

Chapter 1: Transition to a low carbon economy: on the cusp of emerging challenges and opportunities

Abstract

This chapter sets the context in which the present study of opportunities and challenges presented by the transition to a low carbon economy is undertaken. It outlines the significance of a low carbon economy and the benefits associated with the green growth. The theme of sustainability transitions is explored at the beginning of the chapter. The chapter provides a brief overview of the book chapters outlining their contribution to academic and professional debates. The chapter concludes with emphasising the importance of leadership for sustainability at various levels. It calls to widen the remit of sustainability initiatives associated with the transition to a low carbon economy from narrow view of cost cutting measures to broader initiatives that strengthen competitive success and organisational strategies towards sustainability.

Key Words: low carbon economy, sustainable transition, transition towards a low carbon economy, green growth, competitiveness, strategy

Introduction

The attention paid to the low carbon economy is increasing. A recent Carbon Trust report forecasts that global low carbon exports will be worth more than £1 trillion, cumulatively up to 2020 (Carbon Trust 2014b). It is possible that the UK could triple its low carbon exports from £12 billion in 2012-13 to around £30 billion in 2020, and double its share of the global low carbon export market from around 5% to 10% (which would equate to the UK's share of the global pharmaceuticals industry) (Carbon Trust 2014b). As the low carbon sector grows, businesses are seizing opportunities to contribute to the sector, as well as to strengthen their competitiveness either by cost reduction due to resource efficiencies or by discovering new markets that are demanding low carbon goods and services.

This book explores the challenges and opportunities presented by the transition to a low carbon economy from a number of perspectives. It provides an overview of the policy and legislative landscape that is aimed at supporting this sustainable transition, as well as outlining the gaps in support at regional and national level. The role of a number of regional stakeholders, including local councils, Local Enterprise Partnerships (LEPs), universities and

SMEs, is discussed and the challenges they face in engaging and supporting the low carbon agenda in the regions are highlighted. From an organisational perspective, the methodologies and practices of environmental measurement and management are explored. Further, a systems leadership perspective is deployed to argue the need for leadership that embraces opportunities for open innovation (Chesbrough 2004, 2006), network approaches (Miles and Snow 1995, Nohria 1998, Poole 1999, Parkhe et al. 2006) and systems thinking (Westley 1995). This book presents a series of conceptual developments and empirical studies which are aimed at assisting scholars, practitioners and students in their studies of challenges and opportunities presented by the transition to a low carbon economy. This transition can be regarded as one of the most significant pro-sustainability transformations of the 21st century (The 2030 Agenda on Sustainable Development, United Nations 2015).

The significance of the low carbon economy

A low carbon economy is defined as ‘a way of thinking, behaving and operating that minimises carbon emissions while enabling sustainable use of resources, economic growth and quality of life improvements’ (Ian Marchant, Chair of the 20:20 Climate Group, Low Carbon Economic Strategy for Scotland, Scottish Government 2010). It has a focus on both economic and environmental issues, and represents a major economic and social transformation. There are two key imperatives to this transformation: achieving high levels of resource efficiency, and the growth of the low carbon goods and services sector to generate economic wealth. The Director-General of the Confederation of British Industry (CBI) in his recent speech at the University College London conference (June 2015) noted that lower emissions do not mean lower GDP. In 2013, for instance, green gas emissions fell by 2.8% whilst the UK economy grew by 1.7% (CBI 2015). The CBI view ‘green’ as not just complementary to growth; it is seen as a vital driver for growth. Such growth is seen in the

success of UK environmental exports where the low carbon economy's trade surplus is estimated at £5 billion during 2011-12 (Carbon Trust 2014a).

The transition towards a low carbon economy is identified as a key UK Government priority (Climate Change Act 2008). The UK Government set targets for reducing carbon emissions by 20% by 2015, and by 80% lower than the 1990 baseline by 2050 (Climate Change Act 2008). The Department for Business Innovation and Skills (DBIS 2015) highlights the significance of the low carbon sector to the national economy:

- Businesses directly operating in the low carbon economy generated £70.8 billion sales in 2013. This grows to £121.7 billion when the wider supply chain is included. This means low carbon business turnover is more than double that of the UK's auto manufacturing industry.
- The direct low carbon economy generated £26.2 billion in Gross Value Added (GVA) in 2013. This contribution is approximately five times larger than that of the aerospace sector; two and half times the size of the pharmaceuticals sector and almost twice as large as the chemicals industry's GVA contribution.

