Wind Energy: International Practices to Support Community Engagement and Acceptance

SLR Ref: 501.00319.00001

February 2014

An Chomhairle Náisiúnta Eacnamaíoch agus Shóisialta
National Economic & Social Council
NESC

Queen's University Belfast

University of Exeter

CONTENTS

TABLES

FIGURES

APPENDICES

EXECUTIVE SUMMARY

Introduction

The overall objective of this project has been to examine the context and processes for renewable energy development in Ireland as part of an emergent and complex energy system within a changing EU context. This has been done by investigating some of the significant drivers, processes and key components discernible from regional examples (see National Report) as well as from other key countries undergoing energy transformation (Denmark, Germany and Scotland) (see this International Report). The project has sought to reflect on the international experience and examine which elements, if any, of these processes and strategies may have applicability to Ireland in the medium term.

Key factors influencing Community Acceptance

The research has been conducted through the lens of social acceptance theory in both the national and international studies. This provided a structure by which to compare the contexts and practices of the countries studied. The policy and academic literature appears to offer consensus that community acceptance is driven by impacts on place, issues of justice and trust, as described below:

Impacts on People-Place relations

This includes health and environmental impacts, i.e. concerns around the specific changes to the places in which people live, brought about by the wind energy project. The most significant concerns appears to be around the degree of visual intrusion, noise, bio-diversity and broadly, local well-being.

Issues of Justice

Some communities perceive the imposition of wind energy projects from external agents as failing in terms of justice, often seen as having two key dimensions:

- *Procedural Justice,* i.e. concerns that decisions related to wind energy projects are not taken in an open or fair way, leading to resentment that a project has been foisted on a local community, rather than accepted by choice.
- *Perceived distribution of costs and benefits,* i.e. justice issues emerging from the perception that while local communities may have to bear the main impacts of a wind energy proposal (as outlined above), it is external bodies, particularly developers, that accrue most of the benefits.

These factors will combine in complex ways around individual project proposals. We can understand this as reflecting the conceptual framework outlined above, in that the reactions to a local project (i.e. niche) can be strongly influenced by the wider regulatory context (i.e. regime) and the broader societal values around energy and related issues such as climate change (i.e. landscape). Community reactions are also likely to be influenced by the very specific context including local power relations and place-attachment (Devine-Wright, 2009) and as noted can be partly determined by previous community experience with major development proposals or interactions with local regulatory agencies, so that it also displays a degree of path-dependency.

Wind energy and grid infrastructure in Europe

Wind energy has continued to develop at a significant pace since the early 1990s across the European Union (EU). Wind power accounted for 26.5% of new power capacity installations in 2012, the second biggest share after solar PV (37%) and before gas (23%). The key driver for the development of renewable energy has been to decarbonise our energy capacity. The deployment of wind energy and other renewable energy implies that fossil fuel capacity is gradually replaced and decommissioned. In 2012, a total of 31 GW of renewable power capacity was installed. It was the fifth year running that over 55% of all new power capacity in the EU was renewable.

Current member state targets are based on their respective National Renewable Energy Action Plans (NREAPs). In January 2014 the European Commission published new proposals which include a binding EU-wide renewable target "of at least 27%" but stated that there would be no individual targets for Member States. Instead, the Commission intends to introduce a "new governance system" based on national energy plans[1].

Transmission infrastructure has also been high on the European agenda. In October 2011, the European Commission tabled a comprehensive package to enhance trans-European energy infrastructure development[2]. In order to exploit the full potential of renewable generation in the region, strong electricity interconnections as well as interconnections will become increasingly important. The purpose of this priority is the integration of new capacities, mainly from renewables, in Western Europe and their transmission to consumption centres in other parts of the continent.

This is mirrored in Ireland where Grid 25[3] sets out Ireland's strategy for grid development and seeks to facilitate more sustainable, competitive, diverse and secure power supplies in support of economic and social development and renewable energy deployment. It involves extensive work throughout the country which includes building 800km of new power lines and upgrading 2,000km of existing lines which will double the size of today's electricity Grid[4]. The strategy was based on the innovative All Island Study which investigated a range of generation portfolios for Ireland; the ability of the power system to handle various amounts of electricity from renewable sources; the investment levels required, and the positive externalities that would accrue with regard to climate change and security of supply[5]. One of the conclusions of the study was that it was feasible to connect at least 40% renewable electricity in the grid system by 2020 if the Grid was developed in a smart manner, bearing in mind that larger emissions reductions may be required in the future.

Country selection for comparative analysis

In 2000, the annual wind power installations of three pioneering countries – Denmark, Germany and Spain – represented 85% of all EU wind capacity additions. Although by 2012, this share had decreased to 32% (EWEA 2013), these countries provide an unparalleled depth of experience in wind energy deployment to draw upon for this study. Two of these three countries have been selected for this study (Denmark and Germany) in addition to

[1] Renewable Energy Association (January 2014)

[2] In this context, the term energy infrastructure covers electricity transmission lines, gas, CO2 and oil pipelines, Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG) reception facilities and electricity and gas storage.

[3] Eirgrid (2010) Grid 25, A Strategy for the Development of Ireland's Electricity Grid for a Sustainable Future

[4] http://www.eirgridprojects.com/grid25/what-is-grid25/

[5] http://www.eirgrid.com/renewables/all-islandgridstudy/

Scotland which has some similarities to Ireland in terms of socio-political context in addition to its relatively rapid expansion of onshore wind energy since the early 1990s.

Approach and Methodology

The study method has included desk research, face to face and phone interviews and a web-based questionnaire. For each country, key interviews have been completed representing policy, renewable energy and community sectors, with additional material sourced through other means. The research sought to develop a deeper understanding of the practices, processes and drivers in a given context and how if at all these may transfer to Ireland. The key processes examined include: planning processes, policy and governance, social acceptance and participation, community benefit, community ownership, the development process and the role of local government.

Insights for Ireland from the international research

The international study sought to reflect on the experiences of Denmark, Germany and Scotland and examine which elements, if any, of these processes and strategies may have applicability to Ireland in the medium term. The following key insights emerged from the research.

Energy as a social concept

It is clear that in the case of Germany and Denmark (at least) that there is a wider appreciation of energy as part of a complex socio-technical system, so that government strategies, while expressed as (for example) technical targets for generating a proportions of energy by renewables, need to be supported not just by infrastructure or financial instruments, but also initiatives that encourage “softer” social development and engagement with energy, such as community ownership, addressing fuel poverty issues or broader social dialogue on the nation’s energy future. A broader appreciation of the social dimension of the energy system also lends itself to a more empathetic approach to understanding the subjective, understanding that different socio-demographic groups, or geographical communities may hold in relation to specific energy technologies (such as nuclear) or individual energy projects (such as a locally proposed wind farm), which in turn can help support a more deliberative approach to public participation.

Leadership and the role of targets

The international country cases also highlight the importance of government action being guided by long term targets (in the case of Germany and Scotland to 2050 and in the case of Scotland, also binding via the Climate Change Act). Long terms targets seem to be essential to the idea of defining the essential goals of any energy transition and while all EU nations, including Ireland, are working towards targets agreed for 2020, more far-reaching targets clearly help identify the nature of the long term investment needed for more wholesale energy transformation. Such targets are also indicative of the nature of leadership in shaping a nation’s energy future – both Germany and Scotland have sought to encourage a broad consensus around the direction of change in their energy systems and while this may not a sufficient on its own to secure wider social acceptance of specific technologies, it is clearly a necessary factor.

Integrating regulatory regimes

The idea of a long-term government wide approach to energy transformation implies a need to integrate practice across a number of policy areas, ensuring that practice in one area (e.g.

financial support) supports, rather than frustrates other aspects of transition, such as encouraging greater social acceptance. This does have implications for a variety of spheres of public and civic activity, including planning policy and consenting, community development, agricultural and landscape policy etc. As noted in the case of Denmark, these often come together most effectively at the local level and integration can be best achieved under the auspices of locally developed strategies specifically on energy or climate change.

Trade-offs between scale and acceptance

The case of Denmark appears to confirm observations from some of the (Irish) national case studies and from the research literature that there appears to be a generally negative correlation between the scale of wind energy projects and a decline in community acceptance. This appears to relate to not only the greater impact of large scale projects, but also the ownership profile that tends to be association with major projects requiring substantial investment funds, so that they tend to be associated with corporate, rather than community of cooperative interests. Clearly there are increased pressures to expand overall renewable capacity (balanced with energy efficiencies), which in turns demands an increase in project scale. Therefore perhaps one inevitable trade off is between scale and social acceptance. If scale is required to achieve targets (both for decarbonising and economic) it should be recognised that this will necessitate a new, approach to energy policy involving enhanced investment in social engagement so that suitable projects are generally found socially acceptable.

Creating opportunities for diverse niche exploitation

Related to the point above, it is clear that an energy transformation requires an exploitation of a wide range of types and locations for renewable energy projects. This may mean that Ireland will need to develop its capacity in technologies other than onshore wind (such as biomass and ocean energy), but will also need to ensure that its substantial onshore wind resource is maximised by diverse range of developers (from individual landowners to large scale corporate interests), with different sites offering unique opportunities for different type of project. Such an approach will require a more sophisticated approach to financial support and regulatory practice.

Approaches to community benefits

Different countries appear to have adopted very different approaches to securing broader benefits from wind energy developments for the local population. For example, in Denmark despite traditionally having high levels of social acceptance, the notion of community benefits funds, as developed in Ireland and across the UK, is not included in the range of intervention mechanisms as co-ownership and cooperative arrangements have been seen to be adequate for sharing the benefits from wind energy projects. Similarly in other countries, wind energy projects contribute directly to the local tax base, thus directly benefitting local communities without special fund arrangements. Instead in Ireland and the UK, there has been a reliance on voluntary agreements (supported by industrial protocols) for delivering such benefits, which have some positive impacts, but also face a range of difficulties in terms of their levels, administration and how they are perceived by local communities. This review therefore suggests that the notion of “community benefit” needs to be broadened, shifting the focus in Ireland from solely enhancing community benefits packages offered by developers to considering action on different mechanisms. To assist in this, it is possible to consider at least four mechanisms for delivery of community benefits, all of which could potentially be enhanced in an Irish context:

- Voluntary schemes run by individual companies or under industrial protocols;

- Regulatory defined schemes – such as standardised infrastructure levies, community benefits registers etc;
- Incentives for promoting community and co-ownership schemes;
- Schemes linking local development with local tax revenues.

Threats from a poor industrial practice

There is a specific example from Denmark (the Østerild Test Centre) that appears to have had a disproportionate impact on social acceptance of wind energy projects in Denmark. Because of problems of site design, location and the approach taken to engage with key interests, this project proceeded to attract high levels of opposition and media coverage. This appears to have then acted as a catalyst to broader social concerns about the nature of wind energy projects and as a consequence made it increasingly difficult to establish schemes, even well designed and executed ones, in other parts of the country. This clearly highlights the onus on all those involved in the wind energy industry to maintain the highest standards in project design and community engagement, with the poorest practice disproportionately influencing community attitudes to the sector.

Trust as a key concept

It is also clear that a key aspect of social acceptance is the extent of trust between the key parties involved in any wind energy project, including developers, local communities, regulatory agencies and other interests, such as those in the NGO community. There may be a range of opportunities to build trust nationally, or in the context of specific projects including open and transparent decision-making, credibility in key institutions and the development of good local relationships. Different approaches may be needed depending on the scale of the project, or the nature of the parties involved, but the case studies do highlight the benefits that can be derived from intermediaries (such as the Danish Wind Task Force), or advocate organisations, such as Local Energy Scotland.

Insights into Contexts and Practices and their relevance to Ireland

The objectives of this study were to understand the characteristics of wind energy deployment in three countries travelling a pro-active energy transition pathway. By investigating the different contexts and practices of these respective countries key characteristics and initiatives have been highlighted that might help or hinder progress within Ireland. The lens through which this was viewed was that of a social acceptance framework drawing on concepts which help tease out the multiplicity of factors that influence the social acceptance of wind energy and the need for upgraded grid infrastructure to optimise wind and other renewable electricity generating resources.

The key international insights organised under the following categories:

- Procedural Justice
- Place Related Impacts
- Distributional Justice

Procedural Justice

Planning System

Transferable lessons in terms of the planning system are highly context specific (i.e. linked to natural law and property rights) and hence insights may be limited. In Germany the two stage consultation process with authorities, stakeholders and general public on spatial

planning for wind and grid appears to have established a level of certainty for all stakeholders. Each municipality is effectively obliged to declare at least one zone for wind energy development. However, there are issues when applications are across municipality boundaries. The process has close links with the LARES and potentially what is required is a continued, resourced focus on this for Ireland with consideration of cross-boundary partnerships.

Public discourse

Public discourse was found (e.g. Scotland) to be heavily influenced by the media (often negative) and the greater connectivity of objectors (resulting in local protests becoming national with great speed). The implication of this is that industry practice must always be the best, as one bad experience can create a negative effect across the whole sector. This was particularly the case when projects of national interest may be in the planning process (e.g. Osterlid, Denmark, Beauly-Denny, Scotland) and the centralised process may result in less careful consideration of local social acceptance issues.

Consultation

Effective consultation is seen as a critical element of social acceptance. It needs to be done early, genuinely and frequently. It is important for achieving procedural justice for all scales of project. Regulation (e.g. in Scotland) has helped ensure that consultation is not just a tick box exercise by making it a pre-planning requisite which is assessed by local planning authorities. In addition to the potential for the introduction of pre-application consultation requirements, capacity building may be necessary for all stakeholders, including possibly deliberative engagement approaches (e.g. the Citizen's Jury pilot in Scotland) which helps participants engage with the totality of the decision making rather than single issues.

Intermediaries

Intermediaries (provision of expert advice) were seen as particularly beneficial (e.g. Wind Turbine Task Force, Denmark) in providing impartial advice (technical and planning) and engaging the community. A nationwide intermediary may help make better connections between national and local institutions and processes. Elements of this role are already provided by SEAI, IWEA and Meithal Na Gaoithe but there may be a need for a one stop shop approach for communities such as CARES, Scotland.

Research and development

In Germany the role of industry and science was noted as having an important role in the political and social change process required by the energy transition. Research and development can help drive technology innovation which may help reduce place-related impacts such as noise and visual effects which can be barriers to social acceptance. The Sixth Energy Programme (Germany) approach includes strategic, inter-ministerial and international research with an overarching programme to harmonise and maximise value added.

Governance of community benefits

Whilst it was found that in Scotland community benefit was, in terms of governance, subject to guidance (e.g. Highland Council and CARES) and a public domain register (Scottish Government) it was not necessarily thought of as the panacea for social acceptance by communities and academics. For example, the register in Scotland is an important step in

making this more transparent, however, without it being obligatory the information provided is limited to what the developer finds acceptable to reveal.

Place related impacts

Proximity

As mentioned above place related impacts can be a barrier to acceptance, especially for nearby residences. This is particularly complicated in Ireland due to the very dispersed settlement pattern. The research suggests that proximity to dwelling should be a key constraint in site selection. In addition, there are interesting measures limiting thresholds of impacts such as 20dBA for night time levels (Denmark), Ireland is currently consulting on 40dBA (until February 2014) and in Germany the maximum exposure to shadow flicker per day is 30 minutes. Cumulative impacts of such effects from wind farms are of increasing concern to communities and are starting to be addressed strategically, for example SNH's guidance on the cumulative impact of onshore wind energy developments (2012).

Spatial Zoning

Spatial zoning is a tool that has been effectively used in several countries (e.g. Germany and Wales) although it tends to lend itself more to identifying areas that are not suitable for development rather than preferred areas. As a process however, it has the potential to engage all stakeholders to develop a consensual approach that could tie in with national planning, landscape strategy and tourism planning where potentially conflicting policy interests need to be resolved.

Summary

Procedural justice is as important and often intertwined with distributional justice. In Ireland there are some sound processes such as LARES that can continue to be built upon. This mirrors to an extent practices elsewhere, such as the German approach to identifying zones for wind energy development. It is possible that there are lessons to be learnt from the consultation processes in Germany and closer investigation of these may be worthwhile.

Public discourse and the role of the media is an area for concern and underlines the importance of best practice but also of pro-actively engaging public and communities in discussions and debate about future energy pathways. Without this, responses to single projects are likely to continue to be reactive and subject to influence by the media and anti-campaigns.

Resolving proximity issues is critical to social acceptance. Government and industry need to show that they are listening to communities and residents and acting to address unacceptable impacts.

Distributional Justice

A community business tax: (similar to the German model) which ensures that proportionally more benefits are distributed within the locality of the wind farm than leaving the area to be accrued elsewhere (e.g. in the location of the headquarters of developer/operator). This would help to address the balance of distributional impacts compared to benefits for the local community. It could be an additional measure to the local commercial rates already raised from wind farms.

It is worth considering the incentivisation of repowering (as in Germany) as this could help make the most of existing sites. It would also provide an opportunity for communities to renegotiate terms such as equity and benefit as well as to address other areas of concern such as habitat management and restoration. In addition repowering can stimulate the reuse and recycling market for turbine components which can provide local economic opportunities.

Community equity is generally seen as a more effective route to creating local value than community benefit and was noted as a more important aim by interviewees (Scotland, Denmark and UK). In addition to it potentially yielding more value it gives people an active role, long term in the project (enhancing the chances of procedural justice). Affordability of share prices would need to be considered and the appropriate level of equity (20% in Denmark, 51% in Germany, and a target of 500MW in Scotland). Such a scheme needs to be devised and designed with key stakeholders to understand the requirements and likelihood of success. The development of community equity guidelines would be beneficial.

From wider research including the UK, there are a number of Joint Ventures which may provide model approaches. Including JVs between local authorities and companies (e.g. Woking Council), plus community examples such as Neilston Community Wind Farm in Scotland. It is worth considering whether adopting a regulatory approach obliging companies to share equity would assist an energy transition or not. And if such regulation should suggest a target figure as a floor or ceiling, for example the Danish target of 20% may be considered low compared with instances of certain projects such as Neilston (50%) and the German Burgerwindparks.

Summary

Creating local value is likely to be a way of increasing social acceptance and community engagement in wind energy and the associated grid power lines. Measures that improve the distributional justice of the costs and benefits of developments have long term implications for communities over the project's operational life time. This is particularly important in areas of socio-economic deprivation. It is therefore suggested that initial policies attempt to improve and standardise the current benefit offers, whilst putting in place new regulations to encourage equity (and JVs) in the medium and long term. The opportunity to allow people to buy equity only really arises at the development stage so the longer the equity approach is put off the more limited the scope for applying it, although there is potential to apply it at other stages of the project such as repowering and change of ownership. The potential for joint ventures and ways of building capacity within the community (through intermediaries or public bodies) would also be useful to explore. A community business tax would be a further measure that ensures the redistribution of profits to the host community.

Conclusions and Next Steps

In conclusion it was thought that, whilst wind energy in Ireland had developed at a comparative speed to the countries studied, there were a number of important insights, contexts and practices that may help to increase the social acceptance and community engagement in Ireland. These are summarised as follows:

Procedural justice

Energiewende – an equivalent holistic socio-technical approach in Ireland has the potential to address many of the issues of social acceptance and community engagement. This is discussed further in the National Report referred to as Fuinneamh Feasts (Energy for the Future). The concept would be built from the bottom up, with local consultations that feed

into the process. It would incorporate NREAP and the Green Energy Paper and provide the overarching approach from a social perspective.

Community Benefit 1– Increasing the transparency of different community benefit packages may help to standardise the approach and provide communities with a more informed negotiating position. Replicating Highland Council's approach could be considered as this provides a process of governance as well as the financial guidance. Consider setting up a Community Benefit Register for Ireland but in the context of distributional justice and consider next to other measures such as equity, local taxation and joint ventures. Negotiate with IWEA to ensure industry disclose benefit details fully and promptly.

Public discourse - The combination of the integrated planning system and informed public discourse provides a wider and deeper backdrop within which the public may support specific projects. This may help counter balance negative media and anti-wind campaigns stimulating genuine and effective discourse between politicians, public and media which could provide a more stable back drop to social acceptance of appropriate projects in Ireland and in turn help communities to engage more effectively in wind energy deployment. It is suggested that Ireland reviews existing activities and their potential impact (e.g. communication and education campaigns) and considers measures required to support public discourse.

Community consultation and engagement – The quality of consultation and engagement has been shown to have a direct effect on the level of support or objection to new developments. It is worth considering developing communication standards for community engagement. Investigating ways of ensuring that these are applied at all scales of development. Consider the introduction of pre-application consultation requirements for new wind and grid developments. Consider capacity building for all stakeholders before any roll out of new engagement consultation/regulations.

Deliberative engagement – the Citizen's Jury approach currently being trialled in Scotland is worth investigating further. It could be a complementary activity to public discourse initiatives to develop understanding of the issues and decision making involved in wind farms. It may also reach members of the public who are currently not engaged. A pilot study may be useful.

Intermediary – Technical advice is provided by a number of bodies in Ireland (e.g. SEAI and IWEA). The role of the Wind Turbine Task Force in Denmark and CARES in Scotland demonstrate the value of such intermediaries in terms of social acceptance. It may be timely to review the roles of different organisations in Ireland and any gaps in provision of intermediary support. Consider how an intermediary role may facilitate social acceptance (for example, making better connections between national and local institutions and processes) and the remit and delivery of such a role.

<u>Place-related impacts</u>

The international research found a number of initiatives designed to reduce or mitigate place-related impacts. These are important factors in social acceptance as the study interviews indicated, poor industrial practice and proximity issues can lead to challenging projects which in turn can fuel local and national objections to wider issues. There is currently a targeted review in relation to Noise, Proximity and Shadow Flicker in Ireland (consultation runs until February 2014). However, there may be additional value in consulting on a wider range of noise thresholds, set back distances and shadow flicker regulations. It may also be worth exploring the possibility of compensation (or purchase) where proximity issues cannot be resolved for existing as well as future sites. It is suggested

that this is devised and co-produced with local authorities; otherwise, it is less likely to succeed.

Distributional justice

Community Business Tax (Germany) - Conduct cost/benefit analysis of introducing such a mechanism which ensures that a higher proportion of tax is retained in the local community.

Feed-in-Tariff – REFIT incentivises new sites but could also be used to incentivise repowering older sites. This can help optimise energy generation from existing sites which are already familiar in the landscape. Repowering can also provide an opportunity for renewed consultation and community engagement including arrangements for equity and/or benefit.

Community Equity 1 – a scheme similar to the Danish 20% equity is worth exploring. It would be important to assess affordable share prices in Irish context (examples have ranged from €125 to €2500) and the appropriate level of equity to be released to community members (i.e. is 20% too high or too low?). An equity scheme for Ireland should be devised and designed with key stakeholders (community and developers) to understand requirements and likelihood of success. Public bodies may also wish to look at social justice/affordability issues.

Community Equity 2 - a target such as Scotland's 500MW community ownership target is worth considering to drive forward community ownership but is likely be more effective if supported by other measures both financial and intermediary. Investigate how best to define community in a workable way (see alternative UK definitions that include or exclude depending upon charitable status, source of funding etc.). Consider the appropriate target level. It would also be worthwhile exploring the potential for Joint Ventures.

Community Equity 3 – The option to purchase scheme in Germany gives preference to local investors in share distribution. This works well in the context of Energiewende and may work comparably in Ireland with the potential for a holistic context developed with the ETP and county level plans. Further development could include; each county reviewing potential areas where community driven wind farms would be more appropriate; identifying support required such as; capacity, finance, planning advice, legal negotiations; developing equity guidelines. It would also be worthwhile considering applicability for new power lines. Evaluating and consulting with communities on appropriate target level would contribute to procedural and distributional justice and help increase social acceptance.

1.0 INTRODUCTION

1.1 Background

By 2050, Ireland's energy system could be transformed to a system built on wind and other renewables, using a smart grid and integrated into a clean EU energy system. While the need for this transformation may be gaining consensus, there has been less discussion on the process by which this can be achieved. This project has sought out insights for Ireland as to how to achieve an effective transformation and reach its renewable targets for 2020 and beyond, with a particular focus on social acceptance and community engagement.

