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De- and re-coupling energy: Environmental Policy Integration (EPI) and the case of renewable electricity in Scandinavia

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RESULT (summary)

De-coupling economic drivers from environmental degradation is a key dimension of 'sustainable development' (SD), and 'Environmental policy integration' (EPI) – the assessment of potential environmental impacts in sectoral policy-making – is a key instrument in this regard. Promoting renewable electricity (RES-E) can provide de-coupling in the energy sector. Furthermore, innovative modes of RES-E can also induce a 're-coupling'. In this context, the present article provides a comparative assessment of the promotion of RES-E in Denmark, Norway and Sweden in the perspective of EPI. Danish and Swedish RES-E initiatives can to a larger extent than in Norway be related to de- and re-coupling, and therefore more strongly reflect EPI standards. Denmark and Sweden, in each their way, also indicate a positive interaction between EPI and the ability for more long-term and differentiated policy approaches to RES-E. Swedish RES-E initiatives resonate with a sector-encompassing, horizontal EPI approach - whereas Denmark reflects a more vertical, sector-specific EPI dimension. Long-term political commitments formulated at the national level represent a key variable in explaining the status of EPI standards in the present cases, but are substantially conditioned by institutional frameworks and economic interests.

KEYWORDS

SELECTED BY AUTHOR(S)		
	climate change	de-coupling
	environmental policy integration (EPI)	renewable electricity

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1 INTRODUCTION

De-coupling economic drivers from ecological degradation is considered to be a crucial dimension of 'sustainable development' (SD), and 'environmental policy integration' (EPI) can be seen as a crucial decision-making principle for achieving de-coupling. EPI also implies institutional mechanisms for the integration of environmental concerns in sectoral policy formulation and implementation (Lenshow 2002; Lafferty & Hovden 2003; Lafferty & Knudsen 2007; Jordan & Lenschow 2008). An important sector in this respect is energy, not the least by the potential of renewable electricity (RES-E). In this context, the present article provides a comparative assessment of how initiatives for RES-E in Denmark, Norway and Sweden can be assessed according to recently developed EPI concepts and standards.

A high degree of EPI is often considered to depend on politically determined commitments and objectives of change in the medium to long term (Jordan & Lenschow 2008). At the same time, empirical studies indicate that the phase-in of new RES-E production to a large extent depends on stable, long-term and technology-differentiated incentives which can complement technology development and market mechanisms (Reiche & Bechberger 2004; Mallon 2006; Lafferty & Ruud 2008). Studying RES-E initiatives within an EPI perspective stands out, therefore, as fruitful and relevant. Focusing on RES-E, the present article also aims to contribute to a more sector-specific understanding of EPI.

In addition the article aims to demonstrate the necessity of understanding the national and regional-local contexts for anchoring more effective RES-E implementation; that is the economic structures and interests, as well as the relevant institutional frameworks and conditions for public steering of energy and electricity policy in specific settings (c.f. Lafferty & Ruud 2008). The present article will thus assess contextual factors as a background and conditioning agent for the realisation of EPI standards through the promotion of RES-E in Scandinavia.[i]

The three countries in question are usually portrayed as front-runners in pursuing environmentally benign energy policies. They are, however, differently endowed with renewable energy resources and have adopted different RES-E policies. At the same time, the three countries share a wider policy framework and drivers from the international level and have created a common electricity market with Finland (NordPool).

All three are affected by EU energy and environmental policies; Denmark and Sweden as Member States, and Norway as partner in the European Economic Area (EEA). Furthermore, all countries have commitments under the Kyoto Protocol to greenhouse gas (GHG) reductions and the demands incurred by participation in the EU's emission trading scheme (ETS). Finally – and in the present case most importantly – all countries are committed by the EU Directive on renewable energies (RES), which is replacing the former Directive on RES-E and sets national targets for the total share of RES by 2020.[ii] These directives constitute a particularly interesting case for EPI, since the fulfilment of all three of the related goals (climate change, security of supply and employment/economic development) resonates with EPI standards, and the objective of achieving de- and re-coupling.[iii]

The national indicative targets provided for the three countries by the former RES-E directive have not, however, substantially affected national RES-E policies (Chen & Johnson 2008; Karnøe & Buchhhorn 2008; Knudsen et al. 2008). The new RES Directive, on the other hand, is expected to present more demanding requirements. Given the need for a transition period, the potential impact of the new directive will not be assessed in the present context.

The following section presents an outline of the analytical framework employed: This is then followed, in sections 3 and 4, by a comparative assessment of how RES-E initiatives in the three countries reflect the level and type of EPI standards in place. A discussion of contextual factors is then provided in section 5, with a general conclusion in section 6.

