

# Chapter 2

## Joining the Dots: Sustainability, Climate Change and Ecological Modernisation

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**Abstract** Ecological modernisation (EM) can provide an effective strategy for improving sustainability and addressing climate change by overcoming the resistance to change in key sectors. This chapter triangulates a broad range of sources from the academic literature and synthesises them with the findings of previous research by the author. It is argued that governments can assist with the transition to a more sustainable low-carbon economy by using EM to design policies that promote technological innovation, engage with economic imperatives, implement institutional change, improve community engagement and change the public discourse to focus on practical “win–win” scenarios. The theoretical framework of EM was developed in Europe during the 1980s and will need to be adapted for countries like Australia that have a very different political context. Examples are given of how business models can be changed and how government policies can encourage the transition. The adoption of this proposal would increase community empowerment and improve democratic decision-making. This chapter undertakes an original synthesis of sustainable development, climate change mitigation and strong EM to create practical changes to business models.

**Keywords** Sustainable development • Sustainability • Climate change mitigation • Ecological modernisation • Energy

### 2.1 Introduction

It has become a cliché to state that the world faces a profound set of interlinked social, economic and environmental problems. Consider the state of the global environment. For the last five decades, humanity’s ecological footprint has exceeded the capacity of the planet to provide resources sustainably and continues to rise,

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biodiversity has declined substantially and greenhouse gas emissions have almost doubled (Howes, 2017). These problems have major economic and social dimensions, yet have been growing despite concerted efforts to respond to them from the international to the local level of governance (Howes et al., 2017).

Sustainable development and climate change policies were supposed to address such problems, but progress has been stymied by domestic politics, particularly in countries like Australia and the USA whose economies rely on high energy and material throughputs (Howes, 2005, 2017). Australia, for example, has developed a large resources sector that makes a significant contribution to exports, jobs and tax revenues. This makes the sector a powerful influence on national and state government policymaking, particularly with regard to climate change (Pearse, 2009). Such influence is replicated in several developed and developing countries where the economy is prioritised over the environment (Howes et al., 2017).

At the heart of the resistance to change is the fear that actions that improve environmental quality will impair business and cost jobs. The idea of sustainable development was supposed to allay this fear by decoupling prosperity from environmental damage. It appears, however, that major political and economic decision makers remain unconvinced of the credibility of this “win–win” scenario (i.e. they do not believe that it is possible to consistently look after both the environment and the economy), nor do they seem to understand the urgency of environmental issues (Howes, 2005, 2017; Howes et al., 2010, 2017). This chapter argues that the idea of ecological modernisation could be used to break the impasse by encouraging technological change, constructively engaging with economic imperatives, reforming political institutions, improving community engagement and transforming the public discourse so that the focus is on finding practical win–win scenarios. The next section outlines the nature of the problem in terms of the disconnection between the commitments made on sustainability and climate change and the lack of on-the-ground action. The concept of ecological modernisation (EM) is then explained and applied to the problem of climate change and energy production.

## 2.2 The Problem

The idea of sustainable development has a long history. The link between environmental, social and economic issues was recognised in the United Nations International Development Strategy of 1970 and was advanced further at the 1972 Conference on the Human Environment in Stockholm (Howes, 2005; Howes et al., 2017). The term “sustainable development” was coined in the final section of the 1980 World Conservation Strategy which suggested that humanity could have both a healthy economy and a healthy environment if it was more careful about how natural resources were used (IUCN, UNEP and WWF, 1980). This idea was picked up by governments as a way to resolve the growing tensions between environmentalists and business.

The World Commission on Environment and Development was established in 1983 and after four years of investigation its final report, *Our Common Future* (WCED, 1987), offered three useful outcomes. First, it gave a systematic catalogue of interlinked environmental, social and economic problems. Second, it offered sustainable development as a solution to the problems which is defined as: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, Chap. 2, Para 1). Third, the report offered a framework strategy for change which included a meeting of national governments to negotiate new international agreements and actions. This led to the 1992 Rio Earth Summit, where governments of the world agreed to pursue sustainable development via Agenda21 (a document that covered all major sectors of the economy). This was supported by a statement of sustainability principles as well as the United Nations Framework Convention on Climate Change (UNFCCC), the Biodiversity Convention and a statement on forest principles (Howes, 2000; Howes et al., 2017). Subsequent summits in 1997, 2002 and 2012 allowed governments to reaffirm their commitment and assess progress. This culminated in the adoption of 17 Sustainable Development Goals in 2015. Goal 13 requires governments to “take urgent action on climate change and its impacts” and climate change was cited in many other goals (UN, 2015).

The UNFCCC came into force in 1994 and covers both mitigation (by reducing greenhouse gas emissions) and adaptation. The first Conference of Parties (COP) was held in Berlin in 1995 and these annual COPs are the major forum for coordinating international action. The 1997 COP3, for example, led to the Kyoto Protocol that committed developed countries to reducing their emissions by 5% on their 1990 baseline average by 2012 as a first step. In Cancun, the 2012 COP15 saw signatories agree to limit the rise in average global temperatures to no more than 2 °C above pre-industrial levels in order to avoid the worst impacts of climate change. More recently, The 2015 COP21 in Paris set a more ambitious aspirational limit of 1.5 °C and agreed to pursue a “sustainable low carbon future” (UN, 2016). These developments have been driven by a series of assessment reports by the Intergovernmental Panel on Climate Change that have been released every 5 years since 1990 (IPCC, 2014).

The parallel streams of international policymaking on sustainability and climate change have several common features. First, research into the state of the planet has been pivotal in getting issues onto the policy agenda. Second, these issues require action by all sectors of society (the state, business and the community) at all levels (from the international to the local). Third, international negotiations have often occurred prior to the creation of domestic policies (Howes, 2005). Fourth, despite international commitments being in place for a quarter of a century, and agreements stating that these issues are urgent, there has been a lack of progress in implementing the on-the-ground changes that are needed to address climate change and improve sustainability (Howes et al., 2017). As a result, resources continue to be depleted, biodiversity continues to be lost, pollution remains a problem, the ecosystems on which we depend continue to be undermined, greenhouse gas emissions have risen and vulnerability to the impacts of climate change has increased (IPCC, 2014; UNEP, 2012; UN MEA, 2005; WWF, 2014). The Asia-Pacific region has seen

rapid growth in primary and secondary industries over the last few decades which has contributed to these problems, and the region is also home to some of the most vulnerable populations (AAS, 2015; IPCC, 2014; WHO, 2015).

This disconnect between international commitments and local action can in large part be attributed to the barriers to action created by domestic politics (Howes, 2005; Howes et al., 2017). In Australia, for example, a significant proportion of the economy relies on the extraction and export of fossil fuels as well as energy-intensive industries such as metal production. Actions to reduce greenhouse gas emissions are seen as a threat to these industries that rely on the burning of fossil fuels (Howes et al., 2010). This has led to a concerted campaign by some industry leaders to stall climate change policies (Pearse, 2009) and encouraged an ongoing debate about whether climate change is happening. Some members of parliament openly deny the overwhelming scientific evidence.<sup>1</sup> In such an environment, both major political parties have found it difficult to take effective action. Even when some progress has been made, it is often undone by major policy reversals at the national, state or local level of government (Howes & Dedekorkut-Howes, 2016).

The underlying fear of some leaders in business, the state and the community is that taking action on climate change, particularly with regard to reducing greenhouse gas emissions, will cost jobs, impose extra costs on businesses that will make them uncompetitive internationally, and reduce economic growth. This chapter argues that this fear can be allayed by developing a transition strategy based on the concept of strong EM that can improve sustainability.

## 2.3 Ecological Modernisation

Ecological Modernisation (EM) is a school of thought that approaches the issue of sustainability as a design challenge. The aim is to decouple economic prosperity from environmental damage (Howes et al., 2010). This can be achieved by transforming the key technical, economic, social and political institutions of modernity to encourage the uptake of more eco-efficient production and consumption. Such a move should reduce resource use, waste and pollution and reduce the pressures being put on the state of the environment (Berger, Flynn, Hines, & Johns, 2001; Christoff, 1996; Dryzek, 2005; Howes, 2005; Huber, 2008; Janicke, 2008; Janicke & Jacob, 2004; Mol & Spaargaren, 2000). This transformation is good for the environment and good for business because more eco-efficient firms spend less money on inputs such as raw materials and energy (Curran, 2009; Gouldson &

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<sup>1</sup>An excellent example of this occurred on 15 August 2016 on the television programme Q&A, which screened on the Australian Broadcasting Corporation. During the program, Professor Brian Cox (a physicist) confronted new Senator-elect Malcom Roberts with the evidence of climate change. Roberts refused to believe the data provided and asserted that it had been manipulated by NASA so that he could continue to deny that climate change was happening. You can find the programme transcript at <http://www.abc.net.au/tv/qanda/txt/s4499754.htm>.

Murphy, 1997; Janicke, 2008). According to this school of thought, governments should create policies that encourage and support this transition (Blowers, 1997; Huber, 2008; Janicke, 2008; Janicke & Jacob, 2004; Lundqvist, 2000; Mol & Sonnenfeld, 2000; Weale, 1998). This is what governments are supposedly attempting to do with their sustainability policies (Howes, 2005; Howes et al., 2010).

EM emerged in parallel to the idea of sustainable development in the 1980s from European scholars such as Martin Janicke and Joseph Huber (Grant & Papadakis, 2004; Hajer, 1995; Huber, 2000, 2008; Janicke, 2008; Janicke & Jacob, 2004; Mol & Sonnenfeld, 2000; Mol & Spaargaren, 2000; Weale, 1998). The early versions of EM focused on technological innovation and were criticised for adopting a technocorporatist approach to social change (Christoff, 1996). As the school developed, stronger versions emerged that expanded the focus to embrace substantial institutional changes in political and economic systems. The idea was to both create incentives for change and provide better feedback mechanisms for democratic decision-making (Christoff, 1996; Dryzek, 2005; Fisher & Freudenburg, 2001). Strong EM has much in common with the broader goals of sustainable development policies and has five core themes for change (Howes, 2005; Howes et al., 2010):

1. Technological innovation to increase the efficiency of resource use while reducing waste and pollution
2. Engaging with economic imperatives in order to create ongoing financial incentives for reducing environmental impacts
3. Political and institutional change that moves from a top-down model of government to more collaborative governance which builds partnerships across sectors
4. Transforming the role of social movements in order to revitalise civil society and its ability to provide a more effective feedback to decision makers
5. Discursive change that addresses fears about “jobs versus the environment” by reframing the issue as an opportunity to pursue win–win scenarios (i.e. solutions that are good for business and the environment)

A range of similar ideas have cropped up in different parts of the world. Cleaner production and natural capitalism, for example, is an idea that underpins many environmental management systems, such as ISO 14000, the Eco-Management and Audit Scheme and Pollution Prevention Pays (Von Weizsacker, Hargroves, Smith, Desha, & Stasinopoulos, 2009). All of these involve analysing material and energy flows at the facility level in order to make changes that reduce both wastage and costs (Howes, 2005). At the next level is the idea of industrial ecology, where different facilities are linked so that the waste from one becomes the input of the next (much like an ecosystem). There are also the ideas of life-cycle analysis, cradle-to-cradle design, biomimicry and green design that encourage a rethink of products and processes as well as consumption and disposal. While these ideas and initiatives have often grown up in isolation, they all approach sustainability as a design challenge and promote eco-efficiency. Hence, they can be grouped under the broad umbrella of strong EM that provides the theoretical underpinning for the idea of sustainability (Howes et al., 2010).

A practical example of EM at the firm level is the US-based carpet manufacturer Interface which embraced biomimicry in order to become more sustainable (Suzuki

& Dressel, 2002). In 1996, the CEO, Ray Anderson, decided to aim to make the company sustainable by 2020. Since then it has eliminated toxic substances from the manufacturing process, switched inputs from petrochemicals to natural fibres, re-designed products to be recyclable, reduced the intensity of water use by 87%, cut solid waste and increased material recycling. With regard to climate change, Interface now gets 84% of its energy from renewable sources, it has increased energy efficiency by 45% and greenhouse gas emissions per unit of production have been cut by 92% (Interface, 2016a). The company is a successful business: it has expanded its operations to 110 countries, income has grown to more than US\$1 billion, gross profit on sales is more than US\$382 million and the share price has risen by 26% in the last 5 years (Interface, 2016b). This dramatically demonstrates the win-win scenario where institutional and technological change can improve both the economic and environmental performance of an organisation, and there are many others (see: Howes, 2005; Suzuki & Dressel, 2002; Von Weizsacker et al., 2009).

## 2.4 EM, Climate Change and Energy Production

Climate change is one of the key threats to sustainability and could be addressed using a strategy derived from the core themes of strong EM. The main driver of climate change is anthropogenic greenhouse gas emissions and most of these come from the burning of fossil fuels by the energy and industrial sectors (AAS, 2015; IPCC, 2014). Consider the life-cycle impacts of burning coal to generate power. First, extracting coal from an open-cut mine has several impacts: the mining process depletes a non-renewable resource; preparing the site requires vegetation to be cleared which would otherwise absorb carbon dioxide and provide a habitat for native species (hence reducing biodiversity); clearing also increases soil erosion and land degradation; and runoff from the site can pollute local waterways. Second, transporting the coal to a power station releases greenhouse gases from the fuel burnt in the vehicles or vessels involved. Third, burning the coal in the power station releases more greenhouse gases and other air pollutants (such as particulates, oxides of sulphur and nitrogen, and mercury) that put further pressure on the state of the environment and human health (WHO, 2015). Industries such as manufacturing and metal smelting require large amounts of energy and increase the demand for coal extraction and use. The net greenhouse gas emissions of this cycle drive climate change which puts further pressure on biodiversity as well as having significant social and economic costs. This is a classic example of market failure due to a negative externality where some of the costs of production are imposed on people who are not involved in the transaction (i.e. vulnerable residents of poorer countries with low per capita greenhouse gas emissions and future generations) (Garnaut, 2008; Stern, 2006). Applying the five core themes of EM can help to correct this market failure and push the sector towards sustainability.

First is the need to shift to technology that cuts greenhouse gas emissions from power generation. Fortunately, there are already several viable renewable energy options that have significantly fewer environmental impacts than coal-fired electricity generation, including wind, solar, geothermal and solar thermal. Second, there needs to be consistent economic incentives to encourage the uptake of this technology. There have been some trials of subsidies and feed-in tariffs for rooftop solar, while various renewable energy targets have been set at the national and state level. There will need to be a price placed on greenhouse gas emissions in order to internalise the negative externality that they represent. This could be in the form of a carbon tax, a cap and trade scheme, or a baseline and credit scheme. The politics of this are difficult, particularly given recent major policy reversals. This is where the third theme of political institutional change may assist, particularly with regard to building partnerships with the renewable energy sector to promote projects in regional areas. On the fourth theme of engaging with social movements, the Ecologically Sustainable Development working groups provide a useful example of how this might be achieved. They were run by the Australian Government from 1990 to 1992 and included representatives from all levels of government, business, unions and environmental groups. The outcome was the 1992 National Strategy for Ecologically Sustainable Development that still has bipartisan political support and is enshrined in legislation at the national and state levels of government (Howes, 2005). Finally, and perhaps most importantly, is the necessary discursive change. By promoting the win-win scenario and real-world case studies such as Interface, the public debate could be shifted away from the “jobs versus the environment” false dilemma and business could be encouraged to see opportunities for improving profitability. Obviously, this is going to be difficult in Australia as the economy has a significant primary industries sector based on fossil fuels and energy-intensive industries, but it is not impossible (Howes, 2015; Howes et al., 2010).

Consider one of the hardest cases: a firm that is currently in business to extract and sell thermal coal to be burnt for energy production. How could such a business be ecologically modernised to be more sustainable and reduce greenhouse gas emissions? As in the case of Interface, such a transformation will require a commitment from the top executives to rethink the business model. This must occur on the face of some major challenges for the industry. The price that Australia receives for its coal has fallen significantly over several years with demand starting to fall in the OECD and China (World Bank, 2016a). Further, at the 2015 COP21 in Paris, 195 governments committed themselves to reducing greenhouse gas emissions, more than 90 of the Intended Nationally Determined Contributions submitted included emissions trading schemes and more than 40 countries have already imposed a price on carbon (World Bank, 2016b). In the absence of viable large-scale carbon capture and storage, these developments suggest that the future of demand for thermal coal is not promising. A wise strategy for a firm that is dependent on revenue from thermal coal production would therefore be to diversify the business into other activities that are profitable and growing, and which build on the company’s strengths. Coal



businesses understand the energy sector, have a great deal of geological expertise, are experienced with heavy engineering and are able to operate in remote areas. This makes them ideally placed to enter the geothermal energy sector. As the demand for renewable energy grows, they can shift capital and employees out of coal mining and into the construction and operation of geothermal power stations. Governments could assist by providing policy consistency in the form of well-designed economic incentives and by entering into public–private partnerships to provide the necessary infrastructure. Clever firms could also constructively engage with community organisations to highlight their improving environmental performance and build social capital. All of this could be done if business, political and community leaders genuinely believed that such a transition would deliver better economic, social and environmental outcomes (Howes, 2005; Howes et al., 2010, 2017).

## 2.5 Conclusion

The global environment has been seriously degraded over many decades, and this has significant social and economic ramifications that spill into the political arena. Climate change is one of the more critical problems generated by this degradation. It is clear that the international commitments to pursue sustainable development and address climate change need to be matched by on-the-ground changes to the way things are produced and consumed. This is particularly important when it comes to the energy sector that underpins all aspects of industrialised societies. Economic prosperity needs to be decoupled from greenhouse gas emissions, and this means a switch to renewable energy on a global scale. This transition, however, is resisted by sectors that are built upon the extraction and sale of fossil fuels, like thermal coal, because it poses a threat to the prevailing business model. In order to survive, this sector will need to rethink its business model and diversify into renewable energy. Governments can help by providing policies that encourage the necessary technological innovation and create positive economic incentives for change. They will also have to be prepared to reform governing institutions in order to promote more collaboration and partnerships, as well as providing a constructive avenue for community engagement. Above all, fears that being good to the environment is bad for business need to be allayed by promoting practical win–win scenarios. These are the kinds of changes promoted by strong EM, which is why it can provide a practical transition strategy. It must be noted, however, that EM is not a panacea for all the world's social, economic and environmental problems. It is simply a useful device that can help to overcome the resistance to change in some key sectors.



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