socio-economic bind are well known. Similar remarks could be made about ecovillages such as Cloughjordan in Ireland, as described by Kirby in Chapter 8, the ecological neighbourhoods discussed by Vicens in Chapter 12, the study of waste management and landfill in Valencia by Lerma Montero in Chapter 11, and different social organizations' perceptions of the energy transition as discussed by Victor Climent Sanjuán in Chapter 10, as well as an infinite number of other aspects from our societies. The case studies carried out under this perspective loosely conform to the heuristic criteria of Howard and Elisabeth Odum (2001): if we accept that industrial society is currently in its climax and approaching a descendent phase, the policies of the growth phase, which have served well for the period of expansion (large scale, high speed and high levels of competition) will prove increasingly less viable and fraught with conflict. In contrast, the application of principles better suited to a situation of limited resources (smaller scale, efficiency and co-operation) should prove increasingly effective. Specific cases can be examined to detect the signs of this dynamic, emphasizing, for example, experiences of co-operative economics. Historically these have subsisted on the margins of capitalist economic organization, which is oriented toward unchecked accumulation; however, as we enter a historical phase in which resilience, as it is now called, becomes more decisive than accumulation, they will necessarily move toward more central and stable positions. The case is similar for forms of urbanization inspired by proximity, bioclimatic adaptation and collective consumption, or, more generally, of any aspect of life in society.

Reconstructing Austerity

It is also possible to detect signs of the post-carbon transition in the present at the macro level. In this respect, the recession that began in 2007, insofar as it appeared in the form of a new episode of cyclical capitalist crisis, is also conditioned (or, to recover a concept from structuralism,

"overdetermined") by the excessive pressure exerted on planet's ecosystems. Like the previous crises, it includes financial convulsions, unemployment and social protest; in short, the paralysis of productive activity. However, in contrast to previous crises, the policies that seek to rekindle growth only serve to illuminate brief and convulsive episodes of fragile recovery that exacerbate inequality and increase precariousness and imbalances. All this points to the fact that economic growth has reached the limit of its capacity to improve well-being and has become anti-economic (Daly 2014). To paraphrase Illich (2004): the lesson in recent years is that efforts to force development beyond its limits exacerbate its undesired effects in the form of diseconomies and counter productivity.

When the analysis of the present is connected to the conditioning factors imposed by the fact we are in the climax of fossilist civilization, it soon becomes clear that emerging from the relative paralysis of recent years to rekindle growth will soon lead to a worse situation.

Many people are aware that for quite some time now the machinery of growth has not been leading anywhere. However, throughout the world there is a widespread fear that stopping the machine will unleash chaos. Perhaps the lesson of the crisis has been to reveal the path that breaks from this dilemma: the machine is stopping itself, with an extremely high social cost. We fear things will change, but the change has already begun, and the process is painful. Why not face up to reality and consciously embark upon the way down?

This would imply the acceptance of a certain level of austerity and hence the need to develop a positive reconstruction of the term, as advocated by various contributors to this collection, particularly Bramall in Chapter 5 and Alexander in Chapter 7. Yet what are the reasons for the rejection of such a project? The erroneous ideological consensus promoted in recent years, in which austerity has become synonymous with cuts to social rights and increasing inequality, has muddied the waters by reaffirming the illusion that growth is the solution to all our problems.

The message that has repeatedly accompanied the cuts has been that we have lived beyond our means. However, therein lies a paradox: the message from a scientific analysis of the state of the environment over the course of four decades has been precisely this, that we are living beyond the planet's capacity to provide resources and absorb waste. Our ecological footprint is excessive, the Earth is already full, the anthropic pressure on ecosystems is too large… In short, we are living beyond what is sustainable. All of a sudden, the financial crisis has allowed a message that is

nominally the same to justify dismantling our welfare institutions, a controlled increase in inequality and the dissemination of multiple forms of precariousness, poverty and exclusion.

Many cultures have their own messages of moderation and self-containment. (In contrast to the beliefs of a large part of ecologist thought, it is not necessary to turn to indigenous cultures to find such messages. It is possible to trace a path through European culture: Heraclitus of Ephesus recalling that not even the sun would dare overstep its limits. The Aristotelian concept of *mesotes*. Epicurus's natural and necessary desires as the scope for the good life. Francis of Assisi, most certainly. Paul Lafargue defending the right to be lazy. And many more. A path that weaves its way through unsuspected landmarks to lead to the contemporary greens. Berlinguer, for example, the last major leader of Italian communism stated in 1977 that a genuine social transformation must be based on austerity.) While many societies have developed moral doctrines that condemn excess and praise sobriety, many have also exhibited a notable capacity to ignore them when the occasion to do so arises in practice. Like any society, the post-carbon society also needs rules and criteria for living well, a cultural framework that underpins behaviour and maintains essential levels of minimum social cohesion. However, neither the transition to this society nor maintaining its order will be the direct result of the formulation and dissemination of such criteria and rules. Like politics and technology, ethics is necessary but not sufficient.