2 ANALYTICAL FRAMEWORK

Promoting RES-E in a perspective of sustainable development implies structural changes of traditional energy systems which have negative side-effects, such as resource depletion and ecological degradation (in the form of GHG emissions). A more sustainable energy system should be based on renewable sources, and provide less energy-intensive production and consumption patterns. The issue was given a highly substantial and profiled treatment in the processes following the publication of the Brundtland report in 1987 (WCED 1987, 14-15). The same report also pointed to the need of amending the political-administrative systems within which sectoral policies – such as energy – are formulated and implemented (WCED 1987, 313). A core assumption is here that the integration of environmental concerns into the decision-making at the outset would provide policy decisions with a higher probability for contributing to such a transition.

This is a particular challenge for public governance, which has constituted the core focus in studies related to environmental policy integration (EPI). In addition to the more academically based research, there have also been a number of EPI-relevant studies from a more practical, political-administrative approach – particularly those conducted by the European Environment Agency (EEA) and the OECD over the last decade, particularly focusing strategies and governance mechanisms in industrialized societies (Lafferty & Meadowcroft 2000; Lafferty 2004b; Jordan & Lenschow 2008; EEA 2005a, 2005b; OECD 2001a, 2001b, 2002). There has yet to emerge, however, a clear consensus as to what EPI implies (or should imply) for governing strategies for SD. This lack of clarity is related to the conceptual basis, the theoretical foundation and the analytical scope, and, most particularly, to the priority that should be accorded environmental concerns. Furthermore, there are few cross-national studies of EPI related to specific policy sectors (Sgobbi 2007). Hence, there is a definite need to clarify EPI further with insights from specific sectors in a comparative perspective.[iv]

When applying EPI as a framework for the assessment of a given sector, two major analytical dimensions appear as relevant. The first is related to the strength or authority of EPI as a decision-making principle; and the second is related to the implementation of EPI across levels of governance. In the present study, the first dimension will be addressed within the context of

national governance, while the second can be related to the national follow-up of the EU RES-E Directive, as well as to the further implementation of RES-E policies at regional and local levels. The first dimension will here constitute the major analytic focus.[v]

Addressing the issue of EPI as decision-making principle, and given the lack of a clear consensus as to what EPI implies in practice, it is important to refer to the debate on the fundamental criteria involved in an operationalization of 'EPI'. A crucial question here is the priority to be accorded environmental concerns. One position emphasises that the normative intent of EPI is to function as a 'first-order-principle' for resolving trade-offs between sectoral policy goals and environmental concerns by which one can achieve an actual de-coupling (Lafferty & Knudsen 2007). According to this approach, a high degree of EPI entails that environmental concerns are considered in an SD perspective, that is integrated as central premises and eventually reflected in the relevant sector's policy decisions (Lafferty & Hovden 2003,12). This fundamental idea has clear roots in the Brundtland report (WCED 1987, 313).

The notion of EPI as a 'first-order-principle' may seem rigid. The authors purporting this view, however, point out that this does not imply that policy concerns other than the environment must invariably give way. The 'trump' status of the principle in specific cases will depend on the policy process in question (Lafferty & Knudsen 2007). Different categories of environmental concerns can, moreover, often be simultaneously affected by different policy decisions. In relation to RES-E both climate-change and biological diversity can, for example, constitute critical parameters. The outcome of an eventual trade-off between different sets of environmental concerns depends on the overall normative balance of the process applied, most specifically how social and economic concerns are taken into consideration. This will in turn depend on whether the decision-makers employ a medium- or long-term perspective, and, further, whether they perceive relevant changes within a local, national or global context (c.f. Lafferty & Langhelle 1999, 7).

A major question addressed in the present context is, thus, the status of *substantial* EPI standards. As indicated above, this is to a large extent a question of de-coupling economic drivers from ecological degradation. Lafferty and Ruud (2006) point to the importance of addressing production and consumption in an integrated manner in order to achieve an actual de-coupling. More limited approaches focusing mainly on optimizing production processes often fail to take into account cumulative effects related to consumption dynamics, leading in the end to overall dysfunctions through, for example, so called "rebound effects" (Grepperud & Rasmussen 2004, 262). RES-E initiatives should, therefore, be considered within a coherent framework addressing parameters of both energy production and consumption.

Building further on the notion of de-coupling, 're-coupling' can be viewed as the process of defining and implementing new, more sustainable means of production and consumption; that is, processes of 'green innovation' (OECD 2001a; Lafferty & Ruud 2006, 455). Re-coupling also resonates with a crucial premise of the Brundtland report which states that continued economic growth is necessary, provided that the quality of growth changes (WCED 1987, 52). In this perspective, RES-E initiatives should be addressed within an overall governmental policy for innovation, with an emphasis on the principled priority for environmental concerns.