Transitioning to a low carbon economy

In our study of the various challenges associated with the transition to a low carbon economy, a number of themes have emerged, many of which are well debated in academic and professional settings. Some of the themes have emerged as a result of the empirical studies carried out to support various individual and collaborative research projects which our authors describe in their respective chapters. It is important to remind our readers that these themes are considered to be at the cutting-edge of debate about our readiness to transition towards the low carbon economy at the national, regional and organisational levels. Over the

next few paragraphs we outline these themes and provide a brief outline of the approaches undertaken to study them.

A notion of 'transition' and particularly 'sustainability transition' is closely linked to the current debates about the need to move to a low carbon economy (Andrade et al 2015, Loiseau et al. 2016, Loorbach et al. 2010, Whiteman et al 2011). The broad literature on transitions is often associated with a co-evolutionary perspective, drawn from evolutionary and complexity theory (Lewin and Volberda 1999). The recent conceptual developments in this field call for a better understanding of co-evolution between firms and societal and ecological systems, and between peoples' value systems and technical solutions (Korhonen and Seager 2008, Porter 2006). Rotmans (2005) argues that a transition emerges out of co-evolutionary processes in which institutional, technological, behavioural, ecological, economic and other processes intertwine and reinforce each other. Transitions consist of a number of system innovations: 'organisation-transcending innovations that drastically alter the relationships between companies, organisations and individuals involved in the system', such as an economic sector, societal domain or region (Rotmans 2005, p.11).

Chapter 2 of this book offers a conceptual framework of sustainable transitions at national and regional levels. The chapter starts with an overview of the fast emerging definitions in the field and provide a significant steer in setting up the boundaries around the terminology of 'sustainability' and 'green' (i.e. green growth, green economy and low carbon economy). Covarrubias and Garza-Reyes propose a 'Brown-Green spectrum' of sustainability transition, which identifies three main stages of a sustainable transition: brown economy, low-carbon economy and green economy. The authors link these stages with a potential set of indicators for each of the stages (brown, low-carbon and green) to measure and to inform the progress of sustainable transitions.

Chapter 3 considers the history and significance of the policy landscape, policy-making and politics to the transition to a low carbon economy at a regional level. Pearce and Paterson discuss the role of local councils in the stewardship of various climate policy initiatives. They consider the operationalisation of Local Area Agreements and reporting on the national carbon reduction indicators as well as the increasing trend for partnership working with local organisations to support sustainability projects. Within this context, Local Enterprise Partnerships (LEPs) are seen as key stakeholders in supporting the low carbon economic policy in the East Midlands region of the UK. The authors support observations that although LEPs provide the key structural support for low carbon business development, such support varies considerably across the regions (Britton and Woodman 2014). Although attention is drawn to the D2N2 (Derby City, Derbyshire, Nottingham City, Nottinghamshire) LEP region, Pearce and Paterson consider broad challenges around regional support, the local authority-public and the local authority-business interfaces in supporting transition to a low carbon economy.

Following from the theme of sustainable transitions at supra-national and regional levels we consider a number of aspects associated with environmental strategies, practices and performance at the level of organisations. In Chapter 4, Michaels and Powell explore the role of behavioural economics in environmental policy development and assess the extent to which it can be applied in organisations to encourage pro-environmental behaviour. The various types of behavioural ‘nudges’ that are most effective in the transition to a low carbon economy are highlighted, particularly in the context of small and medium-sized enterprises (SMEs). This chapter also describes an application of behavioural economics in the context of the transition to a low carbon economy and highlights a significant opportunity to use its principles and methodology to influence sustainable transitions at an individual and group levels.