The overall objective of the project has been to examine the context and processes for renewable energy development in Ireland as part of an emergent and complex energy system within a changing EU context. It has investigated some of the significant drivers, processes and key components discernible from regional examples as well as from other key countries undergoing energy transformation (Denmark, Germany and Scotland). The project has sought to reflect on the international experience and examine which elements, if any, of these processes and strategies may have applicability nationally in the medium term.

Where it is more usual to examine the technical and environmental constraints to renewable energy growth the main objective of this project has been to examine what effective approaches might achieve greater social acceptance of wind and grid infrastructure, with increased community engagement and public participation in Ireland. It is through this conceptual framework, discussed in Chapter 2, that research data has been sought and analysed.

1.2 Project Design

The project has been designed to focus on two areas:

- International Comparison of Contexts and Practices; and
- National and Local Contexts and Practices which presents the key insights as to how the Irish energy transformation can be more rapidly and successfully achieved with social acceptance and an overview of the key lessons for national policy.

1.3 International Comparative Analysis

The purpose of this report is threefold. Firstly, to provide a comparative international analysis across Denmark, Germany and Scotland of practices to support community engagement and social acceptance of onshore wind energy and associated grid infrastructure; secondly, to understand the characteristics of wind energy deployment in these three jurisdictions; and thirdly, to compare the different contexts and practices and how these help or hinder progress. Comparisons have then been drawn with the Irish context and insights sought from these international contexts and processes which may benefit the energy transformation in Ireland. For example,

- What are the different ways that drivers, practices and key elements can work to mutually reinforce each other or hinder progress?
- What effective approaches might achieve greater social acceptance of renewable infrastructure, increased community engagement and public participation?
- Is there a role for community ownership? What are the consumer enablers and constraints that might be relevant for Ireland?

- What are these countries doing now in relation to community engagement, public participation, and social acceptance?

1.4 Study Method

The study method has included desk research, face to face and phone interviews and a web-based questionnaire. For each country, key interviews have been completed representing policy, renewable energy and community sectors, with additional material sourced through other means.

The resulting account presented in this report considers the uncertainties and risks in each country's transformation and but does not provide a set of best practice examples, instead the purpose is to develop a deeper understanding of the practices, processes and drivers in a given context and how if at all these may transfer to Ireland. The key processes examined include: planning processes, policy and governance, social acceptance and participation, community benefit, community ownership, the development process and the role of local government.

1.5 Structure of Report

The report is structured as follows:

Section 2: provides the conceptual framework of the study in terms of transition theory, future energy pathways and social acceptance;
Section 3: sets out the European context in terms of legislation, targets and wind energy deployment progress;
Section 4: provides a summary of the contexts and processes in Denmark;
Section 5: provides a summary of the contexts and processes in Germany;
Section 6: provides a summary of the contexts and processes in Scotland;
Section 7: discusses key insights from comparative analysis for Ireland; and
Section 8: conclusions, key findings and areas for further development.

1.5.1 Authorship

This report is the product of an SLR project (led by Jean Welstead and Nick O'Neill) that involved contributions by two academics based in Queen's University Belfast (Professor Geraint Ellis) and University of Exeter (Professor Patrick Devine-Wright).

2.0 THE CONCEPTUAL FRAMEWORK

2.1 Introduction

Ireland is in the process of transforming its energy system such that a greater contribution is generated from renewable sources including onshore wind energy. This project has focussed on the processes within this energy transition by which onshore wind and its associated grid connection is achieved in terms of social acceptance and community engagement. This chapter provides an insight into some of the conceptual issues that could help frame a better understanding of how Ireland's energy system has developed in this way, and the scope of intervening to alter its trajectory, if that is required.

2.2 Transition Theory

The last twenty years has seen an increasing understanding that the combined challenge of climate change, energy security and declining fossil fuel reserves, requires a fundamental change in the way societies use and source energy. This will involve not just new technologies and their widespread adoption, but also complex cultural and institutional change. Such far reaching transformations have been termed "transitions", defined as being "major technological transformations in the way societal functions are fulfilled" (Geels, 2002, p. 1257) involving "not only technological changes but also changes in elements such as user practice, regulation, industrial networks, infrastructure and symbolic meaning" (Geels 2002, p. 1257). A wide range of such socio-technical transitions have been examined by researchers in order to try and understand how such changes can come about and the way in which technology and society co-evolve., including the emergence of digital computers (Van den Ende and Kemp, 1999) and naval technology (Geels 2002). These studies clearly show that shifts in technological uptake co-evolve with the capacity, needs and interests of society, underlining the need to see such developments as *socio-technical systems*.

The shift from an energy system based on fossil fuels to other energy sources has been closely integrated with transition thinking – both in terms of social movements (Hopkins 2008) and state strategies (Kemp, 2010). This is particularly useful as 'transition-thinking' enables a consideration of the scope of the changes that a shift in energy source may entail and helps identify the key actions or opportunities that may help steer or expedite such transformations.

Although increasingly elaborate in its analysis, some of the key insights from transition studies for this project include the fact that major transformations require interactions across multiple levels, which can be characterised as being (Geels and Schot, 2007):

- *Technological niches:* These form the micro-levels contexts where radical novelties can emerge through innovative practice. In the example of community acceptance in wind energy this could, for example, be new approaches at engaging with local communities or sharing the benefits of wind energy through innovative initiatives such as discounted electricity or share ownership.
- *Socio-technical regimes:* these form a broader arena that shape technological development through public policy, regulations, adaptation of lifestyles to new technologies, supportive infrastructural development and other society practices that stabilise and channel trajectories of technological evolution. In the example of wind energy in Ireland, the regime will involve the way in which the planning system facilitates wind farm development and grid investment strengthens the ability to expand generating capacity in the west.

- *Socio-technical landscapes*; These represent the exogenous environment, beyond the direct influence of those promoting technological change, such as the influence of macro-economics, deep cultural patterns or global political development, usually taking place at a slow rate, potentially over decades. Examples of such landscapes for the development of a wind based energy system could include the upward pressure on fossil fuels, geo-political instability in oil producing nations and the emergence of evidence of the impact of greenhouse gas emissions.

This means that any robust strategy in dealing with transitions such as changing the Irish energy system should aim to operate at three different levels, including (Loorbach, 2007):

- *Strategic level:* Long term goal formation, strategic visioning;
- *Tactical level:* agenda setting, networking, coalition building, negotiation;
- *Operational level:* Implementation and site specific innovation.

Such an approach has influenced the Netherlands' innovative transition approach to sustainable energy (Kemp 2010) from 2002 onwards, which focuses on transformative change, bottom-up change and the engagement of a range of non-state stakeholders in the transformation process. If Ireland is to focus on the development of its energy system within such a broad framework, it will also have to consider initiatives at all these levels.

The perspective of an energy transition also provides two other important insights into thinking about the future options for transforming the Irish energy system. The first of these is that because the nature of any transition is dependent on the interplay of the different actors, resources and institutions operating within any specific jurisdiction or territory, the nature of a successful transition management approach in Ireland (or anywhere else) will be highly *context dependent* (Bridge et al., 2013). This can be conceived in terms of the broad social context (knowledge, expectations, distribution of powers/costs/benefits, behaviours etc), the economic context (natural resources, availability of capital, subsidies, value, costs/benefits), the regime context (actors, practices, expected norms, powers/policies of government) and the specific sites or places where technology projects are located (Devine-Wright, 2011). It is therefore important to carefully consider the nature of these contexts in Ireland to identify the specific opportunities for transforming the energy system, while understanding the constraints of transferring potential lessons from elsewhere.

The second insight relates to the fact that any transition will depend on a complex set of dynamic *processes* at different spatial scales ranging from structural shifts in global markets to the development of enhanced generating capacity through the commissioning of individual wind energy projects. Through such processes, a wide range of actors will interact with each other, also at different scales, including enhanced international agreements or forge new regulative strategies. At a more local project level this may lead to the development of productive relationships for the development of further infrastructure, or resulting in developing mistrust that could frustrate future projects.

2.3 Future Energy Pathways

A longstanding way of understanding the direction in which an energy system can evolve is the idea of *pathways*, typified by Lovins (1977) as either being "hard" or "soft". A "hard" energy path is how we have traditionally organised energy systems, largely based around centralised fossil fuel power stations that have high levels of inbuilt inefficiency. In contrast, Lovins suggested that a "soft" pathway can be more socially-orientated and is typified by more decentralised, flexible systems, often based on renewable energy systems that may have local ownership structures with good relationship between energy generators and

energy users, giving rise to improvements in energy efficiency. Since Lovin's original conception of energy paths, there has been substantial theoretical development of how this can be used to understand the development trajectory of energy systems.

Many Governments have recognised that inducing a transition from 'hard' energy systems to 'softer' versions offers substantial benefits for mitigating against climate change, increasing energy security and reduces potential risks linked to diminishing fossil fuel reserves. Although such transitions are perceptible in most European energy systems, these are clearly adopting very different trajectories and speed of transition. This can be explained by appreciating how the different *contexts* and *processes* in each country may construct particular aspects of *path dependency*, for example those system that have more deeply entrenched centralised systems of generation and distribution will face additional difficulties in shifting to softer paths and as a consequence may incrementally adopt alternative strategies to achieve the same long term goals. This suggests that the range of influences on transition management are highly dependent on the existing practices and structures (for example infrastructure, industrial profile or lifestyles) that may have developed to support former technologies and as such represent a degree of 'lock-in' (Unruh, 2000; 2002) to future practice, making transformation even more challenging. This therefore suggests that the context of the Irish energy system needs to be carefully considered in terms of the structures that have locked the existing system into particularly pathways of development, and to consider the types of "new pathway creation" (Simmie 2012) needed to stimulate more desirable outcomes.

Therefore in conceptualising such complex shifts in the energy system, we should understand this as a socio-technical system and that fundamental change should be understood as a transition, which can be influenced at a range of different scales, at different timescales and by a co-evolution of society and technology. In focussing on how this has, and will continue to, develop in Ireland this study focuses on the opportunities and contrasts provided by the specific *contexts* of wind energy development and how key actors interact through various *processes* or regulatory change and infrastructure development. Both contexts and processes can be combined to define the *pathway* in which Ireland's energy system will continue to develop. A key insight is that energy transition pathways are *multiple*: there are many routes towards the same goal, not 'one best way'. Accordingly, in this report we provide a summary of alternative pathways that elucidate the types of initiatives and risks that could influence the ultimate trajectory of change.

2.4 Social Acceptance

As noted above, energy systems are essentially socio-technical systems so any particular pathway will provide different social groups with different opportunities and threats. The degree to which any particular pathway manages to secure broad social buy-in has given rise to the notion of "acceptance". Although this is often focussed on the communities that live immediately around specific projects, it is useful to consider acceptance as a more complex and far–ranging concept. The clearest articulation of this comes from Wustenhagen et al (2007), who have suggested that social acceptance should be viewed as a broad concept covering the degree to which all societal actors accept and promote the idea of wind energy, and which is more usefully understood as being composed of three key, inter-dependent sub-elements (see Figure 2.2):

- *Socio-political acceptance,* can be regarded broadly as "public opinion" and therefore reflected in the tone of debate in the media and politics about the value and viability of wind as a source of energy. This element of acceptance does have a direct impact on the degree of support offered by national institutions, such as subsidies, planning policy

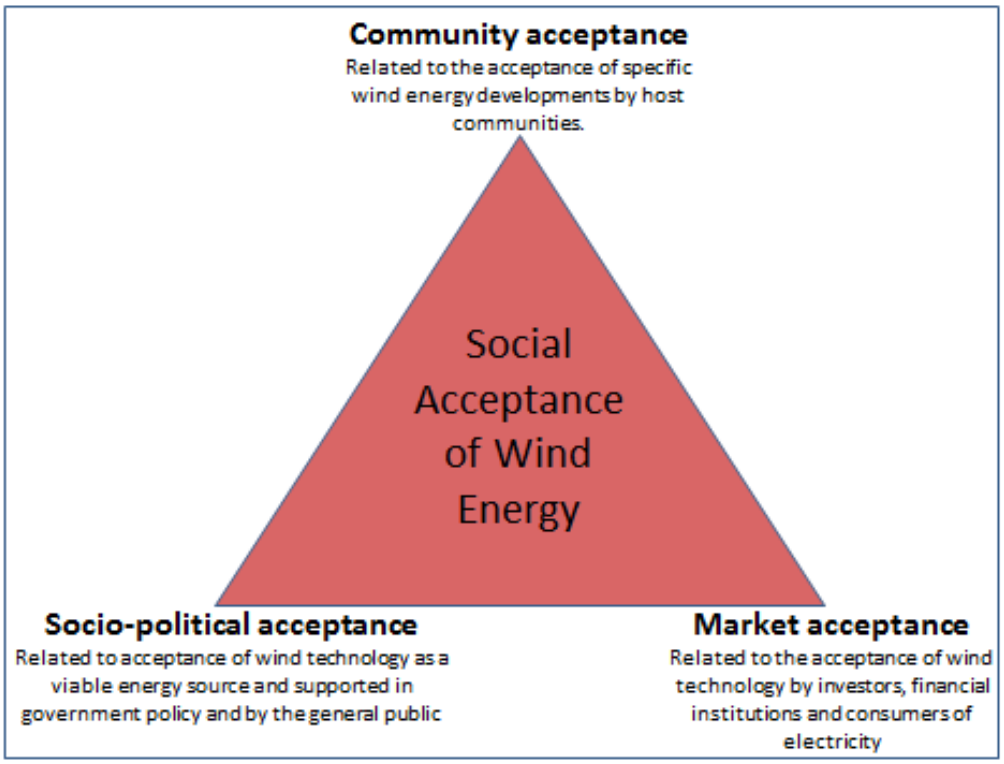
etc. As highlighted by Wűstenhagen et al (2007) several indicators demonstrate that public acceptance for renewable energy technologies and policies are high in many countries. This positive overall picture for renewable energy has (mis)led policy makers to believe that social acceptance is not an issue. However, in a recent paper (Batel, et al 2013) it has been shown that the commonly cited perspective contrasting high general public support (as demonstrated by opinion polls) with strong local opposition (as demonstrated by 'NIMBY' (Not In My Back Yard) type objections) is faulty having been based on misleading comparisons between different questions. The link between national and local and between general support for technologies and specific support for any particular project is not straightforward. At the general level of socio-political acceptance this also concerns the acceptance by key stakeholders and policy actors of effective policies. Those policies require the institutionalisation of frameworks that effectively foster and enhance market and community acceptance, for example establishment of reliable financial procurement systems that create options for new investors, and spatial planning systems that stimulate collaborative decision making.

- *Market acceptance,* relates to the degree to which financial institutions, in the broadest sense, accept wind energy and as such is reflected in the way banks and project developers view wind as a viable area for investment, as well as how energy suppliers, utilities and grid owners and electricity consumers are willing to accept wind energy as part of the energy supply mix of the country. For example, Agnolucci (2007) describes how the evolving financial support regime for wind energy in Denmark has influenced the growth in generating capacity from the mid-1990s onwards. Furthermore, Lipp (2007) suggests that the dialogue about alternative energy paths needs to be opened and funding distributed more equitably among various options. Independent research and openness to alternative models are important in allowing renewables to break into the mainstream, as shown in the Danish case. This requires leveling the playing field between renewable energy and conventional electricity sources. This includes, principally, addressing administrative barriers, allowing grid access, encouraging financing and bringing the public on-side (Lipp, 2007).

- *Community acceptance* is often conflated in many people's minds with social acceptance, but relates more narrowly to the degree to which people living in the immediate surroundings, often bearing most of the direct external impacts of wind energy, accept specific wind energy projects. Key factors influencing community acceptance, derived from the academic research literature on 'NIMBY' objections, are summarised below.

It is important to understand that acceptance is not necessarily distributed equally across each of these levels and broad socio-political and market acceptance of wind energy has secured a strong foothold in Europe and other wind-rich nations from the 1990s onwards. While acceptance in these areas cannot be taken for granted, it is the level of community acceptance that currently offers the greatest challenge for Ireland and elsewhere and due to the inter-dependent nature of each of these areas, increased and more widespread opposition to wind energy projects within communities could in turn lead to reduced levels of acceptance within the socio-political and market arenas. We therefore need to acknowledge that the triangular framework below is limited by being a static description of the three elements of social acceptance and that in fact each of these elements interacts with each other in a dynamic way over time. This in turn reinforces the complex nature of society-technology interactions and how an energy transition based on increased generating capacity from wind energy, relies on a very broad and inter-linked transition that can be constrained by factors that may lie some way beyond the direct deployment of energy projects.

Figure 2.1
The Concept of Social Acceptance



Source: Wustenhagen et al (2007)

Therefore, this report, references the broader institutions that can support and hinder the *social* acceptance of wind energy projects, but also the notion of *community* acceptance, as the current major challenge to energy transformation in the Irish context.

2.4.1 Key factors influencing Community Acceptance

The policy and academic literature appears to offer consensus that community acceptance is driven by impacts on place, issues of justice and trust, as described below:

Impacts on People-Place relations.

This includes health and environmental impacts, i.e. concerns around the specific changes to the places in which people live, brought about by the wind energy project. The most significant concerns appears to be around the degree of visual intrusion, noise, bio-diversity and broadly, local well-being. The responses to such factors can include alternative spatial regulation, improved project design and more sensitive impact assessment. These impacts are also about subjective aspects of change and development – impacts upon people-place bonds and place-related identities (Devine-Wright, 2009). Academic research has shown that community acceptance is heightened when technologies are interpreted by local residents to 'fit' with the place in which they are sited, working with the grain of place attachments and identities (for an illustrative example, see the case study of tidal energy in N. Ireland, Devine-Wright, 2011). Research has also shown that objections can be based upon a sense that technology projects threaten the qualities of cherished places and landscapes, and such responses typically contrast a 'natural' place with an 'industrial' project, whether this is a wind farm

or a high voltage powerline (for examples of each, see Devine-Wright and Howes, 2010; Devine-Wright, 2013).

Issues of Justice ie. some communities perceive the imposition of wind energy projects from external agents as failing in terms of justice, often seen as having two key dimensions:

- *Procedural Justice,* i.e. concerns that decisions related to wind energy projects are not taken in an open or fair way, leading to resentment that a project has been foisted on a local community, rather than accepted by choice. This can arise from several sources: a lack of trust in developers and regulators (Walker et al, 2011); a lack of transparency of the consenting regime that may be influenced by past experience; and poor quality of formal or informal consultations, for example in terms of transparency, sufficient information provided, time for communities to respond, willingness by developers to listen to local concerns and evidence of opinions being taken into account. (Devine-Wright, 2011). The responses to these factors can be in improved procedural design, increased use of participatory methods of engagement and a potential role for intermediaries (e.g. community liaison officers) that are situated between developers and affected communities (Devine-Wright, 2012).

- *Perceived distribution of costs and benefits,* i.e. justice issues emerging from the perception that while local communities may have to bear the main impacts of a wind energy proposal (as outlined above), it is external bodies, particularly developers, that accrue most of the benefits. The potential responses to this can be changing procurement policies to maximise local benefits from construction and operation, increased community benefits and changes to the ownership profile of the wind industry to promote local ownership, for example through a cooperative business model. Whilst community benefits are increasingly viewed as a potential means to increase community acceptance, it is important that it is not instrumentally viewed as a panacea to 'NIMBYism' (Aiken, 2010). Community benefits may be widely interpreted as a bribe to silence local objectors (Cass et al., 2010) and in doing so, may enflame local objections rather than ameliorate them. Moreover, an emphasis upon community benefits serves to monetise project impacts in ways that fail to recognise non-monetary values associated with people-place relations.

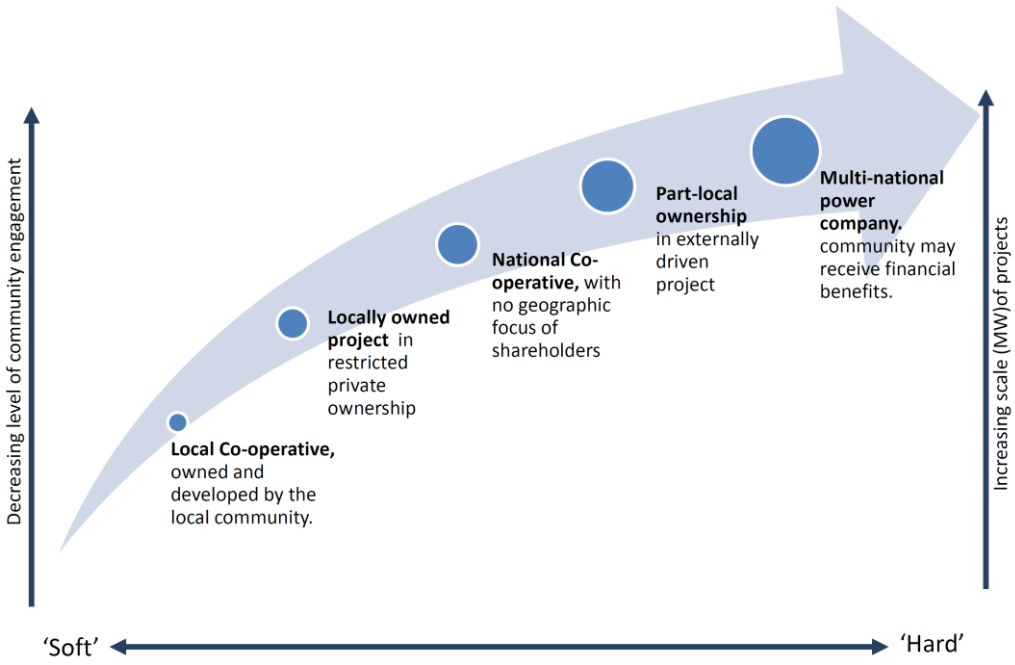
These factors will combine in complex ways around individual project proposals. We can understand this as reflecting the conceptual framework discussed above, in that the reactions to a local project (i.e. niche) can be strongly influenced by the wider regulatory context (i.e. regime) and the broader societal values around energy and related issues such as climate change (i.e. landscape). Community reactions are also likely to be influenced by the very specific context including local power relations and place-attachment (Devine-Wright, 2009) and as noted can be partly determined by previous community experience with major development proposals or interactions with local regulatory agencies, so that it also displays a degree of path-dependency.

2.5 Pathways and social acceptance

It is therefore possible to combine both the concepts of acceptance and energy pathways by considering how various types of wind energy projects are more likely to induce higher levels of community acceptance compared to others. While some types of wind energy development may result in higher levels of acceptance than others, this may be achieved at the cost of other factors, such as overall level of generating capacity or cost – Figure 2.2 below provides a schematic suggestion of how the degree of social ownership may relate to acceptance and scale of development. The nature of these trade-offs must be defined

through political priorities and national strategies and it is hoped that this report will help crystallise the nature of some of the key questions that may help to define the options for future energy transformation in Ireland.

Figure 2.2
Potential trade-offs in soft-hard path continuum in wind energy developments



Source: Strachan et al (2013)

2.5.1 Conclusion

The insights in this chapter into the conceptual issues of social acceptance have been applied as a framework to explore and understand the international practices to support community engagement and acceptance and their relevance in the Irish context.

3.0 UNDERSTANDING THE INTERNATIONAL CONTEXTS AND PROCESSES FOR WIND ENERGY DEPLOYMENT

3.1 Introduction

Chapter 2 has described a number of concepts that help explain the factors that can influence community responses to wind energy projects and why this may vary from one project to another, confirmed by the case studies included in the National Report. Chapter 2 also outlined concepts that help explain differences in community reaction internationally and provided ways to explain the variety of perspectives of, and approaches to, energy policy in different countries. It is clear that developments and initiatives in one aspect of the energy system (for example in the financial support regime) may enhance or undermine other aspects of the system, such as the level of community ownership or degree of local support for wind energy projects. If one adopts a broad transition framework, we can begin to understand both the holistic nature of energy transformation and the long time scale over which change occurs. It also helps explain how past experience can determine the degree of 'lock in' to previous energy regimes. Europe hosts a wide range of approaches to energy transition, some going back several decades. While these experiences have clearly been forged out of unique sets of political, economic and cultural contexts, European countries do now share a wider technical and regulatory landscape with Ireland that can help define the parameters of what may be possible in an Irish context. Given the innovative nature of some of these approaches, this report reviews the experience of three of these countries with the aim of deriving insights into potential lessons for Ireland.