Acknowledging the 'first-order' nature of the EPI principle does not resolve, however, how it can best be applied by governments. Should EPI be seen as a mainly political-administrative framework for decision-making with a focus on rules and procedures? Or should one view EPI more in terms of specific policy 'outputs'; or even more substantially, in terms of actual policy 'outcomes' (c.f. Vedung 2004)? Different answers are provided to these questions (c.f. Persson 2007). In the present article, the main empirical references are RES-E relevant policy decisions (policy outputs); that is the priorities set and the instruments designed to achieve RES-E policy goals.

In order to assess the extent and degree to which RES-E initiatives in the three countries reflect EPI standards, it is also important to identify more specific steering mechanisms. In this regard, it is analytically fruitful to differentiate between two interactive EPI dimensions: the so-called 'horizontal' and 'vertical' dimensions of EPI (Lafferty 2004a, 204-205). A cross-sectoral, horizontal dimension is here related to a balanced trade-off among sectoral concerns within a specific level of governance (supra-national, national or sub-national); whereas a vertical dimension is related to the implementation of EPI within the different sectors (Lafferty & Hovden 2003, 12; Lafferty 2004a, 205-208).

Building on experiences with various mechanisms in OECD countries, different benchmarks have been developed to indicate operational approaches to EPI along these lines (Lafferty 2004a). *Horizontal benchmarks* for EPI thus include: a 'constitutional' mandate for endorsing EPI as a principle; an over-arching strategy with clearly enunciated goals and operational principles for pursuing SD. In addition a need to 'anchor' executive responsibilities and 'political will', and to bring into place a specific plan for administrative communication and coordination across sectoral domains (Lafferty 2004a, 206-208).

The *vertical benchmarks* include sector-specific strategies and action plans for the implementation of the overall strategy with stipulated priorities, targets and designated responsibilities. In addition, budgetary provisions and financial priorities, and a forum for structured dialogue with stakeholders and citizens constitute crucial mechanisms (Lafferty 2004a, 205-206).

It is also important to stress, however, that the coordination and overall integration of horizontal and vertical mechanisms is crucial. The lack of an over-arching SD strategy based on a clear political-institutional mandate often leads to a withering of responsibility (Lafferty & Meadowcroft 2000; Lafferty 2004b). In this perspective, RES-E initiatives can particularly reflect and support EPI by the existence, for example, of RES-E-relevant programmes and the eventual linkage between such plans and a national strategic framework for SD. An incentive for a stronger promotion of RES-E can also be provided by a more active coordination with other relevant policy sectors, such as environmental, industrial, innovation and regional policies. Such linkages can also represent a potential for re-coupling.

In principle, an effective implementation of EPI standards entails political-administrative coordination directly anchored in 'political will' from above. 'Ad hoc' approaches without such

anchoring are clearly more fragile in the daily workings and recurring competition among more traditional sectoral interests (Lafferty 2004a, 206). In a more long-term perspective, however, it is also possible that 'policy learning' can lead to some measure of sector-based EPI initiatives (Nilsson & Eckerberg 2007). Furthermore, it is also possible that robust RES-E initiatives, as well as related follow-up processes, can in themselves lead to a stronger and more substantial implementation of EPI standards as well.

Political leadership, and an enduring, committed mandate to pursue overarching SD-related goals over time are, therefore, crucial factors for the formulation and management of EPI standards (Lafferty & Meadowcroft 2000; Lafferty 2004b; Jordan & Lenschow 2008). To a large extent the same qualities apply to the follow-up of RES-E policy initiatives as well (Mallon 2006; Lafferty & Ruud 2008). The actual playing out of political leadership and a mandate will, however, also depend on the existing framework and capacity for public steering over the sector, as well as the nature of the economic structures and interests that shape and channel political will.

Applying these perspectives, the following two sections provide an initial comparative assessment of RES-E promotion in Scandinavia, viewed as a specific instance of EPI standards for energy production and usage. Following this, section five addresses contextual factors that can shed light on the different ways in which EPI standards are reflected by the three countries' promotion of RES-E.

3 RES-E AND EPI STANDARDS IN SCANDINAVIA

The present section will outline the main RES-E structures of the three countries, the related policy strategies and tactics, and thereby assess RES-E as a specific instance of EPI standards for energy production and usage.

3.1 Denmark

Denmark is the Scandinavian country most reliant on fossil sources for electricity production, but also the country with the smallest proportion of electricity consumption. The country is provided with an extensive infrastructure for district heating and a substantially lower proportion of energy-intensive industry compared to the two other countries. Denmark's total energy intensity is actually the lowest of the EU countries (IEA 2006). Denmark's commitment under the Kyoto Protocol is a 21 percent reduction by 2008-12, which is particularly challenging because of the transport sector. For RES-E, on the other hand, there has been a marked increase from virtually zero in the mid-1970's to 20 percent of total electricity consumption in 2005. Denmark's production of wind power (18 percent of total electricity usage in 2005) is the world's highest per capita.