Given that the post-carbon transition is inevitable and given its incompatibility with the continuity of growth, a certain amount of austerity will also be inevitable. Hence the desirability of reconstructing the concept of austerity instead of continuing to demonize it. (Or, if we prefer, we could use terms such as sobriety, moderation and self-containment; what matters most is the actions that accompany it). Perhaps the way down will not be so terrible if, in addition to being more materially modest, slower and more local, it proves to be more egalitarian, co-operative and democratic. It certainly does not seem easy or likely that this will be the case, but who knows?

References

Altvater, E. (1994). *El precio del bienestar: Expolio del medio ambiente y nuevo (des)orden mundial*. Valencia: Alfons el Magnànim.

Boulding, K. (1966). The economics of the coming spaceship Earth. In H. Jarrett (Ed.), *Environmental quality in a growing economy* (pp. 3–15). Baltimore: Johns Hopkins University Press.

Boulding, K. (1993). Spaceship earth revisited. In H. E. Daly & K. N. Townsend (Eds.), *Valuing the earth: Economics, ecology, ethics* (pp. 311–313). Cambridge, MA: MIT Press.

CFCC15. (2015a). Scientists plot path to climate stabilization at pre-COP Paris science conference. Closing Press Release 10 July 2015. http://poolo.kermeet.com/Data/kmewexV7/block/F_c2e9cb922b825520f98c84fe053052ed559fb09d15715.pdf

CFCC15. (2015b). Our common future under Climate Change—Outcome Statement.http://www.commonfuture-paris2015.org/The-Conference/Outcome-Statement.htm

Daly, H. E. (2014). *From uneconomic growth to a steady-state economy*. Cheltenham: Edward Elgar.

Dunlap, R. E., & Brulle, R. J. (Eds.). (2015). *Climate change and society: Sociological perspectives*. New York: Oxford University Press.

Francis. (2015). Encyclical Letter Laudato Si' of Pope Francis on care for our common home. http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

E. Garcia et al. (eds.), *Transitioning to a Post-Carbon Society*,
DOI 10.1057/978-1-349-95176-5

Freud, S. (2010). New introductory lectures on psycho-analysis. In *Complete works.* (Edition of I. Smith). http://www.valas.fr/IMG/pdf/Freud_Complete_Works.pdf

Georgescu-Roegen, N. (1975). Energy and economic myths. *Southern Economic Journal, 41*(3), 347–381.

Giddens, A. (2009). *The politics of climate change*. Cambridge: Polity Press.

Heinberg, R. (2015). *Afterburn: Society beyond fossil fuels.* Gabriola Island: New Society.

Holtz, G., et al. (2015). Prospects of modelling societal transitions: Position paper of an emerging community. *Environmental Innovation and Societal Transitions.* http://dx.doi.org/10.1016/j.eist.2015.05.006

Homer-Dixon, T. (Ed.). (2010). *Carbon shift: How peak oil and the climate crisis will change Canada (and our lives)*. Toronto: Vintage Canada.

Illich, I. (2004). *Oeuvres complètes* (Vol. 1). Paris: Fayard.

Motesharrei, S., Rivas, J., & Kalnay, E. (2014). Human and nature dynamics (HANDY): Modeling inequality and use of resources in the collapse or sustainability of societies. *Ecological Economics, 101*, 90–102.

Murphy, R. (2015). The emerging hypercarbon reality, technological and post-carbon utopies, and social innovation to low-carbon societies. *Current Sociology, 63*(3), 317–338.

Odum, H., & Odum, E. (2001). *A prosperous way down: Principles and policies.* Boulder: University Press of Colorado.

Osti, G., & Pellizzoni, L. (Ed.) (2014). La transizione energetica: prospettive sociologiche. *Quaderni di Sociologia*, *LVIII*(66), 101–105.

Schumacher, E. F. (2010). *Small is beautiful: Economics as if people mattered* (p. 24). New York: Harper Perennial.

Thomas, W. I. (2002). The definition of the situation. In N. Rousseau (Ed.), *Self, symbols, and society: Classic readings in social psychology* (pp. 103–115). Oxford: Rowman & Littlefield. (Original source: Thomas, W. I. (1923). *The unadjusted girl.* Boston: Little, Brown, and Co.).

Urry, J. (2013). *Societies beyond oil: Oil dregs and social futures.* London: Zed Books.

WBGU. (2011). *World in transition: A social contract for sustainability.* Berlin: WBGU Secretariat.

Weber, M. (1978). *Economy and society* (Vol. 1). Berkeley: University of California Press.

Westley, F., et al. (2011). Tipping toward sustainability: Emerging pathways of transformation. *Ambio, 40*, 762–780.

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