3.2 Wind energy in Europe

Wind energy has continued to develop at a significant pace since the early 1990s across the European Union (EU). There is substantial value in the wind energy sector as demonstrated by the latest European Wind Energy Association (EWEA) figures. According to their annual statistics (EWEA 2013) 2012 annual installations included 11,895 MW of wind power capacity (worth between €12.8bn and €17.2bn) installed in the EU during 2012. Of the 11,895 MW installed, 10,729 MW was onshore and 1,166 MW offshore. Investment in EU wind farms was between €12.8bn and €17.2bn during that year. Onshore wind farms attracted €9.4bn to €12.5bn, while offshore wind farms accounted for €3.4bn to €4.7bn.

In terms of annual installations, Germany was the largest market in 2012, installing 2,415 MW of new capacity, 80 MW of which (3.3%) is offshore. The UK (including Scotland's figures) came in second with 1,897 MW, 854 MW of which (45%) is offshore, followed by Italy with 1,273 MW, Spain (1,122 MW), Romania (923 MW), Poland (880 MW), Sweden (845 MW) and France (757 MW).

In comparison with the development of other new capacity solar power and wind power (closely followed by gas) dominated. Wind power accounted for 26.5% of new power capacity installations in 2012, the second biggest share after solar PV (37%) and before gas (23%). No other technologies in that year compare to wind, PV and gas in terms of new installations. Coal installed 3 GW (7% of total installations), biomass 1.3 GW (3%), CSP 833 MW (2%), hydro 424 MW (1%), waste 50 MW, nuclear 22 MW, fuel oil 7 MW, ocean technologies 6 MW (1) and geothermal 5 MW.

On 22nd January 2014 the European Commission published new proposals which include a binding EU-wide renewable target "of at least 27%" but stated that there would be no

individual targets for Member States. Instead, the Commission intends to introduce a "new governance system" based on national energy plans[6].

3.3 Grid Infrastructure

In October 2011, the European Commission tabled a comprehensive package to enhance trans-European energy infrastructure development[7]. Over the next decade substantial transmission needs will arise in Western Europe and renewable electricity generation will play a crucial role. In order to exploit the full potential of renewable generation in the region, strong electricity interconnections as well as interconnections will become increasingly important. The purpose of this priority is the integration of new capacities, mainly from renewables, in Western Europe and their transmission to consumption centres in other parts of the continent. One central element will be to increase the interconnections between Member States in Western Europe, strengthening the electricity network to ensure that renewable energy generated in the North of this region can flow in a North-South direction.

Grid 25[8] sets out Ireland's strategy for grid development and seeks to facilitate more sustainable, competitive, diverse and secure power supplies in support of economic and social development and renewable energy deployment. It involves extensive work throughout the country which includes building 800km of new power lines and upgrading 2,000 km of existing lines which will double the size of today's electricity Grid[9]. The strategy was based on the innovative All Island Study which investigated a range of generation portfolios for Ireland; the ability of the power system to handle various amounts of electricity from renewable sources; the investment levels required, and the positive externalities that would accrue with regard to climate change and security of supply[10]. One of the conclusions of the study was that it was feasible to connect at least 40% renewable electricity in the grid system by 2020 if the Grid was developed in a smart manner, bearing in mind that larger emissions reductions may be required in the future.

The strategy is to be achieved through a mixture of major reinforcements to existing infrastructure and three new major projects. These are:

- North-South 400 kV Interconnection Development (also known as the Meath-Tyrone 400 kV Interconnection Development)
- The Grid West Project; and
- The Grid Link Project

Recently completed (2012) the €600m East West Interconnector Project was developed by EirGrid and has a capacity to transfer 500 megawatts (MW) of electricity between Ireland and Britain, enough to power 300,000 homes. The East West Interconnector is expected to transform the Irish energy market, opening opportunities to trade energy between both countries and creating a market to export renewable electricity.

[6] Renewable Energy Association (January 2014)

[7] In this context, the term energy infrastructure covers electricity transmission lines, gas, CO2 and oil pipelines, Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG) reception facilities and electricity and gas storage.

[8] Eirgrid (2010) Grid 25, A Strategy for the Development of Ireland's Electricity Grid for a Sustainable Future

[9] http://www.eirgridprojects.com/grid25/what-is-grid25/

[10] http://www.eirgrid.com/renewables/all-islandgridstudy/

3.3.1 Decarbonising capacity

The key driver for the development of renewable energy has been to decarbonise our energy capacity. The deployment of wind energy and other renewable energy implies that fossil fuel capacity is gradually replaced and decommissioned. During 2012, 5.5 GW of gas capacity was decommissioned, as were 5.4 GW of coal, 3.2 GW of fuel oil and 1.2 GW of nuclear capacity. After two years of installing more capacity than it decommissioned, coal power installations reduced by almost 2.4 GW in 2012. In 2012, a total of 31 GW of renewable power capacity was installed. Almost 70% of all new installed capacity in the EU was renewable. It was, furthermore, the fifth year running that over 55% of all new power capacity in the EU was renewable.

3.3.2 Capacity and consumption

The wind capacity installed at end 2012 will, in a normal wind year, produce 231 TWh[11] of electricity, representing 7% of the EU's gross final consumption[12]. Denmark remains the country with the highest penetration of wind power in electricity consumption (27.1%), followed by Portugal (16.8%), Spain (16.3%), Ireland (12.7%) and Germany (10.8%). Of the newer Member States, Romania has the highest wind energy penetration (6.9%).

Each member state is required to produce a National Renewable Energy Action Plan (NREAP). The 106 GW of installed wind power capacity in 2012 is 1.6 GW (1.5%) below the installed capacity outlined in the 27 NREAPs of 107.6 GW. Onshore there are 101 GW of installed capacity instead of 101.7 GW foreseen by the NREAPs (-1%). Offshore there are 4,993 MW of installed capacity instead of 5,829 foreseen by the NREAPs (-14%).

Germany remains the EU country with the largest installed capacity, followed by Spain, Italy, the UK and France. Ten other EU countries have over 1 GW of installed capacity: Austria, Belgium, Denmark, Greece, Ireland, The Netherlands, Poland, Portugal, Romania and Sweden.

3.4 Country selection for comparative analysis

In 2000, the annual wind power installations of three pioneering countries – Denmark, Germany and Spain – represented 85% of all EU wind capacity additions. Although by 2012, this share had decreased to 32% (EWEA 2013), these countries provide an unparalleled depth of experience in wind energy deployment to draw upon for this study. Two of these three countries have been selected for this study (Denmark and Germany) in addition to Scotland which has some similarities to Ireland in terms of socio-political context in addition to its relatively rapid expansion of onshore wind energy since the early 1990s. Devolved arrangements have helped renewable energy in giving greater freedom for Scotland to promote its development, enabling its considerable renewable energy resources to be exploited. There has also been some cross-fertilisation of policy instruments to best support renewable, examples including Renewable Obligation Certificates differentiation, and the emphasis on giving incentives to local communities to support renewable.

3.4.1 Initial drivers for wind energy research and development

The oil crisis of the 1970s, and even more the anti-nuclear power movement of the 1980s, raised interest in alternative energies and the search for new ecologically and commercially

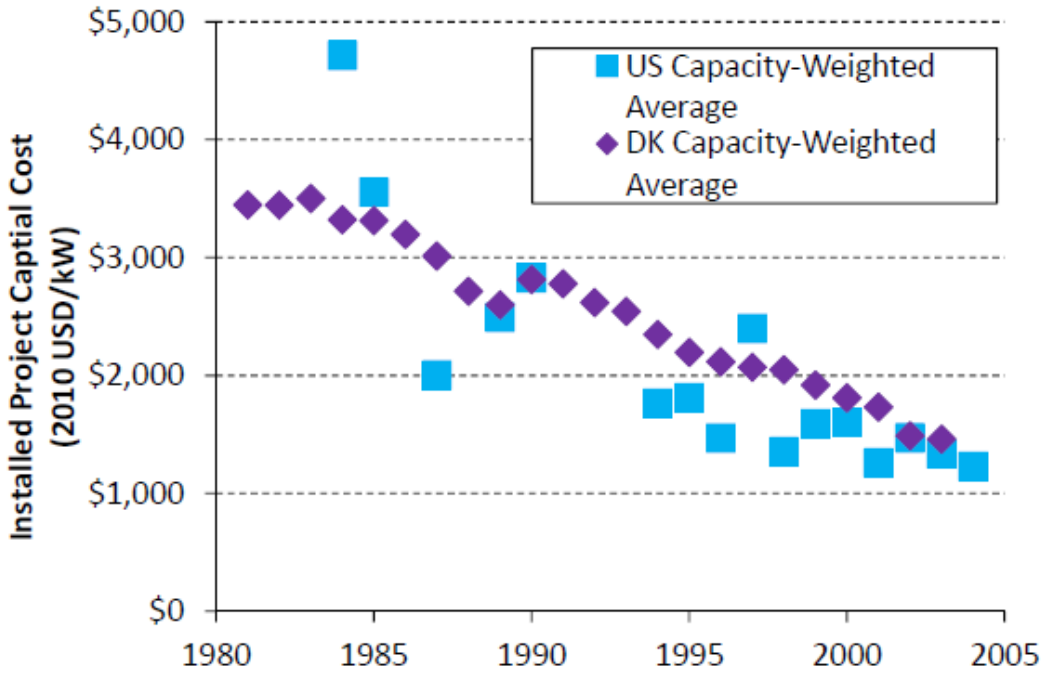
[11] One Terawatt hour is 1000000 Megawatt hours
[12] According to Eurostat, gross electricity consumption in the EU was 3,349 TWh in 2010

viable ways of generating power intensified. The wind turbines built at that time were mainly for research, and extremely expensive. With the help of government financed international research and funding programs, as well as the creation of research institutes in the 1980s, new methods of renewable power generation continued to be researched, developed and implemented. The potential for renewable energy generation to address the need for carbon reduction was later reflected in European and national policies.

Research institutes such as the German Wind Energy Institute (DEWI), the Danish Research Institute Risø and the Wind Energy Group (in UK), as well as various research programmes and international co-operatives in the wind energy sector, were instrumental for the industrial and technological breakthroughs of professional wind energy pioneers. Thanks to close co-operation between the research institutes and the wind energy pioneers, international standards, strict regulation and increasingly efficient designs were developed and implemented to result in modern, commercially viable wind farms.

From the 1980s to the early 2000s, average capital costs for wind energy projects declined markedly. In Denmark, capital costs achieved their lowest level from roughly 2001 to 2004, achieving their lowest level in 2003, more than 55% below the levels seen in the early 1980s (Nielsen et al. 2010). Over the same time period, global installed wind power capacity grew from a negligible quantity to nearly 40,000 megawatts (MW) (GWEC 2006), with the bulk of this growth (>85%) occurring between 1995 and the early 2000s. The primary markets for wind energy during this time were Europe and the United States.[13] Figure 3.1 shows the steady decline in cost kW installed between 1980 and 2003.

Figure 3.1
Capital cost trends in the United States and Denmark



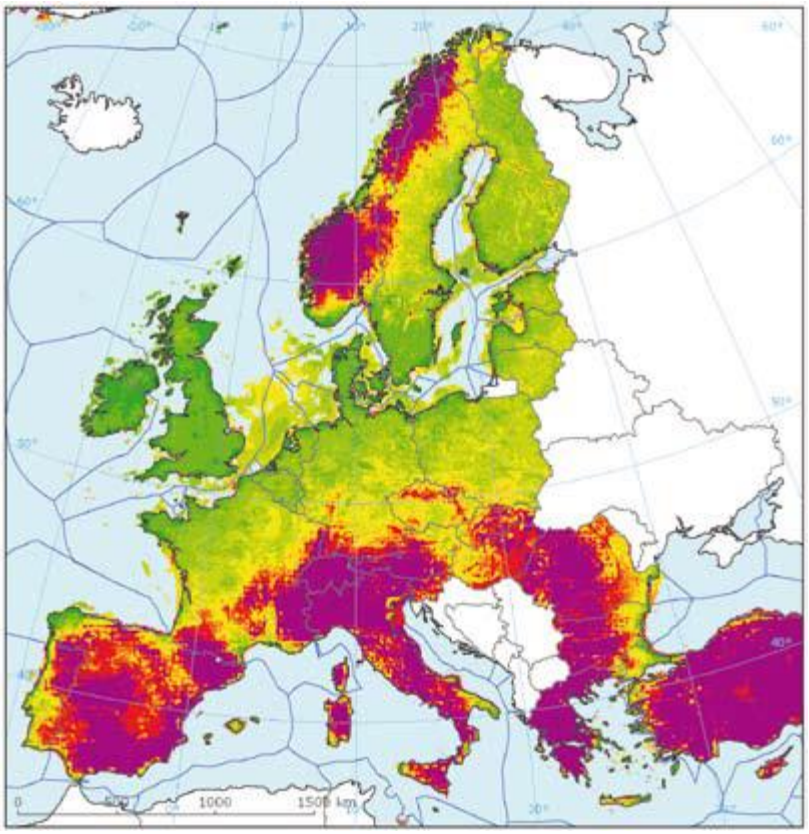
Source: Wiser and Bolinger (2011), Nielsen et al. (2010)

[13] Lantz, E., Wiser, R., Hand, M. IEA Wind Task 26, The Past and Future Cost of Wind Energy, WP"

Over this time frame, technological innovations allowed for the development of larger turbines at lower costs. Economies of scale resulting from increased turbine size were followed by economies of scale in project size and manufacturing (EWEA 2009). More specifically, innovations in design, materials, process, and logistics helped to drive down system and component costs while facilitating turbine upscaling (EWEA 2009).

The figure below shows the of wind energy development (€/kWh) with a 4 % discount rate which range between €0.03kWh and €0.15kWh. The green shading represents the lower costs and the purple the highest. This indicates that Ireland's plentiful wind resource is also one of the most economical to develop.

Figure 3.2 Costs of wind energy development



Source: European Environment Agency, Technical Report (2009) Europe's onshore and offshore wind energy potential; An assessment of environmental and economic constraints.

4.0 CONTEXTS AND PROCESSES - DENMARK

4.1 Introduction

As with Ireland the process of energy transition has been progressing at different rates and along different pathways in the respective countries studied. The purpose of this report is to explore the complexities and challenges to the development of onshore wind and associated grid in each of these international contexts. The following three chapters present the key contexts and processes for each country including an overview in terms of demographics, wind energy development, regime context and future challenges.

4.1.1 Methodology

The method of study included the following tasks:

- International literature review;
- Data gathering from secondary sources; and
- Interviews with key stakeholders (Technical University of Denmark, Danish Wind Turbine Task Force, Danish Energy Agency)

4.2 Denmark

4.2.1 Background

The table below provides a summary of the key data which describes Denmark's wind generating capacity in relation to population and land mass.

Table 4.1
Denmark at a Glance

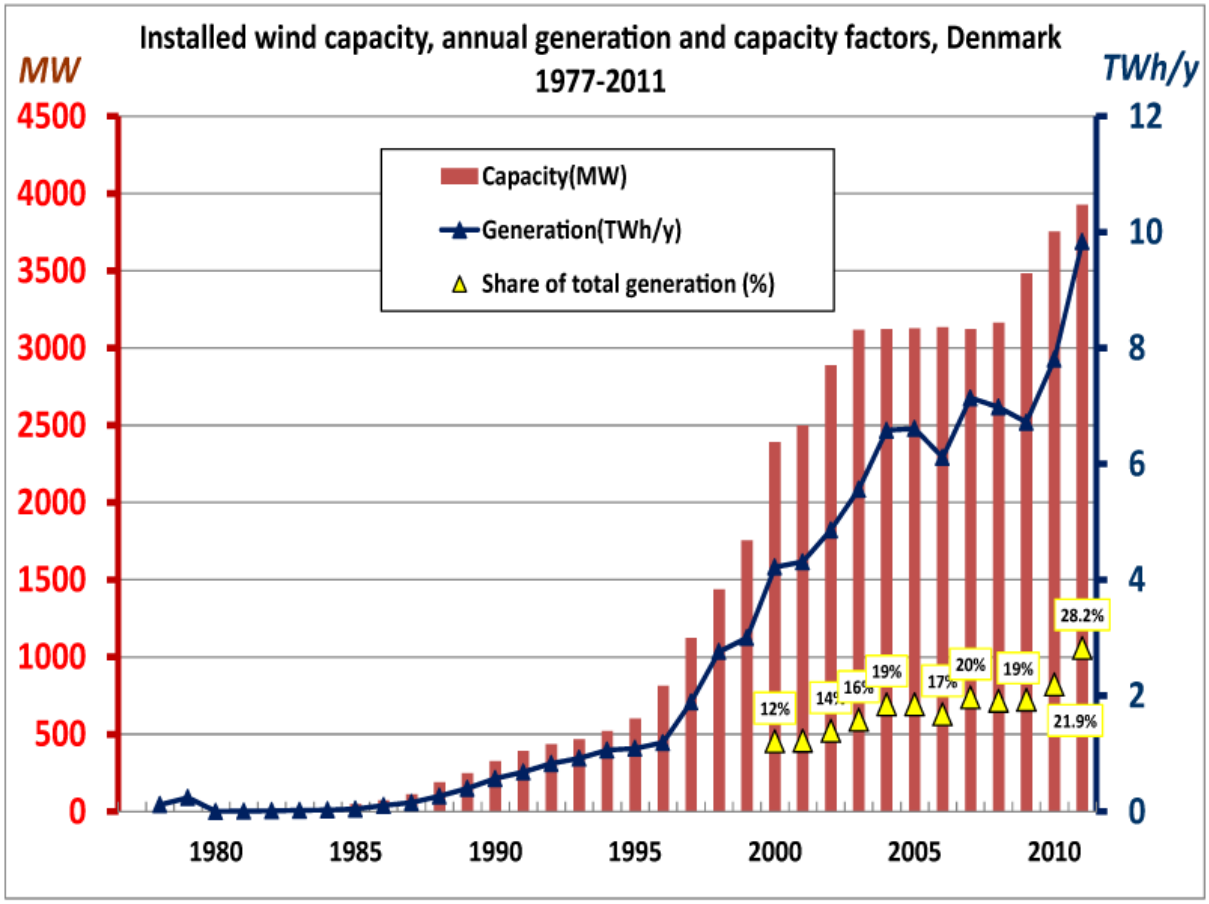
Denmark at a glance		
Socio-Economic Profile	Population	5,584,758 (2012)
	Area	43,098 square kilometres
	Population density	126,4 per square kilometre
MW Wind Energy	Since 1988 Denmark has built nearly 3,400 MW of wind capacity. In 2012 a cumulative total of 4162 MW had been installed, 211 MW in 2011 and 217MW in 2012[14]. Currently, wind power provides about 28% of Denmark's electricity an increase from 2% in 1990. In 2013 wind power has produced 30% of gross power consumption. The vast majority of wind turbine-generated electricity is onshore, but as available land is becoming scarce, an increasing number of wind power developments are offshore.	
No. of Wind Farms	There are approximately 5,200 wind turbines in Denmark. Around 2,000 of these wind turbines are owned by local wind turbine owners' associations.	

[14] European Wind Energy Association (2013), Wind in Power, 2012 European Statistics

4.2.2 Installation of wind energy

The installation of wind energy in Denmark has grown steadily since being an early adopter of the technology in the late 1970s. There was particular strong growth between 2000 and 2005 and then again since 2010.

Figure 4.1
Installed wind capacity, Denmark



Source: Danish Energy Agency

4.3 Key Policy Drivers

4.3.1 Background

Since the first oil crisis in 1973 Denmark has transformed its energy supply and developed its own production of oil, natural gas and renewable energy. Successive national energy plans were developed in dialogue with various groups and the wind sector managed to be included on this agenda because of an organised grassroots movement (Hvelplund, 2005). Starting with reforms in the 1980s, ''*systematic public interference in the monopoly market [helped to break] its 'barrier to entry' institutions and open[ed] the door for the wind power technology*'' (Hvelplund, 2005: 95). Funds to empower independent lobbyists were allocated by Parliament for technical pilot projects, energy offices and independent research centres (Hvelplund, 2005). As experience with wind and other renewable energy was gained and new participants entered the market, an advocacy coalition that initially started with a few

wind enthusiasts was able to grow into a veritable influence, continually pushing its collective agenda (Lipp, 2007).

At the same time, energy has been greatly optimized so that, in spite of considerable economic growth during this period, there has only been a marginal increase in energy consumption. Denmark is therefore better prepared for international energy crises than most other countries, regardless of whether the challenges relate to supply or price[15]. Furthermore, Danish emissions of the greenhouse gases covered by the Kyoto Protocol were reduced by around 8% in the period 1990-2008.

The early commitment of Denmark to a low carbon future illustrates the length of time that transition processes can take to be fully integrated and accepted. If the pathway or transition commenced in the early 1970s there has been time to align processes, and institutions with decarbonisation. Alongside this Denmark developed a manufacturing sector in wind energy, adding benefits and aligning further the economic and social interests with the transition process.

This latter socio-technological context was reflected by an interviewee who noted the strong technological drive, exemplified by small workshops on wind turbines being established in more depressed, west Jutland which then grew into a major industry employing large numbers of people and bringing many benefits. These visible benefits encouraged people to really buy into the need to expand generating capacity. In addition to this the cultural propensity to form co-operatives in sectors like farming meant there was an easily transferred development structure to exploit wind energy. In 'A visionary Danish Energy Policy 2025', published in January 2007, the Danish Government presented a vision for the long-term phasing-out of fossil fuels such as coal, oil and gas, and appointed the Climate Commission to set out specific directions for how this can be done. It was followed by the Energy Policy Agreement of 21 February 2008 between the Danish Government and all of the parliamentary parties with the exception of the Red-Green Alliance. This Agreement set out ambitious goals for the development of renewable energy and for energy savings. A specific goal is that, compared to 2006, gross energy consumption should be reduced by 2% by 2011 and by 4% by 2020. Furthermore, renewable energy should cover at least 20% of Denmark's gross energy consumption in 2011.

This regime context was reinforced in the study interviews where it was noted that the current Danish Government is very keen to promote high renewable targets and the current Minister is very aware of the role that social acceptance can play in this.

The 2008 Agreement also contains a range of initiatives aimed at promoting local acceptance of and commitment to new onshore wind turbine projects. Neighbours of developments will be entitled to seek compensation for loss of property value due to the erection of wind turbines. A local option to purchase has been introduced for new wind turbine projects. Local wind turbine owners' associations can apply for a guarantee covering their financing of essential preliminary investigations. And municipalities where new wind turbine projects are established will have access to subsidies from a green scheme for new wind turbine projects.

4.3.2 Energy Strategy 2050: From Coal, Oil, and Gas to Green Energy

The hallmark of Denmark's energy policy is independence from fossil fuels. In fact, the Danish Government's February 2011 Energy Plan, called Energy Strategy 2050: From Coal,

[15] Denmark Energy Agency, 'Wind Turbines in Denmark'

Oil, and Gas to Green Energy, states this overall goal in its title. The first sentence in the plan states,

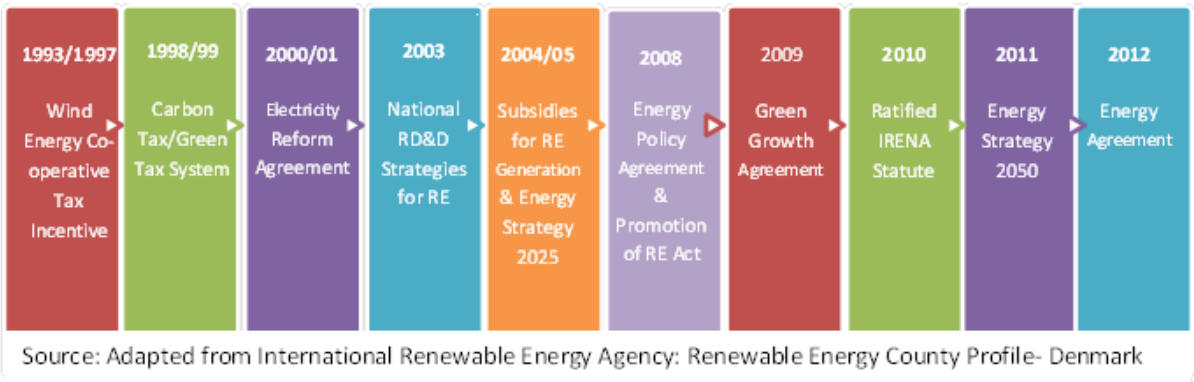
> *"The 20th Century was largely driven by access to cheap and plentiful coal, oil, and gas. However, in the 21st Century we will have to find other means of satisfying our energy needs."*

The plan goes on to state its main goal is independence from coal, oil, and gas by 2050, which in turn will result in Denmark maintaining a secure stable supply of affordable energy and helping to limit global climate change.