The focus on SMEs continues with Chapter 5, by offering insights into SMEs' organisational practices and environmental strategies in the context of the transition to a low carbon economy. As the competitiveness of the economy is seen as a critical factor in ensuring the success of the low carbon transition (DECC 2013; DEFRA 2013, 2014a, 2014b; European Commission 2010, 2014; Scottish Government 2010), so too is the role of SMEs, which account for more than 90% of the low carbon sector in the UK (Carbon Trust 2013). The focus is drawn towards the importance of SMEs' role in the development of markets for low carbon products and services as well as their contributions towards a de-carbonised economy (DECC 2008, 2011, 2013). The chapter starts with a literature review of eco-innovation, environmental practices and eco-advantage in the context of SMEs. A range of case studies presented in the chapter illustrates strategies adopted by SMEs towards achieving advantage in their respective industries through green and/or low carbon innovation and organisational practices towards sustainability. The opportunities presented by both being green and competitive (Dangelico and Pontrandolfo 2015) are discussed in the context of regional SMEs, as well as barriers to SME's sustainability efforts. Baranova and Conway develop a range of recommendations which are aimed at supporting SMEs' competitiveness and enhancing their role as a significant economic and social force in the transition towards a low carbon economy. This chapter contributes to studies of SMEs and sustainability by providing empirical evidence for the significance of the following elements of SMEs' environmental strategies: stakeholder management, leadership for sustainability, culture of sustainability and working with community. The case study research confirms the importance of these 'soft' elements within SMEs' environmental strategies alongside the 'hard' elements often associated with more formalised systems and processes, including carbon and environmental measurement and management approaches.

Chapter 6 takes a closer look at how organisations can measure and manage their carbon emissions. A review of environmental measurement methodologies is undertaken including life cycle assessment, economic input-output analysis and a range of ‘footprint’ assessments, such as the carbon footprint, ecological footprint, water footprint and energy footprint. Conway supports the application of an organisational management perspective in measuring and managing firm’s carbon footprint. Using process-based methodology to initially assess the ‘carbon contribution’ of each of the process stages to the overall carbon footprint of a firm is advocated. This is to ensure the accuracy of the measurement as well as to highlight the nuanced linkages between the firm’s processes and systems and their contribution to the firm’s value generation. This chapter maintains that environmental management, as a prerequisite of a firm’s commitment to reduce its impact on the natural environment, needs to include both operational and strategic perspectives. It needs to be supported by effective measurement methodologies, collection, storage and availability of data for decision-making to ensure a long-term and successful balance between being green and competitive.

The role of the third sector organisations (TSOs) and universities in the transition to a low carbon economy is explored in Chapter 7 of the book. Lynch and Rambukwella outline a growing number of TSOs at national and regional levels and their increasing involvement in various initiatives associated with both a broad sustainability and a more specific low carbon orientation. The chapter considers various players in this arena from local community groups, regional LEAs and national level organisations, including the Green Alliance and the Carbon Trust. The role of the latter is discussed in relation to cross-sector validation of carbon reduction efforts at a level of organisations through, for example, the Carbon Trust Standard accreditation scheme (Carbon Trust 2014b). This chapter also draws attention to the higher education sector where universities are increasingly seen as major stakeholders in supporting the transition to a low carbon economy (HEFCE 2014). The role of the university sector is

discussed three-fold: as higher education providers that support and enable sustainable transitions; as institutions that advance applied research into climate change and low carbon transformations; and as organisations with a strategic purpose to foster deeper involvement from its various stakeholders in supporting a change to a more sustainable future. These stakeholders include students, the local community and other regional, national and international bodies, in order to facilitate a more cooperative transition to a low carbon economy.

Following on from a number of calls for leadership for sustainability in Chapters 3, 5 and 7 of this book, Chapter 8 explores this complex field. Paterson reviews the appropriateness of a systems approach to leadership (Welbourn, Ghate and Lewis 2013) as a necessary ingredient in supporting the transition to a low carbon economy. A number of scholars in the leadership and sustainability fields debate the kind of leadership required to support individuals and groups at various levels to engage in pro-environmental practices (Broman et al. 2013; 2017, Christensen et al. 2014, DeMarco 2016, Etzion et al. 2016, Metcalf and Benn 2013, Schein 2015). This chapter offers a conceptual view of how ‘systems leadership’ could assist in accelerating the shift towards a more sustainable economy. Further, it argues a need for new and ‘distributed’ leadership skills and qualities required in the context of system-wide innovation (Clarke, Wilcox and Nohrova 2013). In order to develop these, it is argued that collaborative ‘civic’ leadership exercises are needed to engage various stakeholders at regional and national levels as pre-requisites to the development of leadership capacity to support sustainable transitions.

As a result of a number of empirical studies undertaken, we observe that managers at all levels need to secure executive buy-in to support ‘green’ initiatives to ensure the success of environmental strategies. Leadership is becoming a critical competence to enthuse and inspire not only the company’s employees but also a wider range of stakeholders to think and behave

in a sustainable manner. The enduring commitment of Unilever's CEO, Paul Polman (Sustainable Business Leader of the Year, Guardian 2014; Guardian 2015; Ignatius and Polman 2012) towards sustainability and change is a powerful example to follow. Management at all levels should be attuned to these commitments to ensure the success of sustainable business strategies.

