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# Ecological modernisation and the politics of (un)sustainability in the Finnish climate policy debate

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## 1. Introduction

The recent policy developments at the international level (IPCC, 2007; EC, 2008; OECD, 2009) have strengthened the politicisation of climate change and created an unparalleled international unanimity about the need for urgent action to tackle global warming. At the same time, the market and innovation-led ideas of the knowledge-based economy have penetrated into national and supranational policies, becoming normative principles for all societal development. They have highlighted the role of science and technology in the global politico-economic order and raised high technologies into the core of modern knowledge production and diffusion (Häyriinen-Alestalo & Kallerud, 2004; Godin, 2006). The recognition that the recent global economic and environmental crises derive from the same origins and cannot therefore be solved separately has resulted in the increasing extension of the ideas of the knowledge-based economy into the sphere of climate and energy policies. Supranational organisations have launched new political concepts, such as 'green growth', 'new sustainable social market economy' and 'Green New Deal', referring to a global transformation towards a 'knowledge-based, greener, competitive and more inclusive economy' that would be 'based on knowledge and new environmental technologies' (EC, 2009; OECD, 2009; UNEP, 2009).

Although concern for the environment has in this way become a new ideological 'master frame' (Eder, 1996), little has been done to change the prevailing politico-economic structures towards a more sustainable social order. A broadly adopted environmental policy approach in many industrialised countries and the EU has been ecological modernisation, whose key tenets include the aim of transcending the traditional division between economic growth and environmental protection through the development and diffusion of technological innovations (Mol & Sonnenfeld, 2000; Jänicke, 2008). Suggesting a win-win solution between these conflicting goals has fitted well to the framework of the knowledge-based economy and created new trust among national governments and supranational organisations in the ability of technology to solve societal problems. Yet the capability of ecological modernisation to solve societal problems has recently been challenged by new economic and technological uncertainties, the rebound effects of technological solutions, increased competition for environmental resources, and the dynamics between the global

North and South (e.g. Baker, 2007; Olsen, 2007; Jänicke, 2008; Jänicke & Lindemann, 2010). This has also been interpreted as an indication of a paradigm change in eco-politics towards post-ecologism and its unsustainable politics (Blühdorn & Welsh, 2007).

Despite supranational climate initiatives, specified emission reduction targets are assigned to individual countries, and meeting climate policy objectives importantly depends on the formulation and implementation of national level policies. Climate policy thus appears as a compelling field where the high-technology and market-oriented tenets of the knowledge-based economy confront global responsibility and regulation on the one hand and national concerns, such as self-sufficiency, the energy supply security, and undisturbed energy distribution, on the other. This article scrutinises the political side of technology by analysing the recent climate policy debate at the national level through the example of Finland. It focuses on the use of eco-modernist strategy in legitimating a technology-led climate policy and scrutinises the related tensions that emerge between the national and international levels. Finland provides a good example in this respect. It has pursued long-term growth-oriented economic and industrial policies along with strong investments in R&D (Cabinet Programmes, 1987–2007). At the same time, the post-war period's centralised steering of national economy has gradually been replaced by the deregulation of financial markets and the opening of national borders for international competition. In comparison to many countries and the EU on average, Finland's R&D investments have increased rapidly, particularly in the late-1990s, and have thereafter continuously remained at a relatively high level (Statistics Finland, 2010). A special characteristic of Finland has also been its strong emphasis on technology and innovation in creating societal well-being and the adoption of growth-oriented technology policy as a guiding principle for other national policies (Pelkonen et al., 2008). These transformations have been characterised, for example, through a shift from a natural resource-intensive to a knowledge-intensive economy (Schienstock, 2007) and from a welfare state to a neoliberal/competition state (Alestalo, 1997; Heiskala & Luhtakallio, 2006; Pelkonen, 2008). Recently, Finland has also been placed among the leading economies in the world in several competitiveness rankings (EC, 2007; WEF, 2009; WEF, 2010; cf., however, IMD, 2010), which has further encouraged the knowledge-intensive and market-led approach among national decision-makers (See also Häyrynen-Alestalo et al., 2005). Yet energy policy has been strongly directed by negotiations between the state and the economically important heavy industry, both not only as key actors in the national innovation system but also as major shareholders in large energy companies.

The following questions will be asked:

1. How is technology-led climate policy legitimised in the national policy debate?
2. What kinds of tensions emerge between national interests and international climate policy targets in this framework?
3. To what degree does Finnish climate policy reflect eco-modernist visions of green growth and what kinds of implications does this have in terms of the global dimensions of climate policy?