4.3.3 Policy Summary

A summary of the pertinent energy and climate changes polices in place since the Rio Conference are presented in Figure 4.2:

Figure 4.2
Policies to Promote Renewable Energy since the Rio Conference of 1992

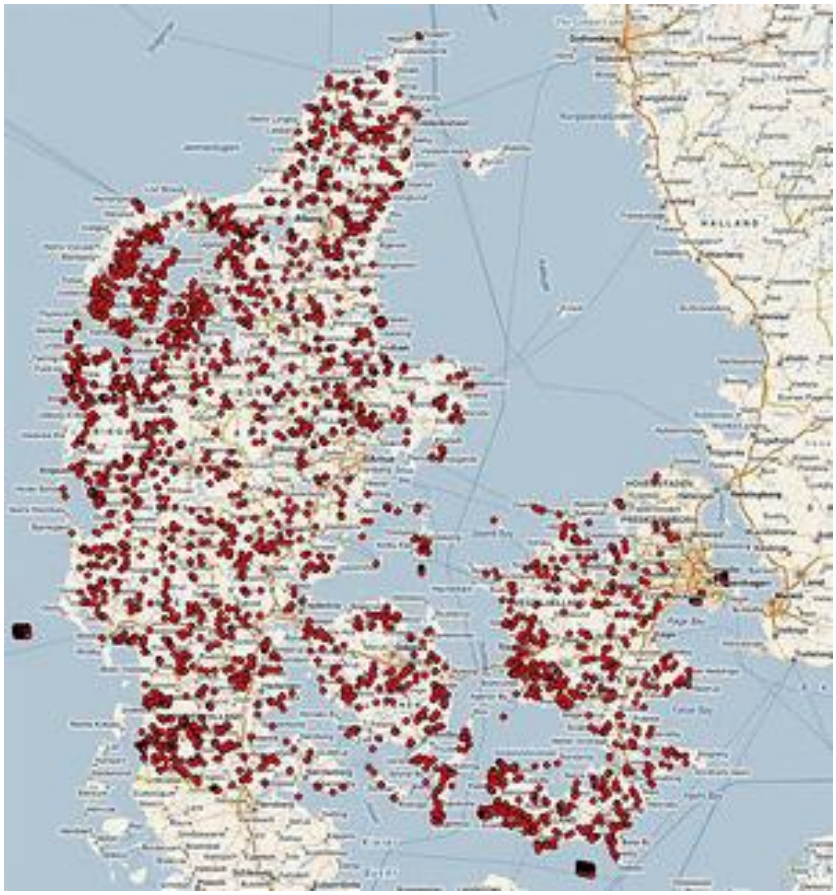


Source: Adapted from International Renewable Energy Agency: Renewable Energy County Profile- Denmark

4.4 Onshore Wind Energy Targets

In March 2012 the Danish Parliament adopted a historically broad and ambitious Energy Agreement on the development of the Danish energy supply. One of the key targets is to ensure that 50 per cent of the Danish electricity consumption is supplied by wind power (on and offshore) by 2020. They are also investing in the infrastructure to support electric cars, so that wind power will be powering some of their transportation needs. Figure 4.3 shows the installed wind capacity as of 2012.

Figure 4.3
Danish wind farms 2012



Source: Danish Energy Agency

4.5 Grid Infrastructure

The Danish Energy Act (2004) stipulated the creation of Energinet.dk, an independent state owned public enterprise merging Eltra, Elkraft System, Elkraft Transmission and Gastra with responsibility for the gas and electricity networks. Energinet.dk's tasks are to:

- maintain the overall short-term and long-term security of electricity and gas supply
- develop the main Danish electricity and gas transmission infrastructure
- create objective and transparent conditions for competition on the energy markets and monitor that competition works
- carry out coherent and holistic planning, taking account of future transmission capacity requirements and long-term security of supply
- support eco-friendly power generation and the development and demonstration of green energy production technologies
- calculate the environmental impact of the energy system as a whole[16].

[16] www.energinet.dk

In terms of grid the Energy Agreement (2012) notes that large electricity consumption in combination with wind power requires an intelligent energy system. Therefore the Agreement lays down that:

- a comprehensive strategy for establishing smart grids in Denmark is to be drawn up;
- an agreement with grid companies on roll-out of remotely readable hourly electricity meters is to be accomplished.

The electricity market in Denmark has been regulated by the Electricity Supply Act. The law's goal is to ensure that the country's electricity supply is arranged and delivered with consideration of security of supply, economics, environment and consumer protection.

The electricity law aims to promote sustainable energy use, including energy savings, use of combined power and heating, lasting and environmentally compatible energy sources, secure and effective use of financial resources and to create competition on markets for production and trade in electricity.

Denmark is part of an integrated regional grid with the Scandinavian countries and parts of Germany. They have a constant trade with utilities in the region, especially hydro plants in Norway. As renewables grow and as Denmark attempts to phase out fossil fuels altogether by 2050, the country is aggressively adopting smart grid technologies, leading Europe in research and demonstration projects on a per-capita basis. The island of Bornholm has been designated as a test bed for extensive smart grid and renewable energy deployment. Figure 4.4 shows the installation of underground grid infrastructure in Denmark.

Figure 4.4
Installation of underground grid in Denmark

Source: Energinet.dk

4.6 Planning Regime

4.6.1 Governance

The municipalities in Denmark are responsible as the planning authority for onshore wind turbine developments and also oversee enforcement of applicable laws. They are responsible for meeting nationwide goals for renewable energy. National regulations overseeing the municipal process ensure that residents and stakeholders are engaged in the planning process. There are two ministries with responsibilities for wind energy; the Department of Climate Change and Energy sets the financial incentives and other economic aspects; the Ministry of the Environment is responsible for the planning process and sets the overall national framework. However, the municipalities are responsible for the detailed development policies and planning decisions. Municipalities are charged with designating areas suitable for large wind turbines. The project approval process usually takes about one year.

4.6.2 Regulations

Danish regulations require a minimum distance from nearby residences to a wind turbine of 4 times the total height, with no ability to waive this limit[17].

Regulations also require a noise survey to be carried out and the sound pressure levels calculated at neighbours' properties. For sparsely populated areas (countryside), 44 dBA is the noise limit for wind turbines, calculated for the area outside a neighbour's house at an outside wind speed of ~18 mph (8 meters/second), as well as at 42 dBA at ~13 mph (6 meters/second). Outside wind speeds are calculated for 10 meters above the ground.

For residential areas, the limit is 39 dBA at wind speeds of ~18 mph (8 meters/second) and 37 dBA at ~13 mph (6 meters/second).

The Danish noise limits refer to an averaging time between 1 – 10 minutes. The sound emission from wind turbines is measured in a series of 1---minute periods, and according to Danish regulation, at least five periods in each of The wind speed intervals 5,5 --- 6,5 m/s and 7,5 --- 8,5 m/s are to be measured and averaged.

Up until now, Danish regulations have not addressed low frequency noise (10 – 160 Hz), since their Environmental Protection Agency has not felt this constituted a problem when Danish regulations are abided. However, in response to requests by stakeholders and complaints regarding noise, new rules related to low frequency noise were promulgated in 2011 and went into effect January 2012. These rules provide a 20 dB indoor night-time limit for low frequency noise during wind speeds of 6 and 8 meters/second, which equals ~20 and 26 feet/second applied to newly proposed wind turbines. Note that other Danish noise limits are calculated or measured outdoors. The agency website states: "no evidence suggests that low frequency noise is more dangerous than other forms of noise." The agency also states that: "When infrasound (they define as 'very low frequency') is audible, it becomes annoying. Where infrasound is inaudible, it does not affect health."

In terms of social acceptance it was noted by one interviewee that this move by the government to lower the noise threshold in response to complaints has been a helpful

[17] Source: IEA Wind Task 28- State of the Art-Country of Denmark

strategy demonstrating the government's willingness to listen and act. It does make it more difficult to find appropriate sites, but also puts pressure on the turbine designers to increase standards and is a better way to lower impacts compared to altering set back distances.

Table 4.2
Denmark's regulations compared to Ireland

Regulation	Denmark	Ireland
Distance from residences	4 times total height of turbine	500m between commercial scale turbine and curtilage of property. (Less can be accepted with written agreement from owner).
Noise (frequency)	20 dB indoor night-time limit for low frequency (pitch) noise during wind speeds of 6 and 8 meters/second	
Noise (level)	Residential areas, the outdoor limit is 39 dBA at wind speeds of ~18 mph (8 meters/second) and 37 dBA at ~13 mph (6 meters/second)	40dBA outdoor limit at any wind speed day or night. (consultation until 21st February 2014)

4.6.3 Planning Process

The development of wind power in Denmark has been characterised by strong public involvement. Although other countries (e.g. Germany) have now adopted a similar approach, Denmark, was an early adopter (since 1994), of obliging local municipalities to allocate zones for wind power development. Only 10% of municipalities refused to follow this directive. This also meant that municipalities have been obliged to involve counties (regional authorities), local non-governmental organisations and utilities early in the planning phase. (Toke et al, 2008: 1135).

Danish law contains several relevant strategies:

- Nearby property owners are compensated for any loss of property value due to the wind turbines;
- Local citizens' (living within 2.8 miles = 4.5 km) have an option to purchase wind turbine shares;
- Subsidies are given to communities with wind turbines;
- Up front mapping by the municipalities that indicates suitable areas for wind turbine development means decisions are made with regulators and residents, before developers are involved; and
- Funds support financing of the analysis and planning for wind turbines by local wind turbine owners' associations (in which a majority of members are residents of the municipality where the association's wind turbines are planned or located).

Compared to the UK and Ireland, the planning process is more regulated and guidance is thought to be potentially complex. An interviewee noted that there are complicated rules to

follow and there can be very subtle dynamics in any specific area. However, the process has been greatly assisted by the Danish Government establishing the intermediary body; the Wind Turbine Task Force.

4.7 Key Process Support Mechanisms

4.7.1 Financial Support

Wind power in Denmark since the 1970s has received supplemental funds paid by the ratepayers due to wind's inability, to date, to compete financially with coal, natural gas, or oil[18].

Since the beginning of the 1990s, the support has taken the form of a guaranteed feed-in tariff or a supplement to the market price. The support is offered for 20 years as compensation for wind turbine owners because electricity production from wind turbines still cannot compete financially with conventional production at power plants using coal, natural gas or oil.

The current supplement to the market price is paid by Energinet.dk, which recoups the sum as a public service obligation (PSO). The amount is indicated on electricity bills. In recent years, when the average market price in the Nordic spot market has been fluctuating between DKK 0.20 (€0.03) and 0.35 (€0.05) per kWh, the PSO tariff has been around DKK 0.10 (€0.01) per kWh. As well as wind turbines, which receive around half of these PSO contributions for environmentally friendly electricity production, the contributions are also spent on supporting decentralised CHP plants, electricity production from biomass, solar power, etc.

The price supplement for electricity produced by wind turbines is regulated in the Danish Promotion of Renewable Energy Act in accordance with the Energy Policy Agreement of February 2008. Here, a broad political majority in the Danish Parliament agreed to increase the supplement to make it more attractive to erect onshore wind turbines. The electricity produced is supplied to the electricity supply grid, and the turbine owner sells the actual electricity on the market under market conditions. A DKK 0.25 (€0.025) supplement to the market price is paid for electricity produced by wind turbines connected to the grid on or after 21 February 2008. The price supplement applies for the first 22,000 full-load hours. Furthermore, a supplement of DKK 0.023 (€0.03) per kWh is paid to cover balancing costs throughout the turbine's lifetime. In the case of wind turbines that were connected to the grid before 21 February 2008, there are special regulations that depend on the date of connection and the size.

Household wind turbines and small turbines, i.e. wind turbines with an output of less than 25 kW that are connected in a household's own consumption installation receive a price supplement which, together with the current market price, amounts to DKK 0.60 (€0.08) per kWh. If a wind turbine erector has earned or purchased scrapping certificates from older wind turbines with an output of 450 kW or less and dismantles the turbines in the period 15 December 2004 to 15 December 2010, the erector may receive a scrapping price supplement of DKK 0.08 (€0.01) per kWh, which is added to the general price supplement of DKK 0.25 (€0.03) per kWh. The scrapping price supplement is paid for the first 12,000 full-load hours at double the dismantled wind turbines' output. The supplement is conditional on the wind turbine being connected to the grid by 31 December 2010.

[18] Information in this section has been extracted from the IEA Wind Task 28- State of the Art Report- County of Denmark

Table 4.3
Summary of Denmark's Support Mechanisms compared to Ireland

Mechanism	Denmark	Ireland
Public Service Obligation	around DKK 0.10 per kWh (€0.01)	€0.06/KWh[19]
Price/Feed-in-Tariff	DKK 0.25 (€0.03) supplement to the market price is paid for electricity produced by wind turbines	Onshore wind (above 5MW) €0.07/KWh.
Householder Price/Feed-in-Tariff	DKK 0.60 per kWh (€0.08)	Onshore wind (equal to or less than 5MW) €0.07/KWh.

4.7.2 2008 Agreement support mechanisms

The Loss of Value Scheme

The loss of value scheme is an interesting concept and in its early years of implementation. It was considered by one interviewee as not working particularly well and even sometimes having the opposite effect of putting people off from accepting local projects, possibly because it raised a level of suspicion (the compensation would be required) and reduced trust in the planning consent process. However, the scheme still requires more promotion to make people aware of the possibility and time to demonstrate its value as a mechanism. The claim process is described below.

Any party erecting new wind turbines with a height of 25 meters or more, including offshore wind turbines erected without a government tender procedure, must pay for any loss of value on real property if the erection of the wind turbines results in a loss of at least 1% of the property value. In order to give neighbours the opportunity to assess the consequences of the wind turbine project, the erector must draw up information material on the project and invite the neighbours to a public information meeting. The material must include a list of the properties lying within a distance of up to six times the wind turbines total height.

Energinet.dk (the independent state body responsible for gas and electricity networks), which must approve the information material, can require that the material should also include a visualization of the project. The meeting must be convened with a reasonable period of notice by means of an announcement in local newspapers and must take place at the latest four weeks before the municipal planning process ends.

Property owners, who believe, based on the information material and the information meeting, that the erection of the wind turbines will reduce the value of their property must notify the loss of value to Energinet.dk within four weeks of the meeting. If a property owner lives further away than six times the wind turbine's total height, the owner must pay a fee to Energinet.dk of DKK 4,000 (€536) to process their application. Neighbours who live closer to the wind turbine project are not required to pay this fee. The fee is repaid if the property owner is granted the right to compensation for loss of value.

The wind turbine erector may enter into a voluntary agreement concerning compensation for loss of value with property owners who have notified their claims to Energinet.dk. If this is not done within four weeks, Energinet.dk will submit the owners' claims to a valuation authority. The Danish Minister for Climate and Energy has appointed five valuation authorities consisting of a lawyer and an expert in assessing real property value. The

[19] Commission for Energy Regulation (2012), Public Service Obligation Levy 2012/2013

valuation authority will decide, on the basis of a specific assessment, the extent to which property owner's claim can be accommodated.

If the property owner's claim for compensation is upheld, the wind turbine erector will pay the valuation authority's costs. If the property owner's claim is rejected, Energinet.dk pays the case costs not covered by any fee of DKK 4,000 (€536). This cost is recouped from the electricity consumers as a PSO contribution. Decisions of the valuation authority cannot be contested with another administrative body but may be brought before the courts as civil proceedings by the owner of the property against the wind turbine erector.

The Option to Purchase Scheme

Erectors of wind turbines with a total height of at least 25 meters, including offshore wind turbines erected without a governmental tender, shall offer for sale at least 20% of the wind turbine project to the local population. Anyone over 18 years of age with his/her permanent residence according to the National Register of Persons at a distance of maximum 4.5 kilometres from the site of installation or in the municipality where the wind turbine is erected has the option to purchase. The scheme aims to increase local interest and support for the installation of new modern wind turbines and is also intended to stimulate the local interest in ensuring that suitable land is zoned for construction of wind turbines in the municipal spatial planning by providing an incentive to local citizens to support the installation of wind turbines in the municipality. If there is local interest in purchasing more than 20%, people who live closer than 4.5 kilometres from the project have first priority on a share of ownership, but the distribution of shares should ensure the broadest possible ownership base.

In order to give local citizens an adequate decision making platform, wind turbine erectors must provide information on the nature and financial conditions of the project. This must be done through sales material containing as a minimum; the articles of association of the company that will be erecting the wind turbine, a detailed construction and operating budget, including the financing for the project, the liability per share, and the price of the shares on offer. The share price is calculated on the basis of 1000 kWH/share. The sales material must be quality-assured by a state-authorized public accountant. In addition, Energinet.dk must approve the sales material as a condition for the wind turbine erector obtaining the price supplement provided for in the Danish Promotion of Renewable Energy Act.

The wind turbine erector must run through the sales material at an information meeting convened with a reasonable period of notice by announcement in a local newspaper. Following the information meeting, local citizens have a period of four weeks to make a purchase offer.

In the case of both the loss-of-value and option-to-purchase schemes, transitional regulations exempt wind turbines where the municipality has published a supplement to the municipal plan with an associated EIA or announced that the project does not require an EIA apply until 1 March 2009. The wind turbine project must also be connected to the grid before 1 September 2010.

The Danish Energy Agency published an evaluation of the option to purchase scheme ('legal buyers system') after the first few years of operation. It was found that in the period from 1 January 2009 to 1 July 2011[20] 15 onshore wind projects implemented the the option to buy.

[20] Danish Energy Agency (2011-2012) Evaluation of legal buyers system on the Act on Promotion of Renewable Energy, Climate, Energy and Building Committee.

The reason for the relatively low number of projects during this period is that the Renewable Energy Act contains a longer transitional period and that a number of projects have been exempted from buying the legal system because they are test turbines. The 15 wind projects comprise 69 wind turbines and a total of approximately 198 MW. The turbines are listed or expected to be erected in the municipalities Lemvig, Mariagerfjord, Randers (2 projects), Rebild, Ringkoebing-Skjern (5 projects), Varde, Vesthimmerland (2 projects), Aero and Aabenraa. Projects have only made a minimum supply of 20% of the project except for the project at Aero, where the entire Project was offered under the option to buy scheme.

There were 335 buyers for the 15 projects ranging from 5 to 60 people per project with an average of approximately 22 people. The value of the purchased shares for the 15 projects is DKK270,032,211 (€36,189,986). The average buyer has purchased shares of approximately DKK806,066 (€108,029). The number of share units is as follows:

- 98 people have purchased 1-10 units;
- 138 people have purchased 11-100 units; and
- 99 people have purchase of 100 shares.

On average, 68% of the offered shares per project have been purchased. Eight projects sold 100% of the offered shares, while 3 projects, only sold about 1-2% of the offered shares. Five projects exclusively sold shares to citizens within 4.5 km from the site, who have priority over other citizens of the municipality.

In the review of the first few years of this scheme it was noted that there was a general desire to expand the scheme to give citizens greater opportunity to buy shares. However, it was also noted by industry that they were uncomfortable with the need to expose project finance and suppliers as part of the scheme as this potentially provided commercially sensitive information to competitors. In the conclusion of the review it was noted that the option to buy scheme does not fully accomplish its aims. Although all offered shares are sold in over 50% of the projects, there are fewer larger investors than intended whereas as a larger number of smaller investors would be preferred. This is illustrated by the average investment being more than DKK 800,000 (€107,217). In terms of distributional justice this may indicate not only a need for an affordable share price but also a limit to the number of shares. The share price across the fifteen projects is not known.

The Green Scheme

In order to further promote the local council's commitment to wind turbine planning and local acceptance of new wind turbine projects, the Danish Promotion of Renewable Energy Act has introduced a green scheme for the financing of projects that enhance the scenery and recreational opportunities in the municipality.

Energinet.dk, which administers the scheme, pays DKK 0.004 (less than €0.01) per kWh for the first 22,000 full-load hours from wind turbine projects that are connected to the grid on 21 February 2008 or later. The money for the green scheme is recouped from electricity consumers as a PSO contribution. The money is lodged in a special account for the given municipality; the amount of money depends on how many wind turbines and of what size are connected to the grid in the municipality. A wind turbine of 2 MW generates a total sum of DKK 176,000 (€23,587).

In order to promote local involvement in new wind turbine projects, during processing of the project the municipality may apply to Energinet.dk for a subsidy for certain development

works or activities that draw on the full amount so that citizens become aware of the benefits that are obtained from the wind turbine erection.

However, the subsidy can only be paid once the wind turbine project is connected to the grid. If several wind turbine projects are implemented in a municipality, the subsidies can be used for one combined project. In order for the money to be paid, the municipality must demonstrate to Energinet.dk that the money will be used in accordance with the application.

The green scheme may wholly or partly finance development works for enhancing scenic or recreational values in the municipality. A subsidy may also be granted for municipal cultural activities and informational activities in local associations, etc., aimed at promoting acceptance of the use of renewable energy sources in the municipality. The municipalities may not raise complaints about Energinet.dk's handling of subsidies within the green scheme, but they can refer Energinet.dk's calculation of the municipality's share of the green scheme to the Energy Board of Appeal.

The Guarantee Scheme

In order to give local wind turbine owners' associations and other initiative groups the opportunity to initiate preliminary investigations, etc., for wind turbine projects, Energinet.dk has set up a guarantee fund of DKK 10 million (€1,340,210) that will make it easier for local initiatives to obtain commercial loans for financing preliminary investigations and keep the initiative takers financially indemnified if the project cannot be realised. The money for the guarantee fund is recouped from electricity consumers as a PSO contribution.

A local initiative may apply to Energinet.dk for a guarantee to take out a loan of maximum DKK 500,000 (€67010). There are conditions that the wind turbine owners' association or initiative group must have at least 10 members, the majority of whom have a permanent residence in the municipality, and that the project prepared involves onshore wind turbines with a total height of at least 25 metres or offshore wind turbines that are established without a government tender.

The guarantee can be given for activities that may be regarded as a natural and necessary part of a preliminary investigation into establishing one or more wind turbines. This might be an investigation of the siting of wind turbines, including technical and financial assessments of alternative sitings, technical assistance with applications to authorities, etc. However, it is a condition that at the time of application the project is financially viable in the opinion of Energinet.dk. Guarantees can be awarded for a maximum total sum of DKK 10 million (€1,340,210). If this limit has been reached, new applications are placed on a waiting list. The guarantee shall lapse when the wind turbines are connected to the grid or if the local group sells its project to another party. Energinet.dk's decisions concerning the guarantee fund may be contested with the Energy Board of Appeal.

4.8 Intermediary bodies

In 2006 there was a reorganisation of municipalities in Denmark, giving them additional planning responsibilities. It was recognised that the municipalities may also need additional guidance to help them in their responsibilities for planning for wind energy, so the Ministry of the Environment proposed a Wind Secretariat, which as an 'intermediary body' would offer help to them. It was formed in 2008 and is very much aimed at helping municipalities succeed whilst not interfering with their planning powers.

An interview was held with the Danish Wind Turbine Task Force (previously called the Wind Secretariat) to explore their role in wind energy development and social acceptance. This provided some detail with regards the Task Force as discussed below.

Establishment of the Task Force

The Task Force was initially set up for a period of 4 years (to 2012), when a new renewable energy strategy was developed. The Task Force was then renewed to 2015 in order the help deliver the 1800 MW target.