Having been strongly affected by the oil shocks of the 1970's, Denmark adopted in 1976 a national energy plan aimed at a more diversified and domestically produced energy supply, with RES-E as a high-profile priority. This plan initiated a strategic policy approach which still constitutes the procedural basis for Danish energy policy formulation and implementation. As

follow-up mechanisms for the energy plans, Denmark introduced comparatively early a broad range of technology-differentiated RES-E incentives – such as guaranteed prices and investment subsidies, including an active promotion of research and innovation (Karnøe & Buchhorn 2008, 86).

In 1990 the Danish parliament adopted, prior to the final outcome of the negotiations on the Kyoto Protocol, an objective of reducing Danish CO_2-emissions by 20 percent by 2005. The target determined the major direction of the energy plan adopted the same year (DEA 2000), and from this point onwards Danish energy policies have been intimately connected with the climate-change policy.

As an ongoing premise for the continued existence and strength of the national energy plan, there has been considerable 'push' and support from below. Denmark represents in this regard an interesting case where innovative actors from civil society, science and industry have interacted with national political visions and top-down, regulatory approaches (Garud & Karnøe 2003; Karnøe & Buchhorn 2008). In particular, the combination of local ownership and nationally set incentives has ensured stable popular support for wind power (Hvelpelund 2005, 88).

Furthermore, since 1976 there have been innovative provisions for the siting of RES-E installations, including the allocation of area-specific rights for wind power production. The Danish Planning Act establishes national guidelines designating specific sites for wind-power turbines. At the same time there have been successive reforms of planning and licensing regulations which focus on reducing administrative barriers and delegating decisions towards regional and local levels.

The bottom-up nature of the Danish RES-E initiatives has stimulated processes of dynamic learning-by-doing among multiple actors, as well as interactive conceptions of R&D. These processes have been systematically funnelled towards scaling-up technologies and thereby created an innovative industrial sector which currently constitutes the backbone of the Danish economy (Garud & Karnøe 2003). These processes also succinctly illustrate the re-coupling potential of the Danish RES-E policies.

In 2007, Denmark's centre-right government adopted a new objective of doubling the renewable share of primary energy use from 15 to 30 percent by 2025, with total energy use to remain at its present level (Ministry of Transport and Energy 2005). Hence, Denmark still operates within a strategic framework coordinating energy and climate-change polices. Furthermore, this framework has been reinforced by a periodically integrated political-administrative mandate – particularly between 1994 and 2001 when there was an integrated Ministry for Environment and Energy. In 2007 a Ministry of Climate and Energy was established.

The Danish profile displays, however, weaker linkages with cross-sectoral strategies for sustainable development. Between 1993 and 2002, however, there was a system of strategic environmental planning with environmental policy status reports, encompassing the energy plans (Dalal-Clayton 1996). Whereas this framework did not entail any further requirements with

respect to RES-E, it can be considered as an over-arching EPI tool in the Danish context. The current SD action plan is intended to represent an equivalent framework (Danish EPA 2002), but lacks mechanisms for ensuring coherence between overall objectives, sectoral implementation and evaluation.

In sum, therefore, Denmark's integration of RES-E with climate-change mitigation can be seen as a reflection of a vertical, sector-specific approach to EPI. Moreover, the promotion of RES-E is coordinated with measures for a net phase-out of fossil energy production and usage – thereby reflecting a substantial degree of de-coupling. In addition Denmark's strong innovative RES-E tradition induces re-coupling processes. In particular, the successful implementation of wind power also seems to have stimulated a consolidation and continuous development of this framework and thereby contributed to reinforce EPI standards.

3.2 Norway

The Norwegian energy profile has traditionally been dominated by hydropower, and more recently by oil and gas. Hydropower provides (in an 'average year') more than 90 percent of the country's total electricity consumption. As of 2008 less than 1 percent was generated by wind power, and an even smaller proportion by biomass. The RES-E profile is further characterized by a high degree of electricity-based heating, and an industrial sector (aluminium and light metals) that uses nearly one third of the country's electricity production. Increasing electricity consumption, power exchanges within the 'Nord Pool' market, and a limited amount of 'new' RES-E production, have all led to increasing shares of imported non-renewable electricity, thereby challenging Norway's advantageous 'green' position. Moreover, the Parliament has decided that, in principle, construction of new large-scale hydropower is no longer an option (Knudsen et al. 2008).