The data consist of the government of Finland's official documents on climate, energy, environmental, technology, and innovation policies; strategies, reports and documents of key ministries; parliamentary proceedings (plenary sessions and committee statements) (2005–2009); and stakeholder statements, documents, reports, and press releases (2008–2010). In addition, key strategies, initiatives, and policy documents of relevant supranational organisations and think-tanks (the EU, IPCC, OECD, UN, WEF, and NEF) are utilised in the

analysis. The analysis was based on a data-oriented approach. Utilising qualitative inductive content analysis (e.g. Hsieh & Shannon, 2005), the documentary data were first coded at the level of individual statements and sentences. The data were then elaborated by organising the initial codings into broader thematic categories, and complementing and expanding on them with the parliamentary and the stakeholder data. The findings were then specified by re-reading the data and scrutinising the ways different arguments were used in specific contexts. Finally, the analysis was deepened by identifying and analysing the main rhetorical strategies and related tensions (Cf. Palonen & Summa, 1996) through which various claims were justified in the policy debate.

## **2. Ecological modernisation and the demand for sustainability**

At the core of national and international climate policy debates has been the question about an optimal social order that would foster environmentally and economically sound development. During the past few decades, many countries have adopted an eco-modernist environmental policy strategy, which seeks to overcome the division between economic and environmental objectives by seeing them as complementary (Hajer, 1995; Christoff, 1996; Mol & Sonnenfeld, 2000). While the idea of sustainable development has been to harmonise economic growth and environmental protection along the principles of intra- and intergenerational justice (WCED, 1987), a central assumption in ecological modernisation is that technology can contribute to both ecological and environmental progress and that it is possible to combine environmental protection with economic growth through the development and diffusion of cleaner technologies (Jänicke, 2008). Other key elements of ecological modernisation include integrating environmental policy to other policy fields, developing new policy instruments, such as voluntary agreements and eco-audit, and emphasising the role of economic actors in ecological transformations (Mol & Sonnenfeld, 2000; Baker, 2007). At the national level, it can be characterised as a government-led action programme that aims at cleaner economic growth through eco-innovation and energy efficiency (Murphy, 2000).

As an environmental policy strategy, ecological modernisation can be characterised as reformist rather than radical, as it aims to redefine the structures of contemporary society to some extent but does not suggest any radical changes to the prevailing status quo (Dryzek, 2005). Reflecting the tradition of modernist eco-political thought, it also suggests a human rationality as the way towards achieving a global politico-economic equilibrium (Blühdorn, 2000). Ecological modernisation thus tends to attach itself more or less to the key premises of liberal capitalist society, where the increasingly market-driven policy orientation (Larner, 2000; Jessop, 2002; Brenner & Theodore, 2002) has strongly highlighted economic and technological aspects in combating climate change. In many industrialised countries and the EU, investing in new technologies has been recently emphasised as the most innovative and cost-efficient way to contribute to emission abatement through producing low-carbon energy solutions and energy efficiency (Cabinet Programme of Finland, 2007; EC, 2008).

The attractiveness of ecological modernisation has undoubtedly related to its compatibility with the key tenets of the knowledge-based economy. As an umbrella concept for all kinds of developments and policies related to science, technology, and innovation, the knowledge-based economy has combined fashionable ideas from new growth theories, the National Innovation System, the New Economy, and the information society, producing a network of

concepts that have reinforced each other (Godin, 2006, 23). The OECD has defined the concept as referring to 'trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors' (OECD, 2005). In a similar vein, ecological modernisation emphasises an innovation-oriented approach and highlights the critical importance of the production, dissemination, and utilisation of knowledge and innovation. Yet this market and high technology-led political strategy has so far not been able to balance various dimensions of sustainability, thus leaving the controversy between the environment and the economy ultimately unsolved. According to Blühdorn and Welsh (2007), it has become evident that the key parameters determining the ways in which environmental issues are perceived have changed. The established ecologist values, diagnoses, and strategies have become outdated, resulting in a paradigm change in the realm of eco-politics. The new phase of post-ecologism is signalled, for example, by neo-materialism commanding late modern societies, the de-ideologisation of politics, the loss of identity of eco-politics as a specific policy field, and the decline of ecologism's political actors. In this framework, key societal and environmental concepts are redefined as economic and efficiency issues in a way that they simulate continuity in relation to modernist values but are at the same time compatible with the perpetuation of the capitalist growth economy (Blühdorn, 2002). Yet manifestations of post-ecologism tend to vary across different politico-economic and cultural contexts. The following sections scrutinise the ways in which they are reflected in the Finnish policy debate.

### 3. Reorientations in Finnish climate and energy policies

Finnish energy policy has traditionally been based on strong state-led governance and regulation, where state-owned energy companies have dominated the production and distribution of energy. Characteristic of the management of the energy system has also been corporatist negotiations among the state and large energy producers, distributors, and buyers. Since the 1980s, however, the energy sector has experienced transformations through deregulation and market liberalisation. Early reforms in this respect included transforming the distributive price control of petrol and diesel oil, liberalising the refinery prices of a large oil company, *Neste*, demolishing the integrated price system of oil products at the national level, and removing the import licensing system of raw oil (Ruostetsaari, 2005). In 1995, the Electricity Market Act meant a change from a centralised state-led steering towards a market-based governance of the energy economy. At the same time, the national energy markets were opened for international competition and Finland became a member of the EU, which transformed national policies towards a more international orientation.

Peculiar for Finland has also been certain continuity in energy policy. Since the 1970s, national energy policy has been largely built upon the concern over the relatively high import dependency, which has raised versatility, self-sufficiency, and security of energy supply among key political questions. A related feature directing energy policy has been the relatively high share of fossil fuels in the total energy supply. In 2005, over half of Finland's total primary energy supply came from fossil fuels, out of which the share of oil was 30%, natural gas 10%, and coal and peat together 14% (IEA, 2008a). Nuclear power (17%) and biomass (20%) have also formed an important part of the national energy mix, which has



gained attention in international comparisons on renewable energy and national fuel mix (IEA, 2008b). Finland's relative share of renewable energy has been among the highest in the EU and the OECD countries. However, while the production of renewable energy has mostly consisted of wood-based biomass generated from by-products and wood residuals of the forest industry, the shares of other renewable energy sources like hydropower (3%) and geothermal, solar, and wind power (together less than 0.3%) (IEA, 2008a) have remained almost insignificant. Finland's ranking has thus been far from the leading European countries like Germany and Spain when measured, for instance, through installed wind and solar power capacity (EurObserv'ER, 2010). In fact, Finland, together with some Eastern European countries like Hungary, Lithuania, Latvia, and Romania, has been placed at the bottom in these comparisons.

The importance of forestry and wood-based fuels in domestic energy production and consumption can be largely explained by the lack of oil, gas, and coal reserves as well as the national economic production structure's reliance on energy-intensive heavy industry (in particular pulp, paper, and metal industries). This has directed national energy policy along the principles of securing the operational conditions of economically important national industry and providing inexpensive electricity for industrial use (Cabinet Programmes, 1987–2007). An important feature in the Finnish energy system has also been the centralisation of energy production, as a small number of energy companies, such as *Fortum* and *Neste Oyj*, account for a large share of Finland's energy production. As the state holds a majority ownership in these energy companies, its interest as a shareholder in maximising share values has, together with the objective of supporting national heavy industry, biased energy policy towards favouring nuclear power and coal over new renewable energies (Ruostetsaari, 2009). Nuclear power has also been an attractive energy production option in Finland because the power plants are largely owned by the state and heavy industry. Two current nuclear power plants are operated by *Fortum*, a public-listed energy company of which the Finnish government owns 51%, and two by *Teollisuuden Voima Oyj*, a public-private partnership company that was founded in 1969 to supply electricity to its shareholders (mostly heavy industry) at cost. While many other European countries committed themselves to phase out nuclear power in the 1990s and 2000s, the Finnish Parliament approved *Teollisuuden Voima*'s application to build a fifth nuclear power plant in 2002. In 2008 and 2009, three new nuclear power construction applications were filed at the Ministry of Employment and the Economy, and the Parliament accepted two application licences (*Teollisuuden Voima* and *Fennovoima*) in July 2010.

Guided by the key energy policy principles of self-sufficiency, diversified production, and the security of supply as well as broader growth-oriented economic development policies, Finnish climate and energy policies have been gradually directed towards a technology and innovation-driven approach accompanied by substantial financial allocations to developing new energy technologies. Foundations for this approach were built in the 1960s and 1970s, when the construction of nuclear power plants, together with the international oil crisis, accelerated the development of technology policy and directed R&D activities towards nuclear energy, energy saving, and energy efficiency research (Murto et al., 2006). Yet these efforts were long seen as part of general industrial and technology policies primarily designed to enhance Finland's competitiveness and economic growth (KTM-81 Committee, 1981; Committee of Technology Policy, 1985). In the 1990s, the development of the national innovation system 'to support the economy, entrepreneurial activities and employment'

(Academy of Finland, 1997) became a key national policy target that was fostered by the government's decision to aggressively increase the GDP share of R&D investment (Cabinet Programme, 1995; Ministry of Education, 1996). The growth of public R&D funding was largely covered by privatising state-owned companies, and most of the additional funding was directed towards technology programs of the Finnish Funding Agency for Technology and Innovation (Tekes), research projects strengthening the technology base in Finland, and R&D activities of the selected industrial 'clusters', one of which was energy and environment (Academy of Finland, 1997). The growing importance of energy technologies was also indicated by several Tekes-funded technology programmes, ministries' renewable energy programmes, and the Academy of Finland's research programmes thereafter. A recent development in this respect has been the establishment of six Strategic Centres for Science, Technology and Innovation (SHOKs) in selected technological fields, one of which is energy and the environment. Co-funded by the state and private companies, they are expected to renew industrial clusters and create radical innovations through public-private partnerships and industry-academia collaboration.

The recent national energy and climate strategies (MTI, 2001; MTI, 2005; MEE, 2008) further develop these ideas. They connect the development of energy technologies more closely to national and international climate policy objectives and highlight the need to move from the import-dependent energy system and fossil energy sources towards the exploitation of low-carbon energy. The strategies are based on 'the government's target-oriented economy policy that supports growth in employment' (MTI, 2001, 40), where strong R&D investments in selected technological fields are expected to increase the productivity and competitiveness of the national economy (Cabinet Programme, 2007; MEE, 2008). Following the ideas of ecological modernisation and recent EU policy developments, Finnish strategies build upon the idea that it is possible to combine the objectives of environmental sustainability, energy supply security, and economic competitiveness through fostering technological advancement (e.g., MEE, 2008, 30). They also imply rather high expectations about high technology-led development. Technological innovations and respective financing are seen to be focal tools not only in attaining Finland's climate policy objectives but also in fostering international technological cooperation, improving Finnish companies' innovation capacity, and promoting export activities. Government funding is increasingly allocated to encourage innovations, especially in areas that develop novel energy technologies or have a high technological risk. The aim is to double the investment in the research and development, implementation, and commercialisation of new technologies by 2020 (MEE, 2008, 54). This technology-driven climate policy orientation reflects the broader political project of the growth-oriented knowledge-based economy (Jessop, 2002; Godin, 2006). At the same time, it serves as an illustrative example of a political field where ideas of technology policy are confronting and partly overlapping with traditional corporatist regulation, resulting in struggles over power between different spheres and levels of decision-making.

#### **4. Legitimising high technology-led climate policy**

In the Finnish policy debate, high technology-led policy orientation is justified by three rather powerful forms of persuasive speech, namely the rhetoric of responsibility, the rhetoric of possibility, and the rhetoric of necessity. Through these discursive devices, high

technology-led and market-oriented climate policy is represented as having a broad societal acceptance and political legitimacy. It is, however, also in these points where the weaknesses of the eco-modernist approach in particular and the knowledge-based economy in general become visible, creating tensions between the national and global levels and pointing to an underlying tendency of trying to 'sustain something that is known to be unsustainable' (Blühdorn, 2000).

### *The rhetoric of responsibility*

In terms of responsibility, many documents suggest redirecting national climate policy towards greater responsiveness to the international politico-economic framework. The commitments to international, particularly EU, climate policy targets together with uncertainties related to the current politico-economic situation are seen to bind Finland to carry its part of the global responsibility and to take action in preventing climate change. The policy documents place Finland as part of the global energy system, bearing responsibility for climate change not only as a single country but also as a member of a 'global community' (MEE, 2008; Prime Minister's Office, 2009). They refer to national climate policy as a broader project that extends to a supranational scale through market-based mechanisms, such as the emissions trade and technology transfer. Tackling global warming is seen to require 'immediate, comprehensive and unprecedentedly strong international cooperation' (Prime Minister's Office, 2009, 29), where the primary role of industrialised countries is to create climate mitigation tools for developing countries, that is, developing new energy technologies and high-technology components that can be utilised in low-carbon energy production.

Referring to common but differentiated responsibilities based on the available technologies and financial resources in different countries, however, this techno-optimist ecological modernisation argument not only assumes technological development as inherently natural for industrialised countries like Finland but also naturalises uneven economic and technological development on a global scale. The assumed technological superiority of industrialised countries also implicitly suggests their supremacy in making judgments on the needed forms of action, thus clearly departing from key principles of sustainability, such as global equity and distributive justice. This becomes visible also in the documents on the Clean Development Mechanism, a flexible mechanism under the Kyoto Protocol, that tend to focus on technological, judicial, and economic aspects of technology transfer with few references to different dimensions of sustainable development (See Teräväinen, 2009). This interpretation of responsibility thus seems to reflect more Finland's aspirations of new market opportunities and emission credits under the Kyoto Protocol than objectives of balanced sustainable development. Moreover, it retains a national orientation while narrowing Finland's global responsibility to the technological sphere and largely bypassing the world's changing power relations, particularly the strengthening role of developing countries in global techno-economic development. The policy documents' 'global community' thus seems to become rather a politically persuasive rhetorical construction reflecting a world order dominated by industrialised countries than a real collective effort or a sense of global responsibility.

Aside from the global level, the rhetoric of responsibility has a strong grounding in national interests. In terms of Finland's responsibility to tighten its own emission reduction targets, the policy documents selectively use some elements of a weak, techno-corporatist variant of



ecological modernisation (Christoff, 1996) to foster rather traditional national interests. In particular, they prioritise the interests of the economically important national heavy industry over international (technology-led) climate policy objectives and point to the responsibility of the national political system to ensure the competitiveness of national industry (MTI, 2005; MEE, 2008). Characteristic of the policy documents has also been the technological selectivity illustrated by the government's highly selective resource allocation policies for certain technological fields and open scepticism towards those renewable energy technologies that would cause additional costs to national industry (Cabinet Programme, 2007; Prime Minister's Office, 2008). In the negotiations concerning the EU climate policy package (EC, 2008), for instance, Finnish representatives actively opposed policy proposals that suggested substantial increases to the share of renewable energy by claiming that Finnish industry is already a forerunner in this respect. While *in principle* emphasising the idea of know-how, knowledge, and innovation as the cornerstones of climate policy, this stance clearly reflected national heavy industry's interests, prioritising voluntary energy efficiency agreements and market-based measures like technology export over additional renewable energy investments and binding climate policy targets (cf. EK, 2009). Given the persistence of corporatism and the traditionally strong state in Finland (Alestalo, 1997; Arter, 1999), these arguments highlight the prevailing importance of the old state-industry negotiations. Despite the recent tendency to outsource industrial production to developing countries and the reduction of domestic manufacturing capacity, a considerable part (81% in 2007) of Finnish renewable energy production consists of by-products of the forest, pulp, and paper industries (Motiva, 2009). Active state intervention and technological development are thus seen to be needed to support the development of the forest industry, as Finland's capability of meeting its renewable energy obligations is claimed to importantly depend on the forest industry's production capacity (MEE, 2008; Prime Minister's Office, 2009). These rather protectionist tones indicate a tension that emerges between international climate commitments and the functioning of global markets on the one hand and national industrial interests on the other.

#### *The rhetoric of possibility*

The rhetoric of possibility refers to technology-led climate policy as a self-evident continuum for innovation and knowledge-oriented economic growth policies. Pointing to Finland's long-term R&D investments within the energy sector, political documents highlight the need to utilise the allegedly reliable and high level Finnish research and technical know-how in developing renewable energies, energy efficiency, and energy-saving solutions. New energy technologies are seen to have a huge potential both domestically and internationally. According to the national climate and energy strategy (MEE, 2008), for instance, environmental and energy technologies contribute to fostering domestic low-carbon energy sources, improving energy efficiency, and strengthening national self-sufficiency in energy production. The aim is also to take full advantage of international market opportunities: investments in energy technologies are expected to enhance domestic production and energy efficiency, but, more importantly, create commercial innovations and goods for 'the expanding global market' (MTI, 2005; MEE, 2008; Prime Minister's Office, 2010). The economic possibilities are highlighted by setting rather high expectations to new technologies' growth potential. The policy documents emphasise, in particular, the possibility of utilising the growing demand of new energy technologies in developing

countries (MEE, 2008). In this respect, they call for strengthening technology transfer and trade liberalisation in order to maximise Finland's export opportunities in the world market. Some have even claimed that the clean technology sector has the possibility of creating 'green *Nokias*' (Ministry of Education, 2005; Anttila, 2007; Hassi, 2009), and, alongside with metal, forest, and the ICT industries, become a 'new supporting pillar' for the national economy (Prime Minister's Office, 2009).

The strong influence of technology policy in national politics (Häyrynen-Alesto et al., 2005; Pelkonen, 2008), together with the emphasis on energy technologies' market potential, indicates that the policy documents largely articulate climate policy in technological and economic terms. It serves as part of broader economic and industrial policies in which new technologies are primarily seen as an engine for economic growth and export revenues (Prime Minister's Office, 2008). In this frame, investing in new energy technologies is not primarily motivated by preventing environmental catastrophes but indeed by promoting Finland's technological and economic competitiveness. The policy documents thus subordinate climate concerns to economic rationale and shift political power from the nation-state to the international market.

The effectiveness of eco-modernist political strategy depends, however, on not only the radicalness of environmental innovations but also the degree of their diffusion (Jänicke, 2008). This issue has been taken up both by international comparisons of techno-scientific performance (Naumanen, 2005; Lehtoranta et al., 2007) and by national competitiveness strategies and evaluations (Prime Minister's Office, 2004). The recent evaluation of the national innovation system (Veugelers et al., 2009), for instance, illustrates that Finnish policy has been too focused on input-oriented activities and calls for more attention to the demand side to correct this imbalance. It suggests active state intervention to provide incentives for the development of technological innovations. In the area of energy, climate, and environment, proposed policy measures include the public procurement of innovation and the establishment of norms and regulations favouring clean technologies. Similar suggestions have been made at the international level in recent visions of green growth (Aghion & Howitt, 2009; OECD, 2009). In practice, though, expectations of technology-led climate policy have been overly optimistic. Despite Finland's strong input activities in R&D and good rankings in international technological and competitiveness comparisons, it has been weak in the utilisation and diffusion of technology. Although Finland has plenty of low-carbon technologies available, their utilisation has remained at a relatively low level. For instance, the production of wind power technologies and components has increased notably in recent years but much of them are produced for export, and the share of wind power in domestic energy consumption has been marginal (0.3% of total energy consumption in 2008). A shortcoming of this kind of a climate policy orientation is thus its weakness in terms of policy implementation and outcomes, which questions the validity of the 'new green economy' thesis.

#### *The rhetoric of necessity*

The rhetoric of necessity reflects the commitments to global climate change mitigation and the EU's renewable energy obligations, which are seen to 'impact Finland's short-term economic growth potential' (Prime Minister's Office, 2008) and 'bring along unforeseeable pressures that weaken the public economy' (Prime Minister's Office, 2010, 49). Increasing world population and consumption, together with the tightening global competition over

raw materials, are seen to require renewals in regional, national, and global production and consumption structures. The National Innovation Strategy, for instance, identifies globalisation, new technologies, the ageing of the population, and sustainable development as key drivers of economic and societal change, arguing that 'the increased awareness of climate change and the threats related to it have created pressure to move towards ecologically sound production and consumption. This pressure is strengthened by the scarcity and the sharply rising prices of raw materials' (Prime Minister's Office, 2008, 3). Along the lines of ecological modernisation, technology is considered to be the key to simultaneously promoting economic growth and environmental and societal well-being. Technological breakthroughs are seen to contribute to not only managing scarce natural resources and tightening emission reduction targets but also creating 'a more sustained economic growth and societal well-being' (Prime Minister's Office, 2009; Sitra, 2009). They are also represented as a necessary means to achieve a greener development path. The Government Foresight Report on Climate and Energy Policy (Prime Minister's Office, 2009), for instance, claims that Finland is 'obliged to develop technologies that are crucial to global emission reductions', such as carbon capture and storage technology that is seen to be needed in the future especially in countries that have large coal reserves, such as China.

Besides developing technological innovations, however, it remains unclear what is meant by the 'economic and societal change' that is called for in recent policy documents. In fact, there are few signs of structural reforms that would point to changes in the prevailing patterns of energy production and consumption. Instead, Finnish climate and energy policies are largely based on the very same premises as in the 1970s and 1980s. The policy documents replicate the assumption that the consumption of energy is continuously increasing and suggest building additional energy production capacity to fulfil this growing energy demand. As in the 1970s, the main response to the additional need of energy is building more nuclear power plants (MTI, 2005; Cabinet Programme, 2007; MEE, 2008). The rhetoric of necessity is thus used strategically not only to promote technology-driven development but also to foster the acceptability of additional nuclear power.

The rhetoric of necessity also points to the characterisation of Finland as a Nordic corporate state and a consensual democracy (Arter, 1999), where the successive coalition governments have since the late-1970s enabled a rather consensual policy style among the main political parties, decision-makers, industry, and labour market organisations. Political documents refer to high technology-led climate policy as having a broad political acceptance at the national level due to a number of stakeholder consultations and the broad-based parliamentary committee work in the preparatory phases of the national climate strategies. Moreover, the consensus-seeking nature of the energy policy decision-making processes has been strengthened by the state ownership of large national energy companies, which has provided an indirect means of regulating the energy sector and reduced open political conflicts. The continuity of the Finnish model of corporatist governance has also been visible in that since the late-1980s and 1990s, there have been few changes in the composition of the Finnish energy elite (Ruostetsaari, 2009). Redirecting climate policy towards an innovation and market-led approach is constructed as a joint national project and a shared goal that requires a profound commitment of all political actors. In this sense, political consensus becomes both a justification and a policy objective.