The Task Force employs four people, plus a manager. The four are all involved in working with municipalities; one of these is a former municipal planner, one used to work as a consultant involved in wind planning and the others have worked for a long time in the Danish Nature Agency. The Manager also looks after another team involved with more policy work for central government. This arrangement works well bringing all wind planning expertise together and provides a conduit by which central government can hear about the experiences of the municipalities. The Task Force was initially based in Aarhus, but is now in the Nature Agency, Copenhagen. It helps around two thirds of all municipalities every year, recognising that of course, not every municipality will host wind projects.

The Task Force's role has developed over the years and has included the following activities:

- inform municipalities of who they were and how they could help them;
- develop a GIS system to help municipalities identify the potential sites for turbines in their areas, taking into account a technical analysis of land use, infrastructure etc.;
- attend public planning meetings with the aim of providing the facts about wind energy – on such issues as the procedures, noise, landscape impacts etc.;
- advise municipalities on how best to run public meetings and to produce leaflets and material on the "facts" of wind energy developments;
- develop projects that are investigating how best to engage with different types of stakeholder; and
- develop a 'one stop shop' website that brings together all the information from all different government agencies and ministries, as a service for citizens, professional working in municipalities and developers.

Trust and reputation

The fact that the Task Force is not seen as pushing for turbines in particular locations (as the planning decision rests with the municipalities), and the recognition that they have specific expertise in this area, seems to have contributed to a greater level of trust in their advice. This was supported by a study interviewing groups opposed to turbines which found that the Task Force did not come across as having a poor or biased image[21]. It was thought that objectors tend to focus on the decision made by the municipalities as these are what determine whether a scheme goes ahead or not. The municipalities are closer to their communities and hold the planning powers. However, there was some concern, noted by the interviewee, that at a national level the municipalities needed to use these powers to contribute to meeting national objectives.

[21] Reported by Task Force Consultee

The Task Force also has a good relationship with wind energy developers, who recognise that they have shared objectives.

The trust and reputation of the Task Force was further reinforced by another interview who said,

'This is a travelling team that goes in to advise developers and local authorities how to best implement wind energy projects, giving specialist advice which seems to have made a really big impact. It does not work directly with communities, but by ensuring best practice standards are applied, it has made a big difference.[22]*'*

The Task Force is particularly interesting in its role as 'trusted adviser', especially as it is perceived in this way by all the key stakeholders (community, developer, local authority). In terms of procedural justice such a role can be pivotal to increasing social acceptance.

4.9 Community Equity and Community Benefit Initiatives

4.9.1 Cooperatives

One of the characteristics of the Danish wind energy sector is the cooperatives or guilds. Many of the wind turbines erected in the 1980s and early 1990s were and still are owned by local cooperatives/guilds. As described above the first wind turbine guild or cooperative was established in 1980 near Aarhus in Jutland, and it soon proved to be the pioneering model for future development. At that time, the wind turbine 'guilds' from all over the country were often the grass roots activists, driving forward wind turbine projects and participating in public debate.

Since then, single-person share ownership has superseded the importance of the cooperatives and now utilities and large energy companies play an increasing role in the establishment and ownership of wind turbines in Denmark, especially when it comes to large-scale wind farms. However, cooperative ownership is still an important factor, and new legislation from January 2009, following a decline in wind energy deployment rates[23], is aimed at stimulating the local engagement and ownership in new wind energy projects. The new Danish act on renewable energy imposes an obligation on all new wind energy projects to offer minimum 20 per cent ownership to local people, e.g. cooperatives.

4.9.2 The background for cooperatives

The overall concept of cooperatives can briefly be described as an autonomous association of persons united voluntarily to meet their common economic or social needs through a jointly-owned and democratically-controlled enterprise[24]. A cooperative may also be defined as a business owned and controlled equally by the people who use its services or who work at it. In 1844, local weavers and other artisans in Rochdale, England, set up a society to open their own store selling food items they could not otherwise afford. This is often referred to as the first successful cooperative enterprise, used as a model for modern co-ops.

The first co-op store in Denmark was opened in 1866, and the first cooperative dairy was started in 1882 in Western Jutland. This was later followed cooperative slaughterhouses and feedstuff wholesale societies. The foundation of a large number of cooperatives can be

[22] Consultation with Technical University of Denmark
[23] Leonardo Energy
[24] http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/social-economy/co-operatives/

considered as one of the most important commercial developments in the history of Denmark.

In the 1970s, many cooperative undertakings disappeared from the villages of Denmark. Some of these are still formally organised as cooperative undertakings, but they have been merged into large units or companies, which are often operating both nationally and internationally. Although the number of cooperative undertakings have fallen, the idea of joining forces, establishing local associations or working groups, is still a widespread phenomenon in Denmark in order to start new businesses or local associations in relation cultural or social activities. It was on this basis that the wind turbine cooperative or guilds were formed.

4.9.3 Cooperatives in practice

Wind turbine cooperatives in Denmark are normally partnerships, which in daily practice function as cooperatives. For legal reasons they are forced to establish formal partnerships due to the fact that in Denmark the interest on the loan for the wind turbine is tax deductible from the private income of the individuals in a partnership, not in a cooperative.

Jointly owned wind turbines in Denmark are organised as partnerships with joint and several liability. In practice, the risk of joint and several liabilities is minimised in that the partnership is unable to contract debt. This is ensured in the bylaws, which maintain that the partnership cannot contract debt, and that the turbines must be adequately insured.

As a partner you own a proportion of the wind turbine corresponding to the number of shares you buy. Often one share is calculated to correspond to the yearly production of 1000 kWh from that particular wind turbine.

Private individuals and cooperatives have played an important role in the development of the Danish wind energy sector. On a rough estimate, approximately 15 per cent of the Danish wind turbines today are owned by cooperatives. The particular strengths of the cooperative structure are considered to be:

- Active and committed members
- Dialogue and political contacts with many stakeholders through a widespread network
- Large public support
- Direct contact to local authorities

4.9.4 Community Equity

Although, as noted by one of the interviewees in this study, the co-operatives are a very positive aspect to Danish development, they cannot necessarily deliver the scale of development required to meet the targets. The government have therefore promoted co-ownership, for example in the Renewable Energy Act 2008, it was stated that 20% of every scheme should be offered to local communities to buy shares in. This has been managed by local authorities and although practice is varied, many have pushed for even higher proportion of local ownership – around Copenhagen this is now 50%. So far this seems to have been a very successful strategy in gaining social acceptance. Major companies appear to comply as they see that if they do not give up these shares, they are unlikely to secure a project. Companies also recognise the costs involved in delays and legal challenges and that this is a way of overcoming these, as well as the value of having a good long term relationship with local communities. Because of the success of this co-ownership

model, there are no programmes of the community benefits schemes that are more common in Ireland and the UK.

Another possible weakness of the cooperative approach might be the financially weak starting point which can often be overcome by cooperation with municipalities, utilities or other investors. However, underlying this may be an issue of distributional justice and equity. As cooperatives can only function if people have the interest and disposable income to invest, those in the community who do not have the means to invest may be disadvantaged. Hence, the share price should be low enough not to dissuade purchase by local residents.

It is likely that local ownership promotes more local dialogue and acceptance. Through dialogues with different interest groups a widespread understanding for the chosen location and layout of the farm can be generated. Potential conflicts can be avoided by taking direct contact to local stakeholders at an early stage in the development of the project, eg contact and dialogues with local farmers, fishermen, enterprises or inhabitants in villages close to the site.

4.9.5 Community acceptance

Denmark is often seen as the great wind power success story. But the number of ordinary Danes participating in the wind power sector has actually decreased for many years[25].

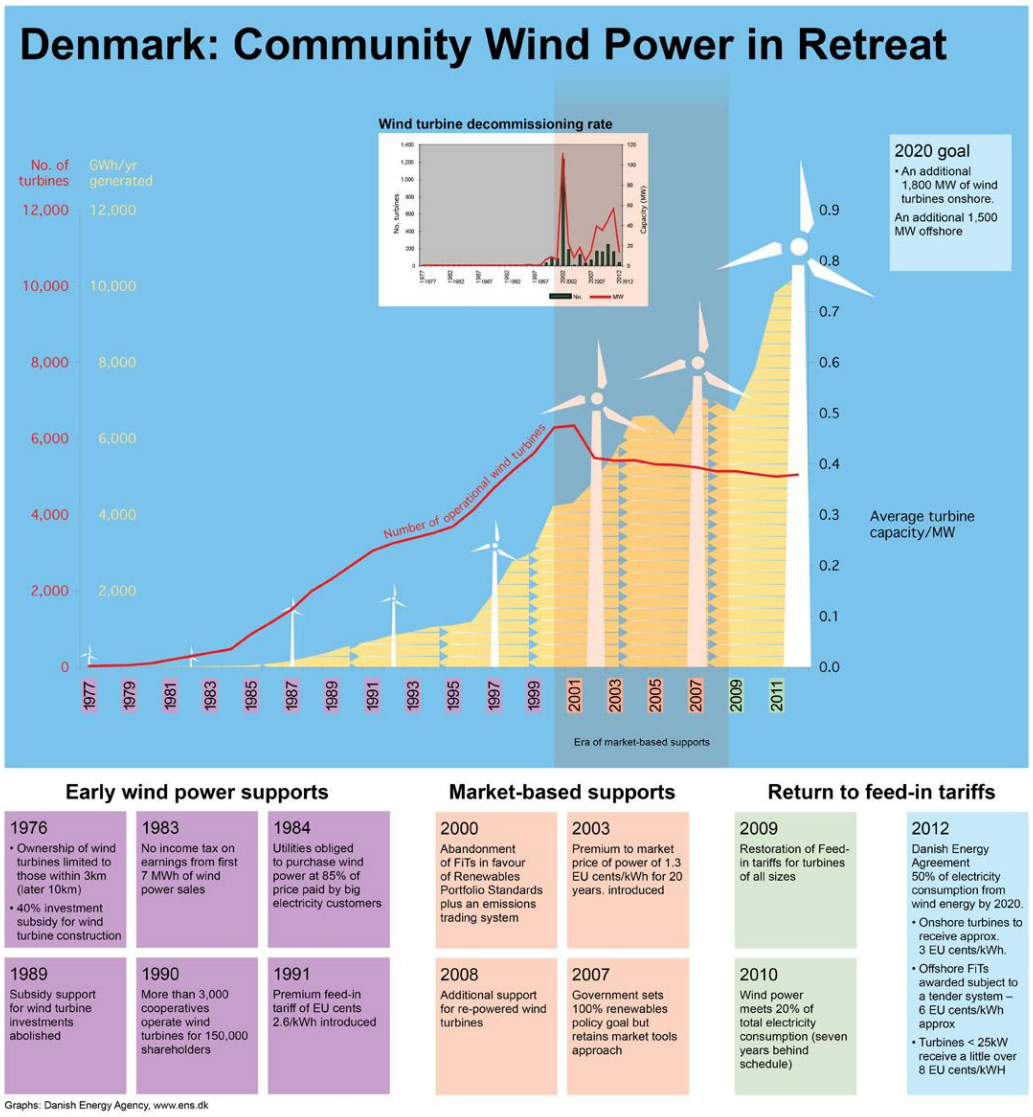
In 2004, 100,000 Danish households owned shares in community wind power projects. 3,000 MW of wind turbines was installed by 2003 – double the target set by the Danish government for 2005.

After 2000, the Danish government tried to control rising wind power support costs through market disciplines. Fixed feed-in tariffs were replaced by renewable portfolio standards and support that topped-up market prices for renewable energy. Restrictions on who could invest in wind power were relaxed. Instead, planning regulations were tightened to protect local interests.

Wind power development stalled. Between 2004 and 2006, less than 40 MW of new wind capacity was added in Denmark. Local opposition to proposed wind projects became stronger and more effective at a time when wind turbines were getting larger and more expensive. The trend may also have been influenced by the change in Feed-in-Tarriffs, abandoned in 2000 and reinstated in 2009. The Danish Energy Agency summarised the progress and the drop in the number of operational turbines in Figure 4.5. However, installation figures for 2012 show a slight increase from 2011 as indicated in Table 4.1.

[25] Aedan Kernan, Greenwell Future, May 2013

Figure 4.5
Community Wind Power 'in Retreat'



Source: Greenwell Future

While public resistance against wind turbines in the landscape remain one of the largest barriers to the development of wind power, public opinion is still positive overall. Opinion polls have indicated wide public support for wind power in general in Denmark. However, in 2009, the Danish Wind Industry Association (DWIA) conducted a small omnibus survey (1052 respondees) of the public's opinion of Denmark's future energy production. Key findings were as follows:

- 91% of the population thought that Denmark should expand the use of wind power;
- 85% thought that the expansion could take place in their local area;
- 96 % thought that the Parliament should support the development of wind power, so that Denmark can maintain the position as a pioneer country; and
- 62% support that more than 50 percent of the Danish electricity production should come from wind power.

The experience from a number of wind energy projects in Denmark shows that public involvement in the planning phase and co-ownership increases the acceptance. Adding to this, two private offshore projects demonstrate that cooperative development and ownership is also an option in larger-scale projects. For example, the Middelgrunden Offshore Wind Farm (40 MW) close to Copenhagen was developed though cooperation between the municipality, an energy company and a number of private individuals. Middelgrunden is considered the world's largest cooperatively owned wind farm with more than 8000 members of the cooperative.

Another example is the Samsø project off the east coast of Jutland (23 MW) which was developed by a cooperative with local people on the island of Samsø and the municipality as members.

It was noted by the interviewees that although there has traditionally been high social buy-in to the wind industry, in recent years this has declined rapidly. At the moment, this seems to have coincided with the growth of external companies, like Dong and Vattenfall building more wind farms. Other factors appear to be an increase in the scale of developments, which are needed to deliver on the targets, and a number of high profile case where local communities have had a poor experience with the consenting process.

The openness of the consenting process also seems to make a difference, one interviewee explained, that there are examples from just outside Copenhagen of two turbines; the first had huge problems as it did not engage with local people. The second underwent excellent public participation and secured permission much easier.

However, the resistance against large scale projects is growing and becoming a significant issue in Denmark. It was noted by Walsh (2010) that in Denmark 'Wind energy implementation slowed considerably in the period 2000-2010 with instances of local opposition increasingly reported. Adverse side effects of municipal reform in combination with up-scaling of wind projects associated with repowering efforts, reduced financial support for wind energy implementation and shifts in ownership, are especially relevant in explaining these trends' (Walsh, 2010, p87).

The other reason is just the sheer number of schemes that have been developed resulting in a significant cumulative effect. The press is also taking a rather negative[26] stance against the larger schemes. The growing extent of opposition is now resulting in some projects failing, although there are a wide variety of experiences in different municipalities. As a consequence, the Government are seeing acceptance as an important issue for action. At a municipality level the Task Force sees local politicians as crucial in the process of wind energy development and one that needs more attention to understand how the politicians can be helped to make the right decisions amidst considerable pressure. An effective local plan for climate change or renewable energy is seen as making a big difference as it allows [27]politicians to be able to contextualise what they need to achieve, rather than being led entirely by the concerns of vocal local groups.

Two Danish examples (Table 4.4) illustrate the success of active public involvement in wind energy schemes. The third case study illustrates the social acceptance issues that can occur through a poorly conducted process.

[26] as it likes to portray the little man fighting against the 'monster' turbines – it makes a good story and difficult to get more positive stories

[27] Consultation with Technical University of Denmark

Table 4.4
Examples of public engagement and social acceptance

Context	Process	Outcome
Horns Rev II[28] offshore wind farm off the coast of Denmark.	Local people were asked to respond to the plans, and these responses (including opinions on distance of the turbines to the shore, day and night time use of lights on them, and fishing exclusion zones) were used in the assessment for the final locations of the turbines.	The open and flexible development process was one of the factors that led to very little public resistance to the project. It is thought that the growing public acceptance was due to openness during the planning process, a large amount of information given to local people, and the development of co-operation with local councils and stakeholders.
Middelgrunden offshore wind farm, in Copenhagen harbour.	Appreciating the very prominent location, the wind farm was designed to enhance this. It was constructed on the lines of the historical defences of the city and presented as such to the local people. There was government support to explore the options available in terms of the technical and environmental issues, and funding for pre-investigations included public hearings. This led to a high information level from the developers, with leaflets, public meetings, news articles, and television coverage. Further, the open planning process invited a broad spectrum of people to participate.	The process led to an 'understanding'[29] being gained during the planning process; suggesting not just that the developers listened to the concerns of the local people, but actively made efforts to appreciate their points of view.
New prototype wind turbine test center near Østerild in Jutland. DTU Wind energy has now three wind turbine test sites in Denmark. The test sites are situated at (1) Campus Risø, Roskilde, (2) Høvsøre Test site for Large Wind Turbines at Lemvig and (3) Test Center Østerild at Thisted. At Høvsøre and Østerild DTU Wind Energy has in total 8 test sites and right now there are two test sites for rent at Test Centre Østerild	The Østerild law was passed in the Danish parliament during February 2011 to enable this to be built. The Danish Technical University is appointed to be head of the establishment and operation of the new wind turbine prototype test facility. Test Centre Østerild was established during 2012 and allows for erection of wind turbines of up to 210 and 250 meters high respectively. The Test Centre's geographical location and facilities allow for the wind turbine industry in collaboration with DTU and other research institutions to carry out research, development and test of prototype wind turbines and new wind turbine technology. A grid connection test facility is expected to be established at the Test Centre, although not until 2014 at the earliest.	The process for establishing the test centre has not been ideal in terms of social acceptance. Firstly, it was proposed in an area that was renowned for its nature reserves, including a number of RAMSAR sites. Secondly, the planning process was very closed, with local people not having a say on whether it should go ahead, and was opposed by a number of very powerful stakeholders. Attracted a lot of protests and because of the open nature of Danish society, news spread and was covered in the media, to the extent that it potentially has had a a widespread negative effect on wind development in general.

[28] Cited in Claire Haggett (2008) Over the Sea and Far Away? A Consideration of the Planning, Politics and Public Perception of Offshore Wind Farms, Journal of Environmental Policy & Planning, 10:3, 289-306, DOI: 10.1080/15239080802242787.
Available on: http://dx.doi.org/10.1080/15239080802242787
[29] Soerensen et al., 2001b, p. 329

The Østerild scheme is of particular interest as it illustrates how weaknesses in procedural justice can be extremely problematic. The centralisation of the planning process due to national interest may in itself have created a more challenging process. It is possible that at a national level this example has damaged the level of trust developed over many years and may be detrimental to the future pathways and trajectory of the energy transition in Denmark.

Figure 4.6
The Østerild test centre

Source: DTU Wind Energy

4.10 Key Insights from Denmark

In terms of international comparison with Ireland, the Danish experience provides some useful insights. This are described below and discussed in further detail in Chapter 7.

Positive aspects:

- Denmark has built upon existing social capital – co-operatives are already prevalent in society in rural Western areas. This could be considered as a possible pathway to growth in parts of Ireland too.
- However, in recent years, in order to reach more stretching targets the scale of wind energy projects has been increasing and as a result a greater proportion are now being developed by large corporate concerns. A consequence of this has been increasing levels of community objection as projects are seen as being developed by external interests.

- A response to this has been that the government has sought to increase Joint Ventures[30] (JVs) for co-ownership between communities/citizens and corporations. The recently published UK Community Energy Strategy (DECC, 2014) also shows strong policy interest in promoting co-ownership of renewable energy projects, as a means of increasing community acceptance. This is a potential recommendation for Ireland to consider similar 20% minimum co-ownership level for every new scheme.
- Corporate acceptance of this ownership ruling in the 2008 RE Act is a sign that it will work if developers see no alternative. However, some companies are likely to resist this regulation in Ireland if they feel they can lobby policy makers successfully.
- It is interesting to note that the entire debate about community benefits is absent in Denmark due to the cooperative ownership emphasis.
- Regime intermediary – the Danish Wind Turbine Task Forces travels to localities and informs local planners and advises developers. It is worth considering something similar in Ireland to serve to better connect national and local institutions and processes.
- Noise impacts – tighter regulations have worked to influence developers and worked better than setback distances as a means of reducing social impacts. This could be considered for recommendation in Ireland.

Challenges:

- The difficulties with wind acceptance in the more populated East of the country suggests that it would be false to conclude that Denmark is a kind of 'wind haven' where objections do not happen. Similar to other places, if development is characterised by 1) large scale proposals 2) lacking procedural justice (through centralised decision making) 3) lacking distributional justice – benefitting large corporations – then objections happen here too. This may make reaching the renewable energy generation targets more challenging which may need to be mitigated by demand reduction as in the Danish case.
- Some of the measures introduced by the 2008 Act may take more time to show value, early indications are that they need to be publicised more to increase take up. However, it is also possible that measures such as the scheme to compensate local landowners if property values are detrimentally affected by a wind farm, may not increase social acceptance as in some instances impacts requiring compensation may in themselves raise suspicion and concern. Even in Denmark, a single high profile case (Østerild) can detrimentally affect the sector's image more generally in society, and illustrates that social acceptance is fragile and must be nurtured to persist.

[30] An association of two or more individuals or companies engaged in a solitary business enterprise for profit without actual partnership or incorporation (www.legaldictionary.com)

Table 4.1
Summary of Key Insights for Denmark

Practice Category	Is it effective?	Context Specific Factors What problem is it trying to solve? Why is it effective? What specific contextual factors contribute?	Relevance For Irish Context?	Further Development
Distributional Justice				
Community Equity **20% option to purchase scheme** **Danish Renewable Energy Act, enforced from 1 January 2009.**	Enables those living close (within 4.5 km) to sites with turbines over 25m to purchase up to 20% shares, so that those most likely to bear the impacts of a scheme will have the option to benefit financially. It is not necessarily equitable as could include properties that do not have a view of the site as well as those that do. Wider distribution of shares is possible if there is local interest for more than 20%. In densely populated areas a higher proportion of ownership is happening, e.g. around Copenhagen it is 50%.	To ensure greater involvement of local citizens and promoting the acceptance by local communities of new and bigger wind farm developments. Creates local value through share dividends (Distributional Justice) and encourages involvement of shareholders from early stages of project (Procedural justice). History of local ownership through farming co-operatives. However, share offers may result in a more individual rather than collective community approach in response to larger scale developments.	Equity is potentially a more effective route to creating local value than community benefit packages. Gives people an active role in a project, not just being a passive recipient of benefit offers. However, an affordable price is essential – need to be sensitive to this in Ireland If not affordable will create divisions at community level excluding some from equity ownership and social dividends.	Investigate options to purchase scheme. Affordable share prices in Irish context Appropriate level of equity to be released to community members (is 20% too high or too low?)
Compensation for decrease in property values	Partial	2008 Act included a proposal to compensate property values if these dropped as a result of a wind project (with turbines 25 metres or more in	It is likely that this will also face problems in an Irish context. Recent academic research in a US context has	Consider further evidence and studies, such as, ClimateXChange,

Practice Category	Is it effective?	Context Specific Factors What problem is it trying to solve? Why is it effective? What specific contextual factors contribute?	Relevance For Irish Context?	Further Development
		height). Neighbours must be given chance to assess project. Developer must hold public meeting and include list of properties within a distance of six times total turbine height (i.e. 1 km for turbines of 100m). Property owners must notify regulator within 4 weeks of meeting of likely loss of value 1% or more. If there are outwith six times turbine height must pay a fee of Euro 500. Danish Minster for Climate and Energy appoints a valuation authority to assess claim. If successful this is paid by the developer and any fee recouped by property owner. The scheme is only partially successful which may be because it must be done before construction, within limited timescales and the loss of value may be difficult to prove.	suggested that there is no robust evidence for wind energy project's impact on house prices, thus raising questions over whether this is a priority issue to be addressed.	University of Edinburgh, is undertaking a study to be published 2014. Consult with stakeholders as to the level of priority compared to other potential measures to increase social acceptance.
Procedural Justice				
Intermediaries (provision of expert advice)	Yes	In 2008 the Wind Turbine Task Force (WTTF) was set up as an advisory body providing technical and planning advice and community engagement/liaison. The (WTTF) aims to provide independent, trusted source of information and support. Local authorities are key actors in planning process. WTTF help two thirds	Could help develop trust in the technical data related to the planning and environmental impacts of wind energy in Ireland.	Conduct need and skills assessment e.g. have local authorities developed this expertise and capacity? Consider how this role may facilitate social acceptance, the remit and delivery of such a

Practice Category	Is it effective?	Context Specific Factors What problem is it trying to solve? Why is it effective? What specific contextual factors contribute?	Relevance For Irish Context?	Further Development
		of Denmark's municipalities every year. A relatively small resource (4 staff) appears to make a national contribution to social acceptance.		role.
Poor industrial practice	Recently experience of consenting process and community engagement has been less positive, especially in relation to large scale developments.	Community engagement is integral to procedural justice in the consenting process. Larger scale and projects of 'national interest' not always handled appropriately. Danish society is relatively open so firstly, expect an open process and secondly, will challenge when this is not the case as in Osterlid.	Procedural justice is important at all scales of project, and particularly at larger scales where developer is external to the community and impacts are larger. One case of poor practice can affect the whole sector.	
Place Related Impacts				
Noise	Yes	Government took note that there were increasing complaints. Regulations lowered to 20Db for night time noise. Improves social acceptance through lowering impact on specific projects and encourages manufacturers to improve the noise performance of turbine models. This offers perhaps a more effective way of addressing this specific impact than altering set back distances	Addressing potential noise impacts in this way is likely to reduce one of the sources of objection to wind projects. It could offer a clear message that developers and industry are listening to communities who are effected by noise.	Current consultation on noise levels until February 2014.