There is a growing body of literature exploring the nature and role of sustainability leadership (Boiral et al. 2009, Egri and Herman 2000, Metclaf and Benn 2013, Wolfgramm et al. 2015). Our study confirms the criticality of senior management commitment and a hands-on approach to working with employees across the organisation and beyond to provide support and stewardship for the success of sustainability initiatives. The realisation that such efforts yield little impact if players act in isolation provides support for our argument about the necessity to work with a wide range of stakeholders, including collaborative strategies for capability building, to ensure a successful transition to a low carbon economy. Recent studies of the new forms of governance required to support sustainable transitions (Rotmans et al. 2001, Loorbach 2007) point to the importance of bringing together stakeholders to understand root causes of persistent complex problems.

In the context of the transition to a low carbon economy, managers are often faced with challenges in initiating sustainability initiatives and ensuring that they contribute to their company's performance and competitive advantage. Our data revealed that to many managers, investments in sustainability had to be supported by a strong business case. In the majority of cases studied, low carbon initiatives were assessed against the payback requirements for capital investments of 2-3 years. Companies were not prepared to sacrifice their competitiveness in favour of a low carbon orientation. Managers in the case organisations confirmed that low carbon strategies have to aid competitiveness and not drain organisational capabilities.

Conclusion

These findings articulate a powerful message to policy-makers and regulators, that to ensure 'green' growth and a strong low carbon economy, managers need see a business case for low carbon strategies. If low carbon management is viewed as another compliance factor to adhere to, then companies will simply ensure compliance - but no more than that. Their efforts will be limited to meeting the regulatory requirements for carbon emissions and ensuring effective carbon management practices. Although these are necessary steps to ensure steady progress towards low carbon targets (DEFRA 2013), the scope and impact of low carbon activities could be much more significant if a positive orientation towards a low carbon future becomes an integral part of any business strategy and is seen as critical to achieving sustainable competitive advantage. In other words, if low carbon orientation makes a business case either to achieve cost efficiencies, competing in new niches (for example sustainable construction or eco-tourism) or the development of innovative green products and services, developments of the firm's business models to allow for sustainability and 'green' growth – then companies would invest more readily in low carbon and a sustainability orientation. The positive message around 'low carbon' agenda and a view of benefits to an organisation beyond the cost cutting exercise could broaden the scope of sustainability initiatives an organisation engages with. In our view such an approach has a potential for contributing significantly towards further acceleration of the low carbon economy in the UK and internationally and with that catalysing the significant economic, social and ecological benefits associated with the green and carbon-natural growth.

References

- Andrade, José Célio Silveira, and José Antônio Puppim de Oliveira. 2015. "The role of the private sector in global climate and energy governance." *Journal of Business Ethics* 130, no. 2: 375-387.
- Boiral, Olivier, Mario Cayer, and Charles M. Baron. 2009. "The action logics of environmental leadership: A developmental perspective." *Journal of Business Ethics* 85, no. 4: 479-499.
- Broman, Göran, Karl-Henrik Robèrt, George Basile, Tobias Larsson, Rupert Baumgartner, Terry Collins, and Donald Huisingh. 2013. "Systematic leadership towards sustainability." *Journal of Cleaner Production* 64: 2013..
- Broman, Göran, Karl-Henrik Robèrt, Terrence J. Collins, George Basile, Rupert J. Baumgartner, Tobias Larsson, and Donald Huisingh. 2017. "Science in support of systematic leadership towards sustainability." *Journal of Cleaner Production* 140: 1-9.
- Britton, Jessica, and Bridget Woodman. 2014. "Local Enterprise Partnerships and the low-carbon economy: Front runners, uncertainty and divergence." *Local Economy* 29, no. 6-7: 617-634.
- Carbon Trust. 2013. *Low Carbon Entrepreneurs: The new engines of growth*, The Carbon Trust and Shell, 2013.
- Confederation of Business Industries (CBI) (2012) The colour of growth: Maximising the potential of green business. Accessed December 09, 2016 .http://www.cbi.org.uk/media/1552876/energy_climatechangerpt_web.pdf.
- Carbon Trust. 2014a. A 'must' win: capitalising on new low carbon markets to boost UK export growth, Carbon Trust. Accessed on August 10, 2016 .<http://www.carbontrust.com/media/504208/ctc829-a-must-win-capitalising-on-new-global-low-carbon-markets.pdf>.
- Carbon Trust. 2014b. Carbon Trust Standard, Carbon Trust. Accessed February 20, 2016 <http://www.carbontrust.com/client-services/footprinting/footprint-certification/carbon-trust-standard>.
- Clarke, E., Z. Wilcox, and N. Nohrová. 2013. "Delivering change: How cities go low carbon while supporting economic growth." *Centre for Cities*.
- Confederation of British Industry (CBI). 2015. John Cridland speech on Greening the Economy to the UCL Green Economy conference on 2nd of June 2015. Accessed May 16, 2016 <http://news.cbi.org.uk/news/john-cridland-speech-on-greening-the-economy/>.
- Christensen, Lisa Jones, Alison Mackey, and David Whetten. 2014. "Taking responsibility for corporate social responsibility: The role of leaders in creating, implementing, sustaining, or avoiding socially responsible firm behaviors." *The Academy of Management Perspectives* 28, no. 2: 164-178.
- Chesbrough, Henry. 2004. "Managing open innovation." *Research-Technology Management* 47, no. 1: 23-26.
- Chesbrough, Henry William. 2006. *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press.
- Dangelico, Rosa Maria, and Pierpaolo Pontrandolfo. 2015. "Being 'green and competitive': the impact of environmental actions and collaborations on firm performance." *Business Strategy and the Environment* 24, no. 6: 413-430.
- DeMarco, Patricia M. 2015. "Rachel Carson's environmental ethic—a guide for global systems decision making." *Journal of Cleaner Production* .

- Department for Business Innovation and Skills (DBIS). 2015. The size and performance of the UK Low Carbon Economy: Report for 2010 to 2013, March 2015. Accessed July 03, 2015 <https://www.gov.uk/government/publications/low-carbon-economy-size-and-performance>.
- Department of Energy and Climate Change (DECC). 2008. *The Climate Change Act*, (c27) Act of the Parliament of the United Kingdom, 26 of November 2008.
- Department for Energy and Climate Change (DECC). 2011. Planning Our Electric Future: A White Paper for Secure, Affordable and Low-Carbon Electricity.
- Department for Energy and Climate Change (DECC). 2013. Increasing the use of low carbon technologies. Policy. Accessed February 24, 2015 <https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies>.
- Department for Environment, Food & Rural Affairs (DEFRA). 2013. Reducing the UK's greenhouse gas emissions by 80% by 2050. Policy. Accessed January 16, 2015 <https://www.gov.uk/government/policies/reducing-the-uk-s-greenhouse-gas-emissions-by-80-by-2050>.
- Department for Environment, Food & Rural Affairs (DEFRA). 2014a. Encouraging businesses to manage their impact on the environment. Policy. Accessed February 24, 2015 <https://www.gov.uk/government/policies/encouraging-businesses-to-manage-their-impact-on-the-environment>.
- Department for Environment, Food & Rural Affairs (DEFRA). 2014b. Reducing demand for energy from industry, businesses and the public sector. Policy. Accessed February 24, 2015 <https://www.gov.uk/government/policies/reducing-demand-for-energy-from-industry-businesses-and-the-public-sector--2>.
- Egri, Carolyn P., and Susan Herman. 2000. "Leadership in the North American environmental sector: Values, leadership styles, and contexts of environmental leaders and their organizations." *Academy of Management journal* 43, no. 4: 571-604.
- Etzion, Dror, Joel Gehman, Fabrizio Ferraro, and Miron Avidan. 2015. "Unleashing sustainability transformations through robust action." *Journal of Cleaner Production*.
- European Commission. 2010. Europe 2020 strategy, EU policy initiative. Accessed June 15, 2015 <http://ec.europa.eu/energy/en/energy-strategy/2020-energy-strategy>.
- European Commission. 2014. Energy 2020- a strategy for competitive, sustainable and secure energy, EU policy initiative. Accessed November 11, 2014 http://ec.europa.eu/energy/strategies/2010/2020_en.htm.
- Guardian. 2014. "Embedding sustainability drives greater profitability, says Unilever CEO Polman". Guardian sustainable business: sustainable business leader of the year. Article by Jo Cofino, Tues 27th of May 2014.
- Guardian. 2015. "How a new boss can breathe fresh life into sustainability". Guardian sustainable business/Leadership, Oliver Balch, Monday 18th of May, 2015.
- Higher Education Council for England (HEFCE). 2014. Sustainable Development in Higher Education : HEFCE's Role To date and A Framework for Its Future Actions. HEFCE. Accessed January, 3, 2017 http://www.hefce.ac.uk/media/hefce/content/pubs/2014/201430/HEFCE2014_30.pdf
- Ignatius, Adi, and Paul Polman. 2012. "Captain planet." *Harvard Business Review* 90, no. 6: 112-118.
- Korhonen, Jouni, and Thomas P. Seager. 2008. "Beyond eco-efficiency: a resilience perspective." *Business Strategy and the Environment* 17, no. 7: 411-419.

- Lewin, Arie Y., and Henk W. Volberda. 1999. "Prolegomena on coevolution: A framework for research on strategy and new organizational forms." *Organization science* 10, no. 5: 519-534.
- Loiseau, Eleonore, Laura Saikku, Riina Antikainen, Nils Droste, Bernd Hansjürgens, Kati Pitkänen, Pekka Leskinen, Peter Kuikman, and Marianne Thomsen. 2016. "Green economy and related concepts: An overview." *Journal of Cleaner Production* 139: 361-371.
- Loorbach, Derk. 2007. "Governance for sustainability." *Sustainability: Science, Practice, & Policy* 3, no. 2.
- Loorbach, Derk, Janneke C. van Bakel, Gail Whiteman, and Jan Rotmans. 2010. "Business strategies for transitions towards sustainable systems." *Business Strategy and the Environment* 19, no. 2: 133-146.
- Kemp, René, and Jan Rotmans. 2005. "The management of the co-evolution of technical, environmental and social systems." In *Towards environmental innovation systems*, pp. 33-55. Springer Berlin Heidelberg.
- Metcalf, Louise, and Sue Benn. 2013. "Leadership for sustainability: An evolution of leadership ability." *Journal of Business Ethics* 112, no. 3: 369-384.
- Miles, Raymond E., and Charles C. Snow. 1995. "The new network firm: A spherical structure built on a human investment philosophy." *Organizational dynamics* 23, no. 4: 5-18.
- Nohria, Nitin. 1998. "Is a network perspective a useful way of studying organizations." *Hickman, Gill Robinson. Leading organizations: perspectives for a new era. California: Sage Publications* 1998: 287-301.
- Parkhe, Arvind, Stanley Wasserman, and David A. Ralston. 2006. "New frontiers in network theory development." *Academy of Management Review* 31, no. 3: 560-568.
- Poole, Marshall Scott 1999. Organizational challenges for the new forms. In Gearaldine DeSanctis & JanetFulk (Eds.), *Shaping organizational form: Communication, connection, and community*, (pp.453-471). Thousand Oaks, Sage, CA.
- Porter, Terry B. 2006. "Coevolution as a research framework for organizations and the natural environment." *Organization & Environment* 19, no. 4: 479-504.
- Rotmans, Jan, René Kemp, and Marjolein Van Asselt. 2001. "More evolution than revolution: transition management in public policy." *foresight* 3, no. 1: 15-31.
- Scottish Government. 2010. *Low Carbon Economic Strategy for Scotland: Scotland a Low Carbon Society*. Scottish Government, published in November 2010, Accessed May 11, 2016 <http://www.gov.scot/resource/doc/331364/0107855.pdf>.
- Schein, Steve. 2015. *A new psychology for sustainability leadership: the hidden power of ecological worldviews*. Greenleaf Publishing.
- The Climate Change Act 2008 (c27). Act of the Parliament of the United Kingdom, 26th November 2008.
- United Nations. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*. United Nations 2015, Accessed January 5, 2017 <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>.
- Westley, Frances. "Governing design: the management of social systems and ecosystems management." *Barriers and bridges to the renewal of ecosystems and institutions. Columbia University Press, New York, New York, USA* (1995): 391-427.

Whiteman, Gail, D. René de Vos, F. Stuart Chapin, Vesa Yli-Pelkonen, Jari Niemelä, and Bruce C. Forbes. 2011. "Business strategies and the transition to low-carbon cities." *Business Strategy and the Environment* 20, no. 4: 251-265.

Wolfgramm, Rachel, Sian Flynn-Coleman, and Denise Conroy. 2015. "Dynamic interactions of agency in leadership (Dial): An integrative framework for analysing agency in sustainability leadership." *Journal of Business Ethics* 126, no. 4: 649-662.