As for sustainable development, Norway adopted (under Prime Minister Brundtland in 1989) a comprehensive programme, based on the major issues of the Brundtland report, and was in the early 1990's generally considered to be an international front-runner in trying to implement EPI, principally through linkages with the state budget (Lafferty et al. 2008). Norway's current SD strategy – which is managed by the Ministry of Finance – is only generally indicative for the sectoral ministries (as part of the national budget), with a very low political profile and no significant monitoring procedures (Lafferty et al. 2007).

Whereas Norway is often commended for integrating its SD efforts within the state budget, there is (in contrast to Denmark) no policy-planning framework for the energy sector as a whole. While there is a planning system for the assessment and classification of the country's hydropower resources which includes the designation of protected areas, no such procedures have thus far been developed for other renewables. In particular, wind-power projects suffer in Norway from complex and time-consuming licensing processes (Knudsen et al. 2008, 266).

On the other hand, however, Norwegian climate policy has, for more than a decade, focused on RES-E as a key contributor to GHG emission reductions. A separate Energy Fund under the auspices of a new public enterprise, Enova, was established in 2001 to provide grants for RES-E

projects, and to promote renewable heating and energy efficiency (Knudsen et al. 2008, 259-61). This is the main instrument for reaching Norway's targets of at least 3 TWh per year wind power production by 2010, in addition to 4 TWh from renewable heating. These targets have been extended to 2016, at which time there should have been realised a total energy switch of 30 TWh. The most recent climate-change policy strategy focuses even more strongly on contributions from the different policy sectors than previous strategies. But this has thus far not led to any substantial policy shifts. In 2006, after prolonged negotiations, a proposed common Swedish-Norwegian certificate scheme for RES-E was dropped by the Government. The idea has been revived, however.[vi]

An additional important dimension in understanding the position of non-hydro RES-E in Norway is the economic dominance of the petroleum sector. Norway is among the world's largest petroleum exporters, and Europe's (second) largest natural gas supplier. The Norwegian Kyoto commitment to limit GHG emissions to a maximum of one per cent above the 1990 level is challenging to achieve, mainly due to the petroleum and transport sectors.

The petroleum sector ensures generous revenues for the Norwegian welfare-state system. Under the current SD Strategy increased levels of welfare are described as both a major achievement and a continuous objective of future policies, and in the political debate few critical questions have been raised about the dominant position of the sector (Lafferty et al. 2007, 186). The sector's dominance is also reflected in innovation-related policies, where substantially higher amounts of public funding are provided for the development of technologies for carbon capture and storage (CCS) compared to RES-E (Mosvold Larsen 2005; Klitkou et al. 2008).

There are, however, current indications of shifting policy priorities. In 2007, a pilot project for off-shore wind power was granted public financial support, and from 2009 a research and development programme for off-shore wind power is in place. Furthermore, in 2009 several research centres for RES have been established with support from the Norwegian Research Council, including two centres for off-shore wind power. The prospect of using Norwegian RES – principally hydro and off-shore wind – as substantial suppliers for the European market, can be considered as a potential for de- and re-coupling in a European perspective. This is, at least implicitly, addressed by the Norwegian energy industry and related research and innovation agents.

Nevertheless, despite recent increases in public financial allocations and industrial interest for RES-E, Norway still lacks a strategic framework and adequate support mechanisms for more effective implementation and phase-in of non-hydro RES-E. Secondly, there is no coherent framework for making trade-off's related to an actual de-coupling of the energy sector. In sum, therefore, Norwegian RES-E initiatives demonstrate, thus far, a very limited reflection of EPI standards.

3.3 Sweden

Electricity accounts for one-third of Sweden's energy end-use, which is more than Denmark but less than Norway. Hydropower and nuclear power account for roughly equal shares of Sweden's

current electricity consumption, together making up some 90 percent. Bioenergy is the most substantial renewable source after hydropower – largely through combined heat and power generation (CHP), whereas wind power accounts for about 1 percent (2007), although currently increasing its share (Chen & Johnson 2008, 221-224). Sweden adopted an ambitious GHG objective in 2002, aiming to reduce the country's total emissions by 4 percent in 2008-2012 compared to the 1990 level, thereby over-fulfilling its Kyoto commitment (4 percent increase).

Based on a referendum from 1980, a phase-out of nuclear power by 2010 has been an overall objective for Swedish energy policy. In addition, there has been a policy objective to reduce the oil-dependence of the economy, providing a reduction from approximately 70 percent imports in 1973-4 to just over 30 percent at current levels (Chen & Johnson 2008). The former social-democratic government even proposed a programme for a 100 percent petroleum-free economy by 2020.

Currently, important policy shifts are undertaken by the current centre-right governing coalition. The goal of a petroleum-free economy has thus far not been followed up, and the goal of phasing out nuclear power generation has apparently been abandoned (Regeringskansliet 2009). Nevertheless, in sum, the structural challenges associated with these traditional goals have together substantially influenced Sweden's increasingly progressive RES-E policies over the last decade (Chen & Johnson 2008).

In addition, Sweden is traditionally praised for having one of the world's most ambitious SD polices. An explicit cross-sectoral strategy for SD has only been in place since 2002, but an overall idea of moving Sweden towards a 'green welfare state' was introduced in the 1990's (Lundqvist 2004). As the country was facing a solid economic downturn, a reinforced focus on SD appeared as a political priority – with EPI as a key instrument (Lundqvist 2000). The vision of a 'green welfare state' invoked all three dimensions of SD, albeit with a specific priority for the environment (Lundqvist 2001).

Whereas the current SD strategy itself has been viewed as politically insignificant (Nilsson & Persson 2008, 233), the strategic SD framework initiated in the mid-1990's can nonetheless be seen as politically strong, actively promoted by the Prime Minister's Office of the previous Labour Government (Lundqvist 2004, 77-78). RES-E initiatives were a crucial part, albeit gradually integrated into the more specific climate-change policy framework (Nilsson & Eckerberg 2007,138). RES-E policies are, moreover, focused by the regular evaluations and revisions of the climate-change mitigation strategies, the last one being undertaken in 2008 (SOU 2008).

It must also be stressed that the system of *National Environmental Quality Objectives*, NEQO (adopted in 1999), has a specific focus on the de-coupling of sectoral activities, and is considered to be Sweden's most prominent EPI mechanism (Nilsson & Persson 2008, 233). The system includes monitoring and comprehensive evaluation reports on the different sectors, particularly energy (Lundqvist 2004; Knudsen 2008). The NEQO system and the climate-change policy

evaluations thus provide Sweden with an explicit and substantial perspective on de-coupling through RES-E initiatives (Knudsen 2008).

Partly in response to the EU RES-E Directive, a wide variety of support schemes were consolidated into a tradable certificate scheme (TGC) in 2003, with an expanded target of contributing an additional 17 TWh RES-E by 2016 (compared to the 2002 level). The TGC scheme obliges electricity consumers to purchase a stipulated share of RES-E, thereby contributing directly to the funding of RES-E production. The TGC scheme proved to be particularly favourable for biomass, while the picture for wind power was more mixed. Consequently, specific financial measures have been introduced to promote the innovative development of wind power, particularly different off-shore concepts. In addition to various innovative developments in the bioenergy industry, this constitutes an important contribution to re-coupling through RES-E in a Swedish context.

As far as the administrative framework is concerned, adjustments have also been made in the licensing procedures, with increased delegation of authority to the regional and local levels. This also reflects an important dimension in Sweden's overall SD framework, with its emphasis on regional and local projects (Lundqvist 2004). In particular, since 1998 investment programmes aimed at the local level have contributed to the conversion of petroleum-based district heating to combined heat and power production based on biomass (Aakre & Torvanger 2007, 29).

The regional-local focus has, however, been solidly anchored within a nationally set policy framework, representing a predominantly top-down approach (Lundqvist 2001; Nilsson 2005). So-called 'national interest areas' for wind power have been identified by national authorities (in close cooperation with regional authorities and stakeholders) as a pre-selection process for wind-power sites (Ministry for Sustainable Development 2005). The actual siting and construction of such facilities has, however, still resulted in several central-local conflicts (Söderholm et al. 2007; Ruud et al. 2009).

In sum, Sweden's integration of RES-E within an overall SD strategic orientation reflects a horizontal, sector-encompassing EPI approach. RES-E is increasingly related to climate-change mitigation, but RES-E initiatives are at the same time relatively well integrated with other parts of the energy policy. The promotion of RES-E thus involves a potential for an actual de-coupling of the energy sector as a whole.

4 SUMMARY ASSESSMENT OF RES-E INITIATIVES AND EPI STANDARDS

As indicated by the previous section, RES-E initiatives can reflect EPI standards in different ways, and the three Scandinavian countries demonstrate how their different promotion of RES-E provides different potentials for de- and re-coupling. This is particularly reflected by the level and type of integration with other policy efforts aiming at the change of energy production and usage.

In this regard, Denmark and Sweden have established more coherent, strategic frameworks than Norway, including more clearly enunciated targets and follow-up mechanisms. Danish RES-E initiatives have also been actively linked to policy measures for innovation and industrial development, thereby implying a stronger re-coupling potential than the other two countries.

When considering the connection between the strategic level and operational modes, the Danish and Swedish RES-E initiatives have to a larger extent been related to differentiated measures and incentives than the Norwegian ones. Strong policy coherence and robust commitments also represent important signals to investors, producers and consumers of RES-E. The more integrated Danish and Swedish planning frameworks have thus resulted in larger shares of new RES-E production. Norway's lack of a similar framework can be seen as a key reason why the country has encountered stronger operational barriers, resulting in only modest development of new RES-E.

Another important aspect of the more coherent approach to RES-E in Denmark and Sweden is the possibility of identifying dilemmas and trade-offs between different concerns. Sweden disposes of the trade-off mechanism most explicitly linked to SD. Within the Swedish NEQO system, RES-E is assessed in a cross-sectoral perspective, with an emphasis on basic resource use. Moreover, this also includes running evaluations of specific policy instruments and their implementation. Although the learning potential of these mechanisms is substantial, there remain, of course, questions as to the extent to which the NEQO assessments actually contribute to different policy outcomes according to the established goals (Lundqvist 2004, 142-143; Knudsen 2008).

In sum, the three countries clearly illustrate different ways by which a strategic and promotional framework for RES-E can promote EPI standards. Denmark and Sweden – though differing on their choice of governing mechanisms and policy instruments – are clearly more advanced with respect to RES-E/EPI than Norway.

5 THE IMPORTANCE OF CONTEXTUAL FACTORS

Following up such an assessment, the next question we can pose relates to the role of contextual factors. To what degree do such factors shed light on the differing achievements vis-à-vis EPI as illustrated by the three countries' promotion of RES-E? As outlined earlier, three main categories of factors are considered to be of importance: Political will in the form of long-term commitments; the operational framework in place for public steering over the sector; and the key economic structures and interests that shape and channel political will.

In Denmark, broad parliamentary agreements have been related to the follow-up of the energy policy plans. Building on an increasingly coherent and environmentally oriented energy-planning process, there occurred a vital shift in 1994 when the political responsibility for energy and environment was merged under the ministerial responsibility of the Social-democratic leader, Svend Auken. Known as a strong exponent of a more sector-encompassing and ambitious environmental policy, Mr. Auken was a key architect of the alliance between the governing

Social-Democrats, and the Radical Left Party and Socialist People's Party in Parliament. The three parties together actively opposed the environmental policies of the previous centre-right governments, emphasising the need of a stronger RES-E promotion (Andersen et al. 1998).

A substantial policy shift occurred, however, in 2002 when the centre-right government significantly reduced the traditional fixed-price support schemes. The support mechanisms were, however, re-adjusted upwards in 2004, after considerable pressure from, among others, the important national wind power industry (Karnøe & Buchhorn 2008,78).

In Sweden the Social-Democratic Government's programme for ecological modernisation, with a strong focus on RES-E, was supported by the Centre Party and the Green Party in the Parliament (Lundqvist 2004). A need for 'sustainable livelihoods' and 'alternative economic growth' were important reasons behind the RES-E policy plans from the 1990's onwards, but this rationale has been somewhat modified by the current centre-right governing coalition. In Norway, although there have been broad political coalitions supporting certain crucial overall principles – such as the 'moratorium' on further large-scale hydropower development – there have been no substantial agreements with respect to initiatives for 'new' RES-E.

With respect to Denmark and Sweden, though both countries show relatively high levels of political commitment, they also manifest contextual differences as to how these commitments are influencing and being influenced by the existing institutional framework and structure of the energy sector. Although the Danish energy plans have provided important guidelines for the transition towards a more sustainable energy system, the substantive outcome in Denmark is to a large degree a historical product of the interaction with bottom-up processes and NGOs (Hvelpelund 2005). In Sweden, on the other hand, there has been a decidedly stronger top-down approach.

Nilsson (2006: 226) points here to two core dimensions of the Swedish governing tradition that seem to stimulate EPI in general: a 'seminar culture' under bureaucratic guidance, and a well-established system of corporatist-pluralist representation. This is reflected by the fact that most of the energy policy reforms in Sweden have been preceded by broad commissions and committees scoping different policy options, with active representation from different experts and stakeholders (Nilsson 2006; Nilsson et al. 2007).

In Denmark we find very different cultural-administrative traditions. Here the historical ownership and management structure of energy production, with local cooperatives as core entities, both induces and facilitates a centrally coordinated policy-planning approach that at the same time achieves high legitimacy through decentralised participation. This has been manifested through the achievement of grid access for smaller RES-E producers, as well as through open dialogue and important 'bottom-up' inputs to the national energy plans. These specific historically anchored structures provide one reason for why Denmark was the last Nordic country to deregulate its electricity sector. The Danish deregulation was, moreover, designed – at least partly – to safeguard the historical structures of the sector (Pedersen & Rieper 2008, 287).

More generally, deregulation also seems to be contextually dependent in its effects. For Norway it has been maintained that that deregulation has weakened the basis for more coherent and politically defined RES-E strategies (c.f. Thue 1996). In contrast, however, Sweden has established broader promotional programmes for RES-E *within* a deregulated policy regime. Although market-based thinking is strongly reflected in Sweden's scheme for tradable green certificates, it has also been necessary to introduce a substantial non-market policy framework for the stimulation of off-shore wind power and local siting of on-shore wind turbines.

A general lack of a comparable structural challenge to the supply of energy in Norway (like that experienced by Denmark and Sweden), provides a key reason why Norwegian politicians have been more recalcitrant to prioritise new RES-E production. Norway does have, however, a vital energy-intensive industrial sector on shore which provides vital employment in the less populous regions of Norway. The Norwegian State has historically provided this sector with long-term contracts for low-cost electricity. These contracts are now beginning to expire, and are no longer seen as viable, specifically with reference to the EEA Agreement (Knudsen et al., 253). In this context, one observes an increasing industrial interest for developing wind power as a supplement to hydropower in the outlying districts.

Energy-intensive industries continue to play an important role in Sweden as well, largely related to wood processing. This industry, however, has had the advantage of contributing to an overall conversion from oil to biomass in connection with the conversion to renewable generation of the extensive infrastructure for district heating (Midttun & Koefoed 2005).

In Denmark, as indicated above, there is no significant energy-intensive industrial structure. Synergies with traditional industries (mechanical and agricultural industries) were crucial, however, in the establishment of new industrial activities related to wind power and bioenergy (Garud & Karnøe 2003; Buen 2005). The Danish experience demonstrates the importance of the specific nature of the domestic industrial basis and its interaction with a politically formulated, but dynamic and stakeholder-focused framework.

6 CONCLUSION

Danish and Swedish RES-E initiatives reflect EPI standards more substantially than is the case for Norway. This is primarily due to the anchoring of RES-E initiatives within more consistent policy frameworks addressing energy production and usage, with de-coupling as a core perspective. Furthermore, Danish RES-E initiatives also imply a stronger and more innovative re-coupling potential than the other two countries.

As far as more general EPI mechanisms are concerned, Denmark and Sweden also illustrate how EPI can constitute a framework with the potential of facilitating the promotion of RES-E. This is demonstrated by the more consistent procedural and institutional linkages between the strategic level and related follow-up mechanisms in the two countries, however in different ways. The Danish approach is more sector-specific and includes a stronger interaction with stakeholders in

bottom-up processes; whereas the Swedish approach is characterised by a more sector-encompassing strategy, within a relatively centralized bureaucratic framework.

A particularly interesting feature to emerge from the present analysis is the manner by which a successful implementation of wind power in Denmark has both stimulated and legitimized further development of a more integrated political-strategic framework for energy and climate. Good policy performance 'on the ground' has, in other words, contributed to a general reinforcement of EPI standards throughout the energy system.

In sum, contextual differences among the Scandinavian states have provided different bases for the promotion and integration of RES-E into existing energy systems. The different energy 'paths', and the outcomes they have conditioned, confirm the need to contextualise 'universal models' for reinforcing the de- and re-coupling potentials of RES-E initiatives. On a more general level, however, the cases also demonstrate that high levels of EPI achievement depend on solidly anchored and enduring political commitments.

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Notes

[i] The present article is substantially building on the author's participation in two recent research projects, as research scientist at the Program for Research and Documentation for a Sustainable Society (ProSus), the University of Oslo: 1) The EU-funded research project *Environmental Policy Integration and Multi-Level Governance (EPIGOV)*. 2) A research project conducted by ProSus providing a comparative assessment of the implementation of the EU RES-E Directive (Dir 2001/77/EC) in eight European countries (Austria, Denmark, Finland, Ireland, Netherlands, Norway, Spain and Sweden) (Lafferty & Ruud 2008).

[ii] C.f. COM(2008) 19 final: Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources. Brussels: The European Commission.

[iii] In the RES-E Directive's preamble this multiple purpose is phrased in the following manner: "The Community recognizes …. that their exploitation [of renewable energy sources] contributes to environmental protection and sustainable development. In addition this can also create local employment, have a positive impact on social cohesion, contribute to security of supply and make it possible to meet the Kyoto targets more quickly." (CEC 2001).

[iv] An important exception to this overall picture is provided by a recent comparative study of EPI in the agricultural and energy sectors in Sweden (Nilsson and Eckerberg 2007).

[v] The EPIGOV project, referred to under endnote 1 above, has addressed both dimensions with a clear emphasis on multi-level governance (MLG). The MLG dimension will not, however, be explicitly treated in the present article, but is substantially analysed in a recent comparative assessment of RES-E policies in the EU and the USA (Knudsen 2009, forthcoming).

[vi] There are ongoing (as to the spring of 2009) negotiations. The outcome will also depend on the compatibility with the countries' commitments under the EU RES Directive.

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