5.0 CONTEXTS AND PROCESSES - GERMANY

5.1 Introduction

This chapter presents the key contexts and processes of the energy transition for Germany including an overview in terms of demographics, wind energy development, regime context and future challenges.

5.1.1 Methodology

The method of study included:

- International literature review;
- Data gathering from secondary sources; and
- Interviews with key stakeholders (Enercon, Saarlland University and Institute for Future Energy Systems, Technical University Muenchen)

5.2 Germany

5.2.1 Background

The table below provides a summary of the key data which describes Germany's wind generating capacity in relation to population and land mass.

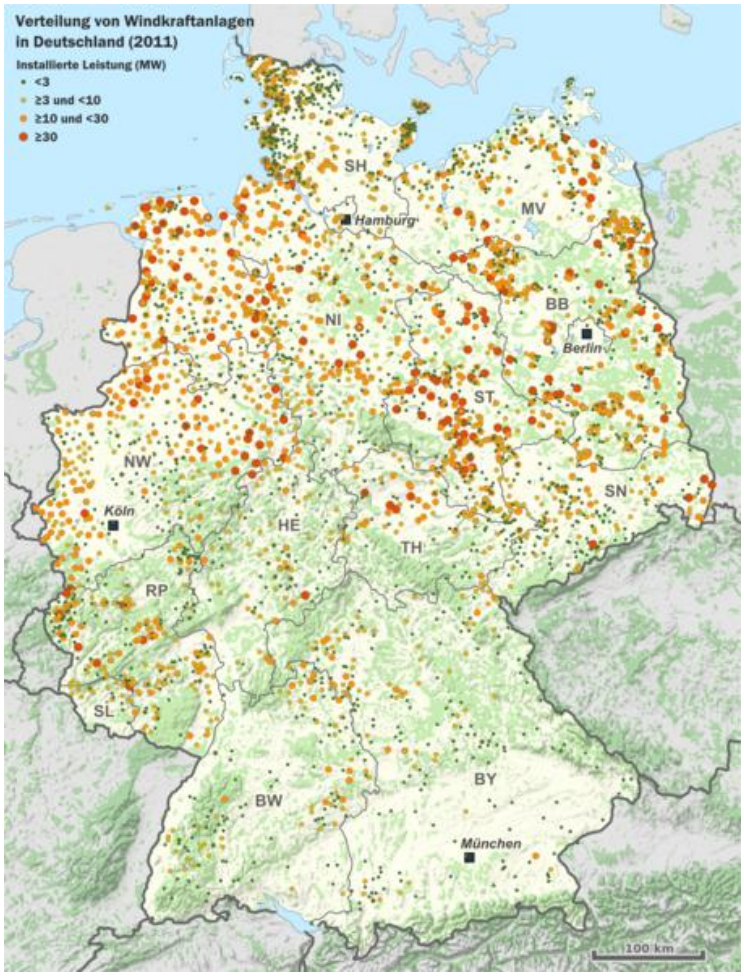
Table 5.1
Germany at a Glance

Germany at a glance		
Socio-Economic Profile	Population	82,422,299 (2011)
	Area	135,236 square kilometres
	Average Population density	235 per square kilometre
	Employees in wind sector	101,100 (2011)
MW Wind Energy	In 2012, 46 billion kilowatt-hours of electricity was generated from wind energy, comprising 7.3% of the share of net electricity consumption. In 2012, 2,415 MW of wind power capacity was newly installed in Germany. The total installed capacity was 31,307,60 MW.	
No. of Wind Farms	998 turbines were installed in 2012. At the end of 2012, 23,030 wind turbines had been installed in Germany in total.	
Source	German Wind Energy Institute (DEWI)[31]	

[31] See: http://www.wind-energie.de/en/infocenter/statistics

The distribution of wind power schemes (2011) is shown in Figure 5.. It is of note that wind energy developments are mainly in the north of the country where wind resource is greater and socio-economic status is lower.

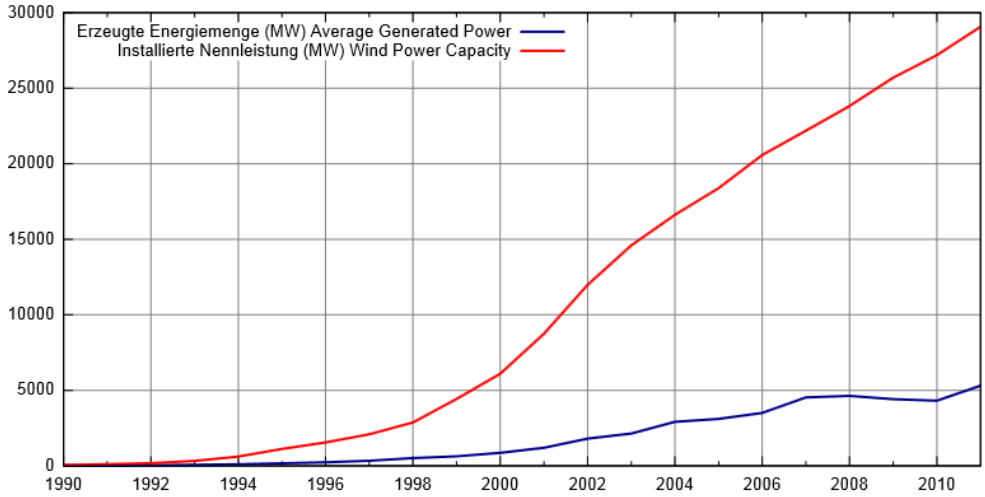
Figure 5.1
Wind Power in Germany 2011



Source: German Wind Energy Association

The growth of installed wind energy capacity compared to average generated power is shown in Figure 5.2.

Figure 5.2
Wind energy installed capacity – Germany 2011



Source: German Wind Energy Association

5.3 Key Policy Drivers

The German Renewable Energy Act (in German: Erneuerbare-Energien-Gesetz, EEG) came into force in the year 2000 and was designed to encourage cost reductions based on improved energy efficiency from economies of scale over time. According to one interviewee it was this Act and the later adjustments; feed-in-tariff (20 years for renewable energy) that stimulated renewable energy and particularly wind energy.

In 2009 a new policy regarding wind energy was introduced in the form of the Community Business Tax. This policy went some way to redistribute some of the benefits from wind energy deployment; before 2009, 100% of all tax paid accrued to the registered headquarters of the company (e.g. Berlin). After 2009, the local payment of tax was 70%, leaving 30% to accrue to company head quarters.

German policy makers took a fundamental policy decision to move towards a sustainable energy supply over the long term. In September 2010, the federal government adopted a comprehensive new strategy, the Energy Concept, which established the principles of a long-term, integrated energy pathway to take the country to 2050 and which determined renewable energy as the cornerstone of future supply. The Energy Concept built on the success of previous policies, notably the Integrated Energy and Climate Programme of 2007, but adopted more ambitious goals. The federal government deliberately set Germany on the path towards becoming one of the world's most energy efficient and environment friendly economies, while at the same time seeking to maintain affordable energy prices and a high level of economic prosperity. However, it may be questionable how realistic or compatible these goals are.

Following the Fukushima Daiichi nuclear accident in March 2011, a political decision which attracted extensive public support was taken to accelerate the phasing-out of Germany's nuclear fleet by 2022 starting with the immediate closure of the eight oldest plants. This decision, combined with the political target to progress towards a low-carbon energy sector, had a major impact on the German energy policy outlook, and resulted in the adoption of a second package of measures, to accelerate the energy transition. This second Energy Package, which completed the Energiewende, contained seven legislative measures to

support renewable energy and grid expansion, promote energy efficiency, fund the reforms and reverse the previous decisions to extend the lifetime of the nuclear plants. Energiewende is an important concept as it is an attempt by the state to embrace the notion of transition through a holistic policy approach.

The scale of Germany's ambitions, coupled with the size and energy intensity of its economy, and location at the heart of Europe's energy system, mean that further policy measures are necessary if Germany's energy transition is to maintain a balance between sustainability, affordability and competitiveness[32]. According to a recent IEA review[33], German consumers have absorbed the costs of the Energiewende, but debate over social and economic impacts of the Renewable Energy Sources Act (EEG) has become more prominent as the share of renewable energy has continued to grow alongside rising electricity prices. The transition to a low-carbon energy sector requires social acceptance in terms of socio-political, market and community acceptance, and needs to maintain retail electricity prices at an affordable level, provide returns that are attractive to investors and ensure local communities have a stake in wind energy projects. Furthermore, decisions of this magnitude on German energy policy inevitably have an impact far beyond the country's borders and have to be taken within the context of a broader European energy policy framework and in close consultation with its neighbours.

Recent energy and climate change polices in place in Germany are summarised below in chronological order.

5.3.1 Renewable Energy Sources Act (EEG) - 2012 Amendment

The Renewable Energy Sources Act (Erneuerbare Energien Gesetz – EEG) promotes renewable energy mainly by stipulating feed-in tariffs that grid operators must pay for renewable energy fed into the power grid. The Act aims to increase the share of renewable energy sources in the German electricity supply. On 1 January 2012 the amendment of the Renewable Energy Sources Act (EEG) came into force (EEG 2012). In agreement with the Energy Concept of the government dating from September 2010, it aims at reaching the following minimum shares of renewable energy in electricity supply:

- 35% by 2020
- 50% by 2030
- 65% by 2040
- 80% by 2050

The basic principles of the EEG, in particular priority purchase, transport and distribution of electricity generated from renewable energy sources as well as statutory feed-in compensation, remain unchanged. Accordingly the growing share of renewables in the total electricity production, market integration, system integration and grid integration became increasingly important. Main mechanisms to improve wind energy integration are:

- A market premium (optional for all renewables, from 2014 compulsory for new biogas facilities).
- A rebate in compensation payments for utility companies selling electricity generated at least 50 % from fluctuating renewable energy sources, inclusion of photovoltaic plants in the feed-in management, as well as supporting instruments outside the EEG.

[32] IEA, Energy Policies of IEA Countries- Germany 2013 Review
[33] See: http://www.iea.org/newsroomandevents/pressreleases/2013/may/name,38340,en.html

A number of measures were adopted as part of the energy package of the Federal cabinet, among which an act amending provisions of energy business legislation ("Gesetz zur Neuregelung energiewirtschaftsrechtlicher Vorschriften"), an act on measures to accelerate the expansion of the electricity grid ("Gesetz über Maßnahmen zur Beschleunigung des Ausbaus der Elektrizitätsnetze") and others.

The feed-in tariff structure for onshore wind remains mainly unchanged. The initial tariff of EUR Cent 8.93/kilowatt-hour (kWh) will be decreased every year for new installations by 1.5%, as opposed to 1% in the EEG 2009. Instead of limiting the payment of the system service bonus, fixed at EUR cent 0.48/kWh for the year 2012, to the end of 2013, it will be paid until end of 2014 for new and until end of 2015 for existing facilities. The repowering bonus of EUR Cent 0.5/kWh (to support the replacement of old turbines by new ones) is restricted to wind turbines that were put into operation before the year 2002.

Table 5.2
Summary of Germany's Support Mechanisms compared to Ireland

Mechanism	Germany	Ireland
System Service Bonus	€ 0.48/kWh for the year 2012, to the end of 2013, it will be paid until end of 2014 for new and until end of 2015 for existing facilities.	
Price/Feed-in-Tariff	€8.93/kilowatt-hour (kWh) will be decreased every year for new installations by 1.5%.	Onshore wind (above 5MW) €0.07/KWh. Onshore wind (equal to or less than 5MW) €0.07/KWh.
Repowering bonus	€0.5/kWh (to support the replacement of old turbines by new ones) is restricted to wind turbines that were put into operation before the year 2002	

For offshore wind, the initial tariff remains at EUR Cent 15/kWh. The tariff for new turbines will not be decreased before the year 2018 (instead of 2015 initially), with a then 7% annual rate of degression (5% initially). To accelerate repayment of investment in offshore wind farms an optional feed-in tariff model was introduced, which offers an initial tariff of EUR Cent 19 /kWh paid for 8 years (standard model: EUR cent 15/kWh for 12 years).

Further supporting measures outside the EEG to stimulate offshore wind energy, include a dedicated loan programme of the KfW bank (see below for details).

The literature review indicated that the German experiences with the Feed in Tariffs (FIT) may provide important lessons for other countries that are in the process of developing policy for the renewable energy sector. The evidence suggests that given appropriate design features, the FIT is more cost effective at getting renewable energy systems developed (Lipp, 2007). Germany has more than 10 years' experience with the FIT and is a world leader in the field of renewable energy development. "*Germany is on track to meet its renewable energy penetration targets and has been able to achieve a number of other objectives, especially industrial development, job creation and CO2 emission reductions*" (Lipp, 2007: 5494). The FIT in Germany has shown that progress can be influenced by providing different feed-in rates, guaranteeing grid access and enabling a range of societal players to participate in the market. By comparison the Renewable Portfolio Standard policy deployed in the UK does not provide the same level of certainty (Lipp, 2007). However, the emphasis on Feed-in-Tariffs and other financial mechanisms supporting distributional justice

was noted by one of the interviewees as detracting from the need to maintain procedural justice.

5.3.2 Law on Energy and Climate Fund

The law on the new Energy and Climate Fund (EKFG) creates a special purpose fund. EFK funds are spent on various support programmes relating to energy efficiency, renewable energy, energy storage and grid technology, energy-efficient renovation, national and international climate protection as well as electromobility. In support of the the Energiewende policy shift away from nuclear power towards a renewable energy supply, the state-owned development bank KfW would cover the expenses for support programmes provided by the bank itself. This comprises support in the amount of EUR 311 million for energy-efficient renovations of buildings and towns and cities. Originally revenue was meant to come mainly from a contractual agreement of the nuclear power plant operators with the German state that skims off part of their extra profits, from parts of the nuclear fuel rod tax and the auctioning of emission allowances as of 2013. As a consequence of the nuclear power exit from 2012 onwards, only the revenues from European emissions trading will flow (but completely and directly) into the Energy and Climate Fund.

5.3.3 Sixth Energy Research Programme

On 3 August 2011 the 6th Energy Research Programme, entitled “Research for an environmentally sound, reliable and affordable energy supply”, was adopted by the Federal cabinet. The research programme is a joint project of the Federal Ministry of Economics and Technology, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the Federal Ministry of Food, Agriculture and Consumer Protection and the Federal Ministry of Education and Research.

The programme sets out the guiding principles and priorities of the German government’s support policy in the field of innovative energy technologies for the coming years, thus laying the groundwork for an environmentally sound, secure and economical restructuring of Germany’s energy supply. The Federal Government’s aspirations for the programme are to accelerate the adoption of renewable energy while ensuring a reliable, economically viable and environmentally sound energy supply for Germany. The Government acknowledges that this transition to renewable energy requires political and social change at the deepest levels, with industry and science playing a leading role. With its 6th Energy Research Programme, the German government is adding a new strategic approach to its energy and climate policy. This approach places emphasis on enhanced assistance for research and development of forward looking energy technologies.

The German government’s budget for energy research clearly reflects its commitment in this regard as it is making around EUR 3.4 billion available for energy research for the period from 2011 to 2014. The remarkable increase in funding of around 75% compared to the period from 2006 to 2009 will mainly be used for the newly established "Energy and Climate Fund". The funds will be employed for strategic priority areas that are vital for a speedy transformation of Germany’s energy supply: renewable energies, energy efficiency, energy storage, grid technologies and the integration of renewable energies into the energy supply system.

Against this backdrop, the Federal Government has refocused its funding of research and development in the energy area in four key ways:

- Strategic focus: The funds available to the government ministries for fostering research and development are to be targeted even more specifically at technologies

and technological systems that are key to the Federal Government's objective of switching to sustainable energy supply for Germany;
- Interministerial collaboration: The government ministries involved in the Programme will develop joint funding initiatives in selected fields of strategic importance to Germany's future energy supply.;
- International cooperation: International cooperation is vital for Germany in particular, due to the German economy's focus on global markets; and
- Harmonisation and coordination: it will endeavour to optimise harmonisation and coordination among the ministries involved in order to maximise the value added by research that is publically funded.

5.3.4 KfW Programme Offshore Wind Energy

In order to accelerate the expansion of offshore wind energy in Germany, the KfW Offshore Wind Energy programme supports the financing of offshore projects in Germany on behalf of the Federal Government. The programme is aimed at giving financial incentives for the innovative offshore wind power technology, thus facilitating private financing in the future. Financing is available for the construction of up to ten offshore wind farms in the German Exclusive Economic Zone (EEZ) or in the 12 nautical-mile zone of the North Sea and the Baltic Sea for project companies regardless of the company background.

KfW provides loans at market conditions to finance the investment costs which are granted strictly on a first-come first-served application basis. Up to 70% of the total debt capital required may be financed, but not more than EUR 700 million per project. Project financing may take place in the form of a direct loan in the framework of bank consortia, a financing package composed of a loan on-lent through a banks and a direct loan from KfW; a direct loan in the framework of bank consortia to finance unforeseen additional costs (cost overrun facility).

5.3.5 Energy Concept 2010

Officially launched in 2010, Germany's "Energy Concept" is a long-term energy strategy for the period up to 2050. The aims of the plan are to secure a reliable, economically viable and environmentally sound energy supply to make Germany one of the most energy-efficient and green economies in the world.

The defining activity areas of the Energy Concept set out the establishment of renewable energies as a cornerstone of future energy supply; energy efficiency; the creation of an efficient grid infrastructure for electricity and integration of renewable energy sources; energy upgrades for buildings and energy efficient new buildings; and the country's mobility challenge (one million electric vehicles on the road by 2020 and six million by 2030). As such, the Energy Concept represents a market-driven, technology-neutral framework transforming energy supply.

Climate protection targets agreed under the Energy Concept are: to achieve a 40% cut in greenhouse gas emissions by 2020, 55% by 2030, 70% by 2040 and between 80% and 95% in 2050 on the values recorded in 1990. The Energy Concept sets out a basic strategic approach for the switch-over to renewables and energy efficiency for a secure, environmentally compatible and competitive supply of energy. The Energy Concept aims to address how to ensure a future energy supply that is both secure and affordable while fulfilling the ambitious climate protection targets of the coalition agreement (minus 80% CO2 by 2050).

In this context, renewables should account for the main share of the energy supply. The Energy Concept contains a large number of specific measures and a sound financial basis for this (the energy and climate fund). In addition to the targets there is an immediate action programme consisting of ten especially urgent measures. The immediate action programme focuses in particular on the expansion of offshore wind power and the expansion/upgrading of power grids. Every 3 years, starting in 2013, the Federal Government will carry out a scientifically grounded monitoring process to review the implementation status of the Energy Concept. Furthermore, the Energy Concept contains a solid plan for financing the necessary measures over the long term.

5.4 Onshore Wind Energy Targets

The Energy Concept describes specific targets and development paths through to the year 2050:

- Greenhouse gas emissions are to be cut by the following rates (compared to 1990 levels): 40% by 2020, 55% by 2030; 70% by 2040 and 80-95% by 2050.
- The share of renewable energy sources in final energy consumption is to increase from roughly 10% today to 60% by 2050.
- Compared to 2008 levels, there is to be a 20% reduction in primary energy consumption by 2020, and a 50% reduction by 2050.
- The annual rate of building renovation to upgrade energy performance is to be doubled from current levels, from 1% to 2% per year. The Energy Concept contains a wide variety of specific measures to meet these targets.

5.5 Grid infrastructure

The Act on the Acceleration of Grid Expansion (Netzausbaubeschleunigungsgesetz – NABEG) 2011 identified the upgrade of grid infrastructure as vital for the ambitious expansion targets for renewable energy in Germany. The three main obstacles to progress were identified as; the duration of permitting procedures, the acceptance of power line projects by residents and the investment conditions. NABEG aims to address these issues through:

- Federal Planning and Federal Grid Expansion Plan

  To standardise approval procedures nationwide, the Federal Network Agency shall carry out federal special planning (Bundesfachplanung) in close cooperation with the affected federal states. The resulting federal grid plan (Bundesnetzplan) shall detail and reserve the necessary power line routes for all of Germany. The public shall be involved at an early stage.
- Greater Participation and Transparency

  Financial compensation for municipalities affected by power lines, improved participation of citizens in drawing up grid expansion plans, and an information campaign by the government. Network operators and environmental groups shall improve communication and transparency, thus leading to greater acceptance of projects.
- Offshore Grid Expansion

  The legal prerequisites shall be created for joint grid connections of offshore wind farms (cluster connections). In addition, an offshore master plan shall ensure optimal coordination of the offshore wind power expansion.
- Promotion of Cross-Border Interconnections

To promote integrated networks and improve the internal electricity market, clear legal provisions for the construction of cross-border interconnections shall be introduced, in particular with a view to grid access fees and the conditions for the connection to the transmissions network.

- Reduction of Bureaucracy at Competent Authorities

  By cutting bureaucracy the competent authorities shall be freed to focus on their main tasks. They shall be allowed to delegate formalised procedures to private project managers.

- Simplifying Permitting Procedures

  Permitting procedures shall be simplified. For 110 kV overhead and underground power lines a uniform permitting regime shall be introduced to reduce approval time.

- Promotion of Storage Sites

  The construction of new storage sites shall be encouraged by exempting them from grid fees for 20 years, instead of 10 years as under the current legal regime.

- Additional Measures

  In addition to NABEG a set of regulations shall speed up grid expansion. This includes the regulatory framework conditions, as they affect investments. Possible amendments in particular with respect to R&D shall be speedily evaluated.

The NABEG proposal is in line with other efforts to speed up grid expansion to accommodate an increasing input of renewable energy. One example is the Amendment of the Energy Line Extension Act, which took place in 2011. The amended law provides more powers to state authorities to decide when underground cables shall be used for certain extra high voltage pilot projects regulated by EnLAG. The German Energy Blog suggested in 2011 that underground cables may improve the acceptance of grid expansion in Germany[34]. However, undergrounding of cabling may not be possible in all circumstances.

5.5.1 Implementation of grid improvements

The Federal Network Agency (Bundesnetzagentur) is the German regulatory authority for the electricity sector. Its task is to promote competition in regulated sectors and to ensure discrimination-free grid access. The Federal Network Agency makes its decisions on the basis of the Energy Industry Act (EnWG) and the Grid Expansion Acceleration Act (NABEG). Since 2011, it has also played an essential role in the negotiation of the annual grid development plan.

According to Bundesnetzagentur there are a number of challenges for the network operators:

- Nuclear and coal-fired plants are large and powerful facilities. In order to generate the same volumes of energy with wind and solar power and biomass many small generation facilities are required. The electricity generated in a decentralised way therefore needs to be collected, as it were, and transported to the consumers.
- Often, it is a case of renewable generation being available at those locations where little or no electricity is consumed. This results in a surplus of energy needing to be transported over long distances - particularly from the north to the south and west of Germany.