Although there seems to be a broad consensus on the necessity of the national technology-led policy vision, its realisation seems to remain somewhat problematic. One problem in

turning the rhetorical construction into a coherent political strategy has been the fragmented division of responsibilities between different sectoral ministries on environmental issues. While the coordination of international climate policy is placed under the Ministry of the Environment, national climate and energy policies belongs to the Ministry of Employment and the Economy, and the flexible mechanisms to the Ministry of Foreign Affairs. Other ministries are also involved with climate and energy policy preparations in their respective fields, such as agricultural and forest policies (the Ministry of Agriculture and Forestry) and knowledge infrastructure (the Ministry of Education). The unclear division of responsibilities, together with the traditionally strong boundaries between sectoral ministries, has recently raised discussion about reforming policy coordination structures through enhancing cross-sectoral cooperation across administrative, organisational, and political borders and/or establishing a separate climate and energy ministry (Vapaavuori, 2010). Another problematic issue has been the concentration of power within the energy sector. In this respect, an emerging question has been the multiple role of the Ministry of Employment and the Economy in governing both energy policy and nuclear power security issues and acting as permission authority, while, at the same time, being a substantial owner of companies applying permissions for new nuclear power construction projects, which has been claimed to have resulted in an interest controversy (Lampinen, 2009, 41). Discussion has also emerged about the limited role of the Ministry of the Environment, which is responsible for international climate policy but not for national level climate policy. Despite the politically powerful consensus rhetoric, it might therefore be difficult to speak of *a* governmental rationality and *a* (national) political will in governing such a complex and multi-layered policy field.

## 5. Towards a green economy?

Ecological modernisation, at least in the weak, techno-corporatist version (Christoff, 1996), has become a broadly accepted political strategy in Finland. It has reinforced the ideas of the knowledge- and innovation-driven economic development model and provided politically persuasive 'green' elements for national technology policy. In addition, ecological modernisation has neither required radical interventions to the established patterns of production and consumption nor challenged high-technology and market-led economic growth policies. Emphasising the knowledge-based economy's principles of flexibility, openness, and fluidity (Beerens, 2008), particularly in relation to the international market, this approach highlights the development and commercialisation of environmental innovations and new technologies as a key solution to the problem of climate change. At the same time, Finland's technological and economic competitiveness in the world market are raised as important national policy objectives, as the rapidly growing world market is seen to favour 'continuously renewing' and 'efficient' economies with 'proactive adaptation capability' (STPC, 2006; Cabinet Programme, 2007). This is also reflected in the understanding of the environment, which has changed from a cost burden to an opportunity for economic profit.

The policy documents' selective use of ecological modernisation also signifies the interconnectedness of the knowledge-based economy and unsustainability. While emphasising a knowledge- and high technology-driven development path, this approach suggests the continuance of almost unlimited economic growth. It subordinates climate,



environmental, and broader societal objectives to the techno-economic rationale, leading to preferring short-term political choices in a situation where long-term solutions would be needed. Moreover, it has had little to say about the distribution of costs and benefits on a global scale, thus largely ignoring the uneven development impacts of global economic growth. In this respect, the Finnish approach seems to follow Blühdorn's (2007, 263–264) characterisation of post-ecologism by prioritising 'economic competitiveness and growth, the security of Northern life-styles and the preservation of established global power relations', where technological advancement, economic growth, and continuous global competition have become non-negotiable imperatives.

Moreover, the knowledge- and technology-driven development path reflects a rather narrow understanding of sustainability. The policy documents contain only generic references to sustainable development, and the relationship between economic growth and environmental degradation remains undefined. In addition, they place climate change high on the national political agenda and treat it as a political field of its own, leaving other environmental concerns, such as environmental equity and biodiversity, largely outside the mainstream political debate. Guided by a nation state-centric perspective aiming primarily to respond to an individual industrialised country's interests, Finnish climate policy is thus incapable of adequately taking into account a broader global development perspective. Characteristic for the Finnish approach is also, as in Blühdorn's 'politics of unsustainability', that key societal and environmental concepts are being reinterpreted to legitimise the technology-led economic development path. Environmental concepts become translated into economic language, as illustrated, for instance, by the policy documents' strong emphasis on the cost efficiency and profit opportunities of new environmental technologies. They are also strategically used to justify certain controversial political choices, such as nuclear power that has recently been reframed as a 'clean', even 'green' technology. It seems indeed that in the framework of the knowledge-based economy, all climate policy measures become conditioned by Finland's technological and economic competitiveness. Yet many authors, such as Paul Krugman (1994), have argued that it is irrational to assume that nation-states could compete with one another like private enterprises.

The adaptation of new policy concepts, such as 'green economy', 'green growth', and 'Green New Deal', indicate an effort to integrate environmental issues into broader growth policies. At the same time, however, they illustrate the prevailing supremacy of consumerist market economy's values in relation to ecologically sound development. Redefining the knowledge-based economy as being driven by eco-innovation does not, as such, bring much new to the assumptions of market-oriented new growth theories. In fact, suggesting a state of equilibrium through the objective of 'sustainable economic growth', it follows the ideas of neo-classical economics. The green growth, green economy, and Green New Deal models thus contain a built-in controversy. As Schumpeter has argued (See Lundvall, 1999), innovation processes (whether green or not) cannot be based on a state of harmony and equilibrium because they always involve constant creation of new ideas, products, services, and needs. Furthermore, the very idea of knowledge and innovation as the key drivers of economic progress is by no means new. Most of the ideas of the knowledge-based economy and the new growth theories can be traced back to the work of Moses Abramovitz (1989/1952) and Fritz Machlup (1962), which highlighted the significance of knowledge production and innovation for economic growth already in the 1950s and 1960s.



In both scientific and public climate policy debates, questions about the optimal scale for the economy and the environmental implications of economic growth have recently been revived. This has resulted in mainstream economic theories and the knowledge-driven growth paradigm as a whole having been increasingly questioned. One vision of a sustainable society has been derived from John Stuart Mill's (1965/1848) concept of the 'stationary state', which has been used to refer to a zero-growth society and 'a continuous state of dynamic equilibrium', in which technological advancements would be directed towards a more equitable redistribution of wealth (Winch, 2004; Lin, 2006). Alternative suggestions based on critiques of unlimited economic growth have also been developed within the degrowth movement (See, for example, Fournier, 2008; Latouche, 2009). Central to this approach has been an emphasis on 'escaping from the economy', that is, challenging the ways in which economy and its practices are thought of and conceptualising forms of social organisation that do not rely on an economic vocabulary (Fournier, 2008). Common to these critiques has been the idea that economic growth is not an answer but part of the problem of environmental degradation and needs therefore be called into question (cf. Meadows et al., 1972). A report of a British think-tank, the New Economic Foundation (2010, 1-2), for instance, argues, 'Just as the laws of thermodynamics constrain the maximum efficiency of a heat engine, economic growth is constrained by the finite nature of our planet's natural resources (biocapacity)'. Yet in the mainstream policy debates, these voices have so far remained relatively marginal. The Finnish experience illustrates that while advocating an integrative (innovation) policy approach with greater inclusiveness towards environmental concerns, the green economy thesis persistently reproduces a basis of legitimacy for the continuance of the knowledge-based economy's growth model. At the same time, it actually narrows the space for any alternative suggestions that might challenge the prevailing politico-economic status quo.

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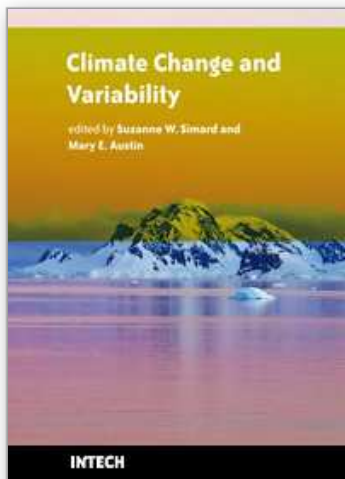


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## **Climate Change and Variability**

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Climate change is emerging as one of the most important issues of our time, with the potential to cause profound cascading effects on ecosystems and society. However, these effects are poorly understood and our projections for climate change trends and effects have thus far proven to be inaccurate. In this collection of 24 chapters, we present a cross-section of some of the most challenging issues related to oceans, lakes, forests, and agricultural systems under a changing climate. The authors present evidence for changes and variability in climatic and atmospheric conditions, investigate some the impacts that climate change is having on the Earth's ecological and social systems, and provide novel ideas, advances and applications for mitigation and adaptation of our socio-ecological systems to climate change. Difficult questions are asked. What have been some of the impacts of climate change on our natural and managed ecosystems? How do we manage for resilient socio-ecological systems? How do we predict the future? What are relevant climatic change and management scenarios? How can we shape management regimes to increase our adaptive capacity to climate change? These themes are visited across broad spatial and temporal scales, touch on important and relevant ecological patterns and processes, and represent broad geographic regions, from the tropics, to temperate and boreal regions, to the Arctic.

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