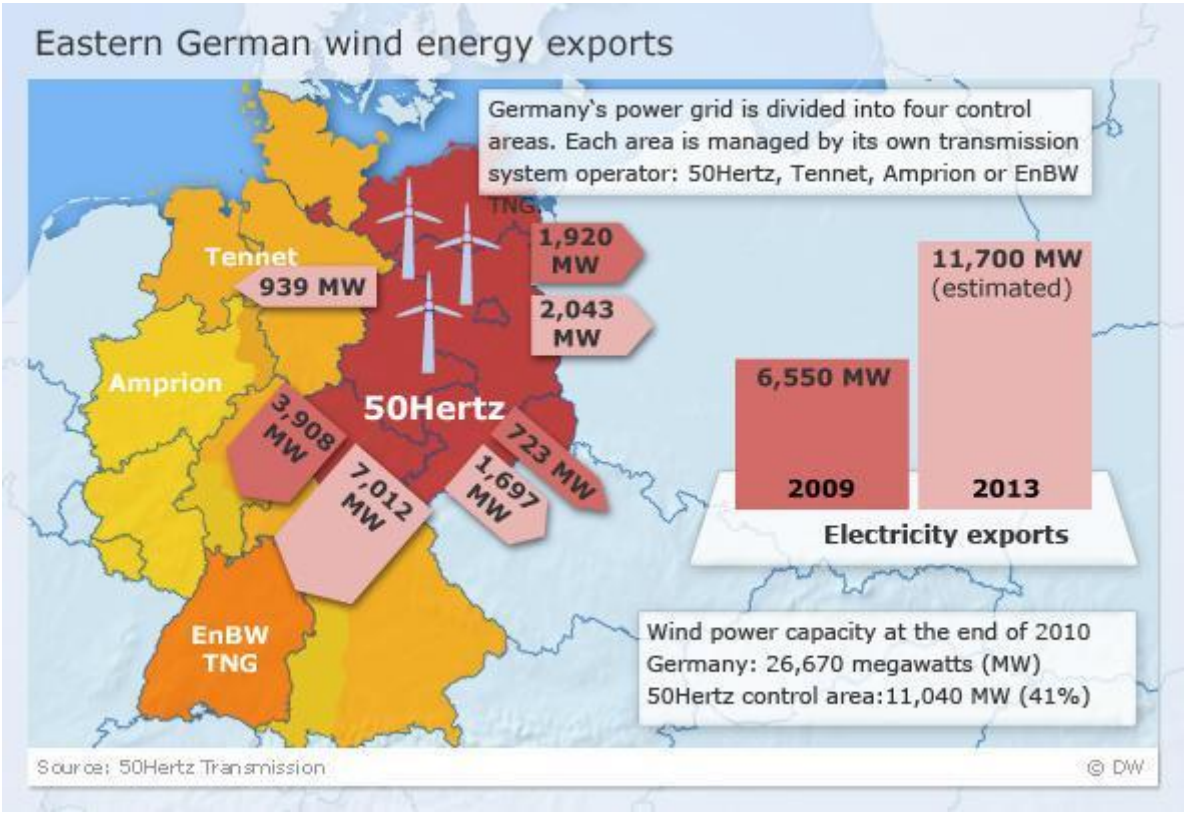
[34] German Energy Blog (March 2011)

- An increasing number of renewable energy generators are now being installed on the distribution network and medium voltage levels. On high generation days more energy is generated locally than can be used. The excess energy then flows from the bottom up – in other words, from the distribution network via the medium voltage level into the transmission network. This energy needs to be transported elsewhere to be used.

The expansion of the transmission and distribution networks is seen in Germany as the most important means of moving energy supply away from nuclear power and coal towards greater levels of renewable energy. The IEA 2013 review of Germany's energy policies contend that the forecast growth in renewable electricity generation capacity, and the need to bring the electricity output to market, must be complemented by timely, large-scale, cost-efficient investments in the electricity transmission and distribution systems. At present, transmission infrastructure carrying power from northern Germany to the south is increasingly congested, and likely to become more so.

There is also a need to connect the new northern wind farms to demand in the south. At the moment, Germany has to route power through bordering countries' grids when supply is high, taking wind power from the North Sea and Baltic regions to Germany's south. But according to media reports, Germany's neighbours do not necessarily see this as a sustainable solution, creating more pressure to upgrade grid infrastructure.

Figure 5.3
Eastern German wind energy exports



Source: Institute for Energy Research

The geographic concentration of large volumes of wind power, as much as 25 GW by 2030, in northern Germany, a region with low electricity demand, and the need to transport it to the industrial south where demand is will place further strain on the networks. Major power flows in Central Europe, including loop flows, originating in Germany, in the north-south direction through the Czech Republic and Poland, are among the drivers of the need for enhanced operational co-ordination, financial settlement and infrastructure investment in Central Europe.

As a result of changes to the German Energy Act (EnWG), the four Transmission System Operators (TSOs) are required to prepare a joint network development ten-year plan. The first such plan – the Electricity Grid Development Plan 2012 (NEP 2012) – which was subject to public consultation before examination and approval by the Federal Network Agency in November 2012, contains plans for the reinforcement of approximately 2 900 km of lines and construction of 2 800 km of new power lines. The approval was given to 51 of the 74 projects proposed by the TSOs. Cost estimates for this work vary but are somewhere in the region of EUR 20 billion to EUR 30 billion over the next ten years.

As most renewable electricity generation is connected to the distribution system, rather than the transmission system, large investments are also required in the country's 870 distribution systems. Once more, estimates of the scale of investment and works vary but a study published by the German Energy Agency forecasts that capital investments of between EUR 27.5 billion and EUR 42.5 billion are required over the next ten years. So far, strong focus has been given to development of the transmission system which is commendable; however, as the greater share of investment will take place in the distribution networks, the focus of future policy by the government and Federal Network Authority needs to be on distribution.

To date, Germany's record with regard to the construction of new grid infrastructure is patchy and planning and consenting procedures present a major stumbling block. Increased and effective co-operation between the Länder and between the federal government and the Länder is also necessary to make possible the Energiewende. Further implementation measures must be considered, which aim at more transparency and public involvement in the decision process of grid extension. The NABEG provides part of the solution, as does the appointment of the network regulator as one-stop shop for projects of national interest. In a 2013 review[35], the IEA note that the preparation of the first joint Network Development Plan by the four electricity TSOs is a welcome step in this regard. In response to the growth in variable renewable energy, the IEA also stress that investing in electricity storage capacity and improving energy efficiency in electricity transmission and distribution must be considered. Furthermore, a stable regulatory system is required to ensure the availability of long-term finance to network operators.

The plans for a target grid for 2050 constitute a paradigm shift in grid planning based on a long-term approach assuming that electricity will be supplied almost completely from renewables in 2050. The obligation for system operators to establish a ten-year grid expansion plan ensures coherent planning by the individual operators. Furthermore, the introduction of specialised national planning for transmission systems is geared towards ensuring binding, nationwide planning of routes. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety contends that this is important in terms of transparency and legal certainty for transboundary infrastructure projects.

It is estimated that an additional 36,000 kilometers of high voltage lines are needed by 2020. However, there is evidence of some resistance to grid expansion; with an environment

[35] See: IEA (2013) Energy Policies of IEA Countries – Germany 2013 Review

agency poll showing only 42% of Germans would accept a new power line running through their community[36].

Figure 5.4
Planned Grid expansion in Germany

Source: Institute for Energy Research

5.5.2 National Energy Action Plan (NREAP)

Under the EU Directive 2009/28/EC member countries of the European Union are obliged to draft and submit to the European Commission National Renewable Action Plans (NREAPs)[37]

[36] The Carbon Blog (25 Jul 2013) The Energiewende: Transforming Germany's energy sector, Mat Hope
[37] http://ec.europa.eu/energy/renewables/action_plan_en.htm

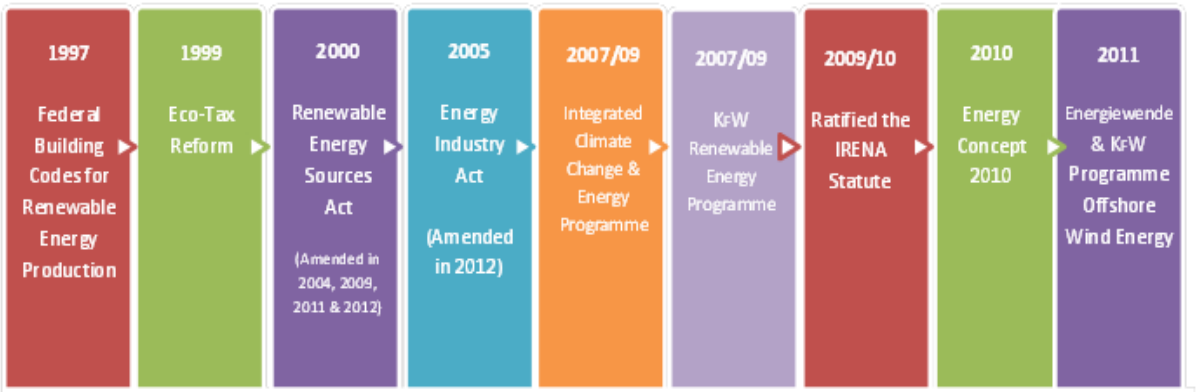
outlining the pathway which will allow them to meet their 2020 renewable energy, energy efficiency and GHG reduction targets.

In its national action plan the Federal government lists in detail existing and future measures, instruments and policies for the promotion of the use of renewable energy. The measures and instruments required for achieving this goal, e.g. the Renewable Energy Sources Act (EEG), have been established, but they shall be regularly evaluated and further developed in the future. A crucial measure for the development of renewable energies in Germany is "2012 Amendment of the Renewable Energy Sources Act – EEG" supporting energy production from renewable sources (summarised above).

5.5.3 Policy Summary

A summary of the pertinent energy and climate changes polices in place are presented below:

Figure 5.5
Energy and Climate Change Policies



Source: Adapted from International Renewable Energy Agency: Renewable Energy County Profile- Germany

5.6 Planning Regime

5.6.1 Planning Process

According to IRENA[38], the German planning system is characterised by effective rule of law coupled with a transparent administrative and permitting process. The legislation is clearly defined and has been enforced in a timely and targeted manner. Guidance is provided through the building codes, while siting and permitting laws are available for all landscapes.

Comprehensive spatial plans are widely used to concentrate wind farm developments inside designated areas. Preparation of plans is made by public authorities; decisions are taken by elected bodies. Regional Plans set out designations of suitability areas or priority areas for wind turbines on the basis of specific location criteria. Organisation of regional planning bodies and their role and importance in wind power development vary among the 16 federal states of Germany. Local plans feature designation of special building zones for wind turbines. Local plans are made by local councils. They have to be adjusted to the regional plan. At local level, preparation can be done in a public-private partnership with project

[38] IRENA-GWEC: 30 YEARS OF POLICIES FOR WIND ENERGY See: http://www.irena.org/DocumentDownloads/Publications/GWEC_Germany.pdf

developers. Where there are no provisions for wind turbines in a spatial plan, erection of turbines is generally permissible outside built-up areas.

These spatial plans are considered by one interviewee as a planning policy that contributes to socially acceptable development of wind energy. The fact that every municipality is effectively obliged to declare at least one zone for wind energy use prohibits the remaining area for use by wind turbines. This was normally the most acceptable and suitable area in the region. Building permits are only granted within the area which has been zoned by politicians and councils. Another interviewee thought that this combination of top-down and bottom-up planning effectively linked the state, regional and local levels. Each community makes their own local plan and integrates this into the regional spatial plan; the resulting plan can both include and exclude wind energy.

In most cases, there are two successive consultations of authorities, stakeholders and the general public – the first consultation on the outlines of the plan and the scope of environmental investigations, the second consultation on the draft plan. There is no fixed time frame for the relevant planning authority to make a decision. Planning procedures take several months at least, and may take several years.

Issues may arise for cross-border projects, where many grid projects have been delayed or stopped at Länder borders. NABEG[39] intends to streamline and accelerate the permitting procedure by mandating that a federal planning procedure be carried out that determines corridors for the power lines, which are binding for the subsequent plan determination procedure. At present, the procedures for individual power line projects are conducted by the respective authorities of the Länder. This can lead to delays when two or more jurisdictions are involved and NABEG may confer this competence to the Federal Network Agency, a measure that could accelerate the permitting process without compromising the integrity of the process.

The consultations revealed that it is still a question of balancing between different regions (and how they contribute to the national target of RE) but there is no overall plan of where all RE power plants should be sited and how a better balance can be acheived between them. This would help develop a better sense of all the regions of Germany being one and having a stake in the overall national target and its achievement. The importance of the role of spatial planning was emphasised, however, in Northern areas which are generally more in favour of wind energy, there is a gradual sense that ‘now we have enough’. This sense of cumulative impacts is leading to a limit to acceptability and regional impacts. This is not just in relation to wind farms but panoply of infrastructural impacts (railways, powerlines etc.). A broader view would be to integrate regional spatial planning and make this more visible in national debates.

An overview of Planning and licensing Procedures in Germany is presented in Figure 5.6[40]:

[39] Act on the Acceleration of Grid Expansion (Netzausbaubeschleunigungsgesetz – NABEG).
[40] Source: Wind Energy in the BSR 2 (2011) Planning and licensing procedures for wind farms in the South Baltic Region- A guide for potential investors

Figure 5.6
Overview of Planning and licensing Procedures in Germany

Involved Parties	**State** (State governments and authorities, federal authorities)*	**Municipalities** (Municipalities, cities, rural districts, municipal associations, public utilities)	**Private Stakeholders** (Citizens, private firms and organisations)
Procedural Steps ⇩			
Regional Planning ***Legal Basis: Spatial Planning Act, State Planning Acts*** Designation of wind farm areas in regional plans. Consultation procedure is repeated until the plan is ready for decision.	**State Planning Authority:** *issues recommendations on planning criteria* **State Authorities, Federal Authorities:** *submit statements* **State Government:** *enacts the regional plan*	**Regional Planning Body:** *elaborates draft plan* ⇩ **Rural Districts, Cities, Municipalities , Municipal Associations, Public utilities:** *submit statements* ⇩ **Regional Planning Body:** *considers statements and takes decision on the plan*	**General Public, Private Firms and Organisations:** *submit statements*
Local Planning ***Legal Basis: Federal Building Code*** Designation of wind farm areas in land-use plans; designation of turbine locations in site development plans. Local plans must be in accordance with provisions made in the regional plan. As in regional planning, consultation procedure is repeated until the plan is ready for decision.	**State Authorities, Federal Authorities:** *submit statements* **Building Authority:** *enacts the local plan*	**Local Council:** *elaborates draft plan* ⇩ **Neighbouring Communities, Municipal Associations, Public Utilities:** *submit statements* ⇩ **Local Council:** *considers statements and takes decision on the plan* ⇩	**General Public, Private Firms and Organisations:** *submit statements*
Licensing ***Legal Basis: Federal Pollution Control Act*** Licensing of wind turbines on request of a wind farm developer or turbine operator. When there is no regional or local plan making provisions for wind turbines, general stipulations of the Federal Building Code apply.	**Environmental Authority:** *distributes application documents* **State Authorities, Federal Authorities:** *examine the project on the basis of relevant regulations* **Environmental Authority:** *grants permission and makes additional requirements*	⇩ **Local Councils, Public Utilities:** *examine the project on the basis of local plans, or other relevant regulations*	**Wind Farm Developer:** *investigates, commissions, or negotiates with:* Land Owners: *right of use* Grid Operator: *grid connection* Turbine Manufacturer: *type and delivery of turbines* Consultants: *calculation of noise and shadow impact, environmental investigations and submits application documents* **General Public:** *makes representations (mandatory consultation only for projects of 20 or more turbines)* **Wind Farm Developer:** *erects and commissions wind turbines*

5.6.2 Regulations

German Building Code

There were two significant changes made to the German Building Code[41]:

- In general, only certain kinds of structures can be built in the German countryside. In 1996 the building code was revised so that wind turbines are permitted by right in much of the countryside. The result is that the presumption is that turbines are allowed to be installed, unless a reason is presented why that should not be the case. This change obviously makes the permitting process relatively simple and quick.
- As part of the change, German cities and communities were required to identify wind resource areas within their borders. Under this law, wind energy plants are categorised as "privileged projects" and local authorities are required to designate specific priority or preferential zones for wind projects. Such identification also helped to expedite the placement of wind turbines.

Environmental Protection:

In parallel with the incentives for installing wind turbines, Germany has also implemented relatively regulations regarding environmental impact. Of particular significance are regulations for shadow flicker and for noise. The shadow flicker regulation is maximum 30 minute per day. The noise regulation limits night-time sound level to 35 dB(A) in purely residential areas. This is considerably higher than the Danish example, which is 20dB.

Table 5.3
Germany's Regulations compared to Ireland

Regulation	Germany	Ireland
Shadow flicker	Maximum 30 minutes/day	No shadow flicker on any existing dwelling within 10 rotor diameters of any wind turbine. If shadow flicker does occur shut down will be required for the associated time periods. (consultation until 21st February 2014)
Noise (level)	Residential areas, the night time limit is 35 dBA	40 dBA outdoor limit at any wind speed day or night. (consultation until 21st February 2014)

5.7 Key Process Support Mechanisms

5.7.1 Financial Support

The Feed in Tariff (FIT) model in Germany evolved over time, in which renewable energy support was building, mainly within civil society. A two-component tariff was designed for wind energy by the (EEG)[42], with an initial fixed tariff for a period of five years, and a second

[41] See: http://www.irena.org/DocumentDownloads/Publications/IRENA_GWEC_WindReport_Full.pdf
[42] See: Tariffs, degression and sample calculations pursuant to the new Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz - EEG) .of 4 August 2011 ('EEG 2012'). Available on:

period of 15 years with a tariff level modulated by the local wind conditions. A strong element of the EEG was the obligation for power utility companies to purchase renewable energy at set tariffs over a period of 20 years. Few anticipated the impact the FIT would have in Germany, but because of its success in terms of installed capacity, manufacturing and job creation, it has survived three changes of government[43].

The German experience with the FIT provides important lessons for other countries that are in the process of developing policy for the renewable energy sector. The evidence suggests that given appropriate design features, the FIT is more cost effective at getting renewable energy systems developed (Lipp, 2007). Germany has more than 10 years' experience with the FIT and is a world leader in the field of renewable energy development. The FIT in Germany has shown that this measure can be managed by providing different feed-in rates, guaranteeing grid access and enabling a range of stakeholders to participate in the market.[44]

Table 5.4
Summary of Germany's Support Mechanisms compared to Ireland

Mechanism	Germany	Ireland
Price/Feed-in-Tariff	EUR Cent 8.93/kilowatt-hour (kWh) will be decreased every year for new installations by 1.5 percent. Repowering bonus of EUR Cent 0.5/kWh	Onshore wind (above 5MW) €0.07/KWh. Onshore wind (equal to or less than 5MW) €0.07/KWh.

5.8 Intermediary Bodies

The Clearingstelle[45], located in Berlin, is an intermediary or facilitator as defined by section 57 of the Renewable Energy Sources Act. Its remit is to 'settle any disputes and issues of application arising under this Act'. Options include mediation, joint dispute resolution and arbitration. In addition to this it provides general advice on how to apply the provisions of the Act and anticipate any problems.

The Clearingstelle is commissioned and exclusively funded by the Federal ministry for the Environment, Nature and Nuclear Safety. The staff consist of an interdisciplinary team of lawyers and engineers with expertise in renewable energy technology.

The German Clearingstelle differs from the Danish Task Force as its main aim is to settle disputes, whereas the Task Force works to intervene and support at the strategic and project level. The strength of the Clearingstelle is that it provides a central point with the legal and technical knowledge to address disputes. The provision of such a service could help gather

http://www.erneuerbare-energien.de/fileadmin/ee import/files/english/pdf/application/pdf/eeg_2012_verguetungsdegression_en_bf.pdf

[43] According to IRENA (2012) from 2002 onwards, new installations received lower tariffs. Different elements such as technology learning were considered to set an annual tariff degression. See: http://www.irena.org/DocumentDownloads/Publications/IRENA_GWEC_WindReport_Full.pdf (page 65)

[44] See Lipp, J. (2007) 'Lessons for effective renewable electricity policy from Denmark, Germany and the United Kingdom', *Energy Policy 35*: 5481–5495

[45] www.clearingstelle-eeg.de

data on issues of dispute establish standards for resolving these and limit the negative effect of unresolved disputes on the rest of the industry

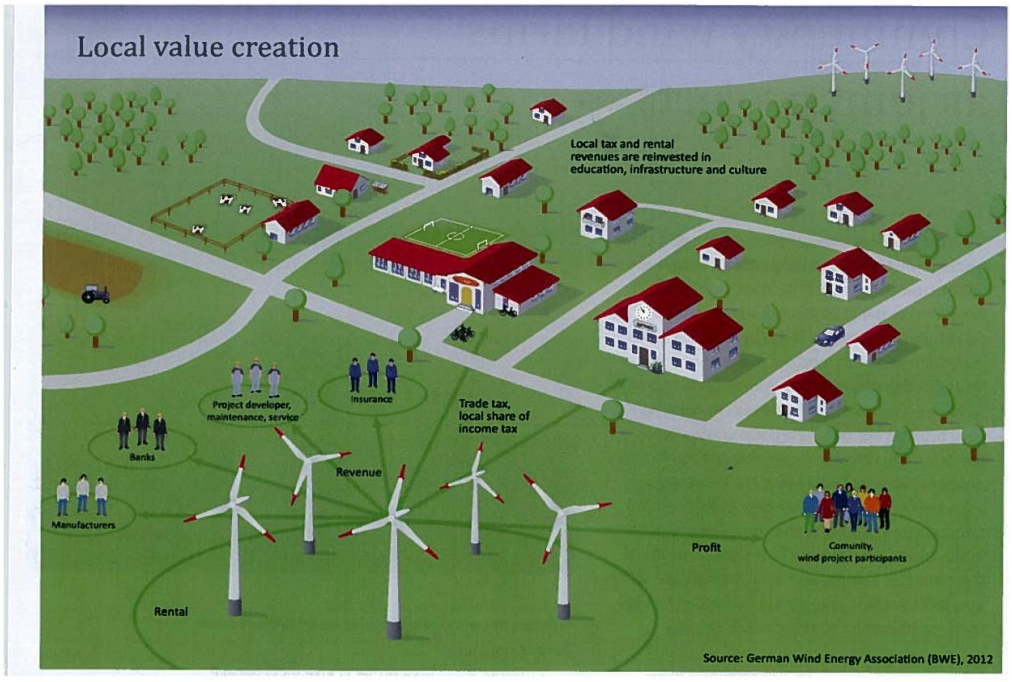
5.9 Community Equity and Community Benefit Initiatives

There is recognition and measures which aim to share the benefits of wind energy deployment and associated grid with the community. These include:

- Creating local and regional value, to keep revenue generated in the region
- Support for community driven wind farm developments, for example in the north there are lower than average incomes and a desire to have projects driven by local farmers to avoid the distributional injustice of the main investors not being connected to the place or bearing the impact of where the project takes place[46].
- Regional banking offering various options: lower credit rates, or longer run times, or provide legal help/education for interested residents to encourage local financial participation
- Reducing the price of shares to make it easier for more widespread investment. For example, shares were initially €10,000 to become a member of an energy cooperative

The potential stakeholders for local value creation are shown in Figure 5.7.

Figure 5.7
Local value creation



Source: German Wind Energy Association

[46] Interviewee mentioned stereotypical story of rich dentist from south/Bavaria and poorer North East residents having to live with the wind farms

It was thought by one interviewee that more local financial investment is seen as a solution to reduce risks, and conflict over wind energy projects. Many communities now apply to be 'wind priority areas' to gain monetary revenues, however, the success of this may depend on how that particular community functions and if the process for applying is seen as transparent and fair.

5.9.1 Community Ownership Initiatives

According to the German Wind Energy Association, in Germany projects are often funded with shares purchased not only by energy firms, but also local businesses, associations, and even individual citizens. Wind farms generally require considerable upfront investments. For individuals, such investments are relatively hard to make. But when a number of local market participants come together to contribute funding, expertise, and time, people can see their ideas come to fruition together. People in communities can use such renewable energy projects to strengthen their regions and step up local climate protection efforts. An interviewee explained that politicians have not made it a legal stipulation, but have expressed their views in public via the media that Germany needs both big investors and big projects, but it is also looking for financial participation of local residents to progress renewable energy. A significant proportion of wind power capacity is owned by farmers or 'Burgerwindparks' ('Citizens' wind farms'). These latter schemes are citizen–investor-owned schemes with strong local participation. These also involve ethical investment principles emerging from the grassroots movement, and they sometimes offer lower returns (Toke et al., 2008).

Citizen-owned wind farms ideally come about in close cooperation between the initiators (often local people), the communities involved, and the local population. The investment sums are kept to a minimum for locals, who are also given preference over out-of-town investors when shares are divvied out, dividends paid, and leases signed; all of this ensures that there is great local involvement and acceptance. For instance, people who own property adjacent to installed systems can also sign leases for access roads and cables that cross their property. In this way, citizens also financially benefit from the clean income from "their" wind farm. These wind farms also offer communities additional sources of income in the form of trade tax, thereby opening up new financial leeway.

In northern Germany, wind farms initiated by local people are the norm, not the exception, in some areas, such as northern Frisia, Germany's northernmost county. In the mid-1990s, the first community-owned wind farms were built here. The initiators first started looking for suitable sites for community projects and the contracted a number of studies. The sites were to have the lowest possible impact in terms of noise and shading. As a result, local acceptance of wind farms was considerably improved. Today, 90% of wind farms in northern Frisia are owned by citizens, including the wind farms in Ellhöft (50 shareholders) and Galmsbüll (170 shareholders). It is thought that, community ownership leads people to identify with their community's energy policy. Citizens can become involved and play a local part in creating a distributed energy supply and in protecting the climate.

5.10 Community Acceptance

There are a variety of measures in place that have served to both increase public participation and public acceptance of wind turbines in Germany. These include:

- Wide spread public education
- Renewable energy education at all academic levels, including high schools, colleges and universities.

- Research and development activities, involving universities, institutes and industry
- Incentives for permitting and access to financing, including for cooperative ownership of wind turbines.

Empirical evidence reveals that there is, as a matter of principle, general support of renewable energies from the German public (Zoellner et al., 2008). Qualitative data has showed that the relevance of the operating company's commitment; participation of the general public; and the choice of the location for the (wind farm) were among the most relevant aspects for community acceptance in the implementation process.

There have been cases of public opposition on landscape and visual grounds which may be influenced by perceived procedural injustice. For example, *"the importance of landscape evaluation and a strong connection between procedural justice criteria, such as transparency, early and accurate information as well as possibilities to participate during the planning and installation process"* (Zoellner et al., 2008: 4140), were considered key issues in shaping local stakeholders' attitudes to renewable energy schemes, in a Germany study funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The study addressed the public acceptance of certain renewable energies (grid-connected larger PV ground-installed systems, biomass plants and wind turbines) from a socio-scientific perspective across four regions in Germany. Another study also found that there has been public opposition to grid development projects in Germany[47] (Schweizer-Ries P, 2010).

According to the German Wind Energy Association[48], independent surveys conducted by research institutes demonstrate the great support for more renewable energy. One interviewee believes that a high level of acceptance is achieved in municipalities where the zoning focuses on establishing community wind farms or ownership structures which allow local people to invest. They considered this to be further assisted by early provision of information and a transparent political process. Nonetheless, opinions differ on whether wind turbines have a positive or negative social impact, there is possibly a fear of new areas in the landscape (not zoned for wind energy) being subject to development. In addition traditional power companies are likely to object for fear of displacement and the nuclear lobby is concerned as cheap wind energy will prevent new nuclear power stations[49].

If popular opinion prevails, Germany's energy supply will mainly switch to solar and wind power over the next few decades. A representative survey conducted in 2011 by TNS Infratest on behalf of Germany's Renewable Energy Agency found that 94% of German citizens want more renewable energy. In addition to greater independence from fossil fuels (such as coal, oil, and gas), the reasons included positive effects on the environment and climate, job creation, and lower energy prices over the long term. In terms of future generations, renewable energy technologies are proving to be more future-proof than conventional energy sources.

The study showed that overall, two thirds of Germans wanted deployment ofwind energy to increase. A greater proportion (71%) would like this to be through offshore wind turbines.. Indeed, NIMBY-ism ("not in my back yard") is less of a problem for renewables than with conventional power. TNS Infratest survey found that support for wind turbines nearby is especially high among people who have already had experience with wind turbines near

[47] Schweizer-Ries P, 2010, "Environmental-psychological study of the acceptance of measures for integrating renewable energies into the grid in the Wahle-Mecklar region (Lower Saxony and Hesse)".
[48] http://www.wind-energie.de/en/policy
[49] Interview with developer

them. For instance, 69% of those surveyed who had lived near a wind farm said that it was 'very good' or ‚good' to have wind turbines in close vicinity compared to 60% of those who had no previous experience. There was also greater support where local citizens were able to directly invest in community-owned wind farms and reap part of the profits. Renewable energy sources, previous experience and potential for ownership all improved levels of social acceptance.

Nonetheless, there are some communities that do not want to have turbines built nearby for a wide range of reasons. If renewables are to continue to grow, greater local acceptance is seen as one of the main challenges. The GWEA contend that community ownership will play a crucial role here.

This is not just an issue with wind farms. It is also an issue with power lines. As discussed earlier there are extensive new transmission powerlines planned in Germany. An idea suggested by the Minister for Environment, Nature Conservation and Nuclear Safety (Peter Atmayer) is to allow residents within 2km of the line to purchase shares, and then receive a dividend of 5% per annum over the following 20 years. This has led to further discussions and controversy over how much compensation is required in the energy sector, and particularly for transmission lines. The Minister hopes that a suitable percentage and procedures of decision making can be established, which would address issues of distributional and procedural justice. However, a relatively wide cross-section of society are questioning this, seeing it as a potentially deliberate ploy to surmount arguments about landscape impacts and possibly setting up a presumption of infrastructure 'compensation' norm which would include other structures such as motorways and railways etc.[50]

5.10.1 Energy Transition

One of the main challenges to the energy transition is to integrate and interconnect different aspects of energy production and consumption. It is suggested through the consultations that regional energy concepts should be developed, embedded in participatory processes. This would discern what suits a region in terms of specific energy sources (e.g. wind, biomass, solar) versus energy efficiency.

There should be more effort made to integrate local people in both planning processes and means of distributing benefits of projects and associated grid infrastructure.

The discussions about financial benefits need to be broaden to cover other aspects that can influence community acceptance, e.g. landscapes and place attachments; trust; procedural justice; fears about technologies and potential health impacts. It is not sufficient to only offer monetary benefits.

Table 5.5
Examples of community ownership

Context	Process	Outcome
The Hilchenbach community wind farm / Rothaarwind GmbH & Co. KG. Rothaar Mountains of North Rhine/Westfalia	Five turbine wind farm constructed in 2008. In Hilchenbach, active inclusion of local people increased social acceptance. The community-	A total of 88 people hold shares in the project. The local authority also purchased shares. More than two thirds of the shares went to people from the community of Hilchenbach

[50] Study interview

	owned wind farm in the Rothaar Mountains is designed to juxtapose the local benefits for citizens and the global benefits for climate protection with the impact on the immediate surroundings. In addition, the project also supports local value creation. The concept of community-owned wind thus serves as an alternative community-friendly model that contrasts with conventional investor-owned wind farms.	and the surrounding area. The wind farm offsets around 21,000 tons of carbon dioxide emissions each year.
The Ingersheim Community Energy Cooperative	"*If you can't do it alone, you can do it with others."* Was the approach of the initiators of the biggest wind turbine in the state of Baden-Württemberg. They brought together a group of motivated citizens and founded 'Energiegenossenschaft Ingersheim und Umgebung eG' in March 2010. Their goal was to use the project to take responsibility for a sustainable, climate-friendly energy supply for themselves and future generations. Despite some complaints a 2 MW turbine was installed. 75% of those involved are from Ingersheim and the surrounding area.	Total community investment sum of around €3.6 million. Around 80% of the upfront costs were covered by equity capital from members. The company thus has no material credit risk. At the beginning of the project, the minimum share size was €2,500. A total of 22,920 shares, each worth €125 euros, were sold. Members now receive an annual dividend in addition to gradual repayment of their shares for the first 15 years of operation. Energie-genossenschaft Ingersheim und Umgebung eG also joined Baden- Württemberg's Cooperatives Association, which now monitors the project as an outside party.

Source: German Wind Energy Association

5.11 Key Insights from Germany

Positive aspects:

- The German planning regime is working at multiple scales – national, state/regional and local.
- The government has recognised this multi-scalar and interconnected nature of energy transformation and such as embraced the notion of transition through the concept of 'Energiewende', which incorporates not only energy supply and investment targets but also has energy efficiency and social dimensions.
- There is prioritisation dispatch for wind on the grid connection which helps support the sector.
- The zoning of wind priority areas giving clear signals to population and to companies.
- The Feed-in-Tariff for 20 years gives certainty to investors.
- The creation of local value and local return through the 2009 law of community business tax means 70% of revenue stays local (in Portugal it is a tax of 2.5% going to the local municipality) incentivising councils to work with developers.

- Local share issue keeps financial benefits in the immediate area (addressing the spatiality of distributional justice).
- There is innovative thinking around issues such as recent proposal for residents within 2km of new power line to be able to purchase shares with a 5% per/annum return over 20 years (Minister intervention).
- A reduction in the cost of minimum share price, such as Ingersheim reducing the price from €2500 to €125 – makes it affordable.

Challenges

- There are regional difficulties – arising from piecemeal, non-coordinated approach to achieving targets for RE implementation that are set at the national level – this may be a downside of delegating powers downwards to the regional level.
- There is a lack of integration of energy demand and supply aspects both regionally and locally.
- There is a lack of coordination between various RE sources, for example wind and solar.
- There is an overemphasis in public and political debate upon financial compensation and benefits can obscure other important aspects of siting acceptability (location, impacts and procedural justice).
- Wind farms located near administrative boundaries may not be very well handled indicating a lack of coordination and consistency across municipal boundaries.
- Development of grid infrastructure to support renewable energy may face increasing social acceptance challenges.

Table 5.6
Summary of Key Insights for Germany

Practice Category	Is it effective?	Context Specific Factors What problem is it trying to solve? Why is it effective? What specific contextual factors contribute?	Relevance For Irish Context?	Further Development
Distributional Justice				
Community Business Tax	Yes, law mandating 70% of profit into municipal area	Community Business Tax policy aims to redistribute the benefits locally from wind energy deployment. From 2009 70% local payment of tax with 30% to developer's HQ location. Helps to increase the social acceptance of developers external to the community operating in that area.	As larger scale developments come forward driven by targets and economic opportunity such a mechanism will help redistribute benefits locally.	Consider alongside current mechanisms such as PSI??
Feed-in-Tariff	Yes but of diminishing influence.	The reduction in feed-in tariffs provides an incentive to lower costs, such as for equipment, in order to make renewables competitive on the market. EUR Cent 8.93/kWh for 20 years but will decrease by 1.5% every year for new installations. Repowering is incentivised with additional EUR Cent 0.5/kWh.	Incentivising repowering may be worth considering for Ireland. This could help make the most of existing sites which are currently part of the landscape. It would provide an opportunity for communities to renegotiate terms such as equity and benefit.	Review potential for repowering older sites. Consider incentives for repowering. Consider mechanisms for consultation and community engagement in repowering process.
Option to purchase	Yes (recent research suggests that 51% of German renewable energy is citizen owned[51]) Support for community driven wind farms in north where incomes are lower. Current discussion on equity option for all residents along a transmission line. 'Burgerwindparks' (Citizens' wind farms)	To increase public participation and redistribute benefits. Regional banking options to encourage local financial participation Reduction of share prices Preference to local investors in share distribution Communities may apply to be 'wind priority area' to gain monetary revenue. The 5% share option for residents within 2km of power line with 5% dividend for 20 years is currently being considered as a new measure in Germany.	Worth considering areas where community driven approach may be more appropriate than external corporate approach. Alternatively, Joint Venture may work. Guidelines for equity provision may help create more level playing field between communities and developers in Ireland.	Each county could review potential areas where community driven wind farms would be more appropriate. Identify support required; capacity, finance, planning advice, legal negotiations. Develop equity guidelines.

[51] Morris, C. (2013) Citizens own half of German renewable energy. Available at http://energytransition.de/2013/10/citizens-own-half-of-german-renewables/

Procedural Justice				
Energiewende	Yes, especially as the two stage process involves consultations with authorities, stakeholders and general public. However, cross border wind energy developments can be problematic due to lack of co-ordination between regional plans and grid connections.	The Energy Concept sought to address the need for a long term integrated energy pathway to 2050. Renewable energy and onshore wind cornerstone to supply. To solve decarbonisation, economies of scale for energy efficiency and supply. Energiewende accelerates move away from nuclear. Integrates grid with an assumption that majority of power will be generated from renewable by 2050. Every municipality is effectively obliged to declare at least one zone for wind energy development, usually the most acceptable and suitable area. However, the northern areas which have generally been in favour are now resisting the cumulative effect of their contribution to national targets and expect a balance of effort/acceptance from the more populated and wealthier southern areas. Renewable energy sector is growing but so too are electricity prices. Questions arise of affordability of policy.	An Energiewende approach would help give certainty to all stakeholders. .	Explore Energiewende or Energy Transition Plan approach.

NAREG	Ten-year grid expansion plans aiming at binding, nationwide planning of routes. Yet to be fully delivered	Seeks to resolve planning delays while engaging public.	It would accelerate the planning process for the erection of pylons.	Examine NAREG for its applicability in Ireland.
Public discourse	Yes	To increase public understanding, participation and acceptance. Activities include: Wide spread public education Renewable energy at all education levels R&D involving universities, institutes and industry	The combination of the integrated planning system and informed public discourse provides a wider and deeper backdrop within which the public may support specific projects. May help counter balance negative media and anti-wind campaigns.	Review existing activities and their potential impact. Consider measures required to support public discourse.

Regulations	Yes	To address public concerns in terms of shadow flicker and noise. Shadow flicker – maximum 30 minutes per day Noise – Night-time sound level within residential areas below 35 dB(A)	Addressing immediate environmental impacts has been found to dissipate in-acceptance. Persistent environmental nuisance for one household can trigger a much larger scale objection.	The noise level is considerably more than the Danish regulation but it may be worth consulting upon the different options in Ireland (currently consulting on 40 dBA. Less than 30 minutes of shadow flicker is challenging where shadow flicker occurs. This may only be possible to resolve through site design or compensation.
Intermediaries (provision of expert advice)	Yes, important to recognise that industry and science play a leading role in the political and social change required by the energy transition.	Sixth Energy Research programme aims to research for an environmentally sound, reliable and affordable energy supply. Technology innovation which may help reduce place related impacts such as noise and visual effects. Comprehensive approach, strategic, interministerial and international. Supported by harmonisation and co-ordination programme to maximise value added.	Maintaining research programme and integrating this into renewable energy policy, planning and practice could help progress the low carbon transition pathway for Ireland.	Review of relevant research and application to policy, planning and practice. Identification of areas that merit future research, such as, technology use and noise thresholds, public opinion (omnibus survey).
Provision of arbitration	The main aim of the Clearingstelle is to prevent or settle disputes. In this way it is not pro-actively addressing social acceptance.	The Clearingstelle, located in Berlin, is a facilitator as defined by section 57 of the Renewable Energy Sources Act. Its remit is to 'settle any disputes and issues of application arising under this Act'. Options include mediation, joint dispute resolution and arbitration. In addition to this it provides general advice on how to apply the provisions of the Act and anticipate any problems. The Clearingstelle is commissioned and exclusively funded by the Federal ministry for the Environment, Nature and Nuclear Safety. The staff consist of an interdisciplinary team of lawyers and engineers with expertise in renewable energy technology.	Not necessarily relevant. However, a central point with the legal and technical knowledge to address disputes may be useful in Ireland. In particular it would help gather data on issues of dispute, establish standards for resolving these and limit the negative effect of unresolved disputes on the rest of the industry.	Consider this remit as a separate or integrated one with the role of intermediary as exemplified by the Danish Task Force.
Place-related impacts				

Spatial zoning	Helps to ensure that areas deemed not suitable for wind energy (e.g. 'wild lands') development are preserved. May be better at identifying areas that are NOT suitable for development rather than vice versa. As found with TAN8, Wales. (University of Cardiff interview)	Helps identify places where large scale energy projects might spoil landscape character. Helps to send a clear signal to developers and reduce risks. Divorces technical estimates of resource availability from socio-cultural assessments of place-appropriate development.	Must be implemented in a participatory and consensual manner, with all key stakeholders, including local authorities. Could tie in with a national planning or landscape strategy. Also with tourism planning.	

6.0 CONTEXTS AND PROCESSES - SCOTLAND

6.1 Introduction

This chapter presents the key contexts and processes of the energy transition for Scotland including an overview in terms of demographics, wind energy development, regime context and future challenges.

6.1.1 Methodology

The method of study included the following tasks:

- International literature review;
- Data gathering from secondary sources; and
- Interviews with key stakeholders (Scottish Government, ClimateXChange, University of Edinburgh, Islay Energy Trust, University of Aberdeen, University of Cardiff)

6.2 Scotland

6.2.1 Background

The table below provides a summary of the key data which describes Scotland's wind generating capacity in relation to population and land mass.

Table 6.1
Scotland at a Glance

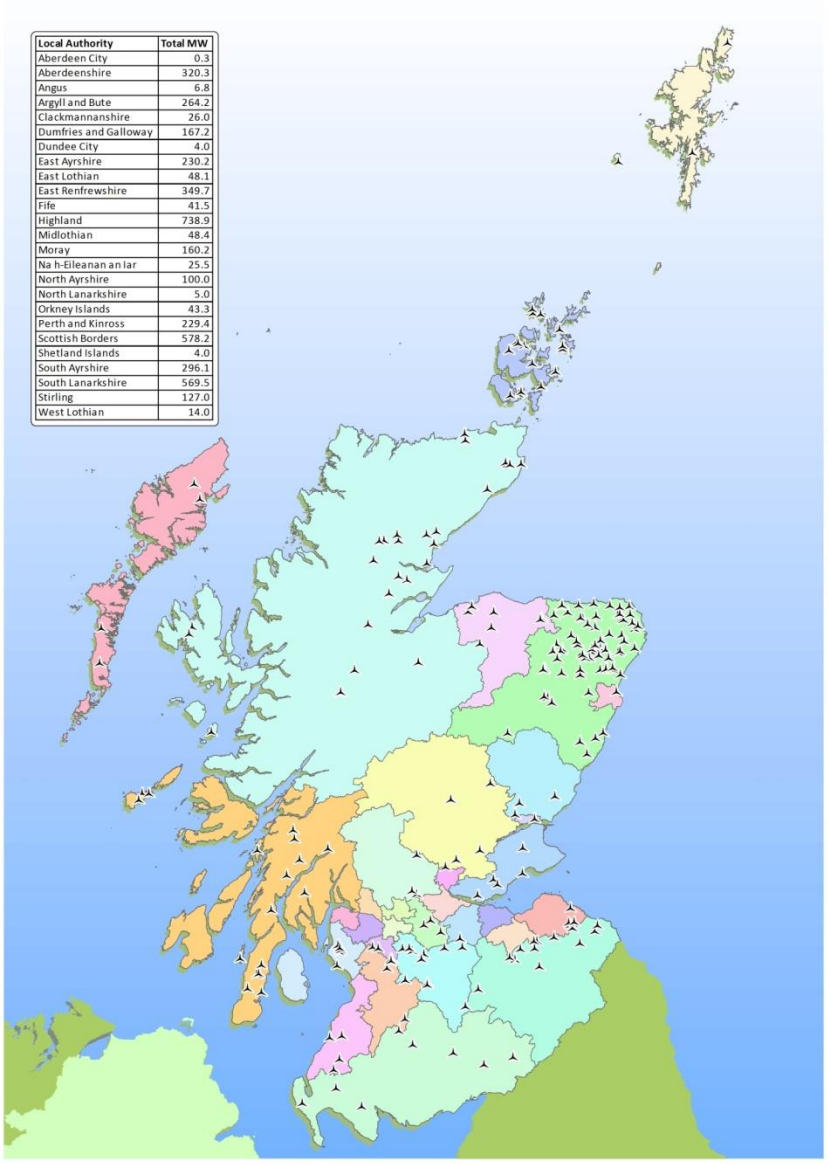
Scotland at a glance		
Socio-Economic Profile	Population	5,313,600 (2012)
	Area	78,782 square kilometres
	Population density	67.2/ square kilometre (average)
	Employees in wind sector	11,000 (2012)
MW Wind Energy	4,508MW onshore (2013) 190MW offshore (2013) In terms of the short-medium term forecasts of renewable electricity installed capacity, the 2020 Routemap Update suggest that there will be over 9 GW of operational capacity by 2017. This is more than double the level deployed in June 2012.	
No. of Wind Farms	212 (approx) plus micro generation (Source SLR)	
Sources	Scottish Renewables[52]	

[52] See: Scottish Renewables website: http://www.scottishrenewables.com/publications/

2020 RENEWABLE ROUTEMAP, FOR SCOTLAND 2012[53]

The following figure shows the distribution of operational wind farms in Scotland.

Figure 6.1
Wind energy – installed capacity Scotland



Source: SLR Consulting Ltd

6.3 Key Policy Drivers

The Climate Change (Scotland) Act 2009[54] is a key commitment of the Scottish Government, and is the most far-reaching environmental legislation considered by the Parliament during

[53] Source: (http://www.scotland.gov.uk/Resource/0040/00406958.pdf)
[54] See: http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact

the first ten years of devolution. Part 1 of the Act, creates the statutory framework for greenhouse gas emissions reductions in Scotland by setting an interim 42 per cent reduction target for 2020, with the power for this to be varied based on expert advice, and an 80 per cent reduction target for 2050. To help ensure the delivery of these targets, this part of the Act also requires that the Scottish Ministers set annual targets, in secondary legislation, for Scottish emissions from 2010 to 2050. Public engagement is a significant feature of Part 6 of the Act. However, it was noted by one interviewee that all measures are retrofitting a market which was not set up to bring benefit to communities. This retrofitting is possibly one of the main underlying challenges in terms of social acceptance of wind energy, as encouraging good practice within a process which is not initially designed to benefit communities may only be partially successful. Meeting the targets will also become more difficult as there is increasing pressure on sites, cumulative impacts and reduced returns through financial measures (Renewable Obligation Scotland, Feed-in-Tariff and Contracts for Difference).

Other measures were put in place, such as, the *Planning etc. (Scotland) Act 2006* which established a requirement for greater community involvement in the planning process. The Planning Advice Note (PAN) 81 on Community Engagement sets out the opportunities for community involvement in the development planning process as well as during the planning application and determination process. PAN81 was replaced by PAN3/2010. The revised guidance provides advice to communities on how they can get involved in the planning process and advice to authorities and developers on ways of effectively engaging with communities. However, effective engagement is resource intensive for all parties, particularly when projects can take years to develop. In the case of communities where participation is likely to be voluntary this can be particularly challenging.

The Routemap for Renewable Energy in Scotland 2011 was an update and extension to the Scottish Renewables Action Plan 2009. The original Renewables Action Plan set out short term actions towards the delivery of 2020 targets for renewable energy. The Routemap presents actions which are focussed on targets, within the current development of UK regulatory support, arguing constructively for the UK Government to ensure that such support matches Scotland's ambitions. It is updated on an annual basis.

Scotland's approach demonstrates the benefits of a holistic and cross-cutting vision aligning policies to deliver a low carbon transition. The Scottish Government continues to show it determination to ensure that Scotland benefits from the low carbon opportunity, and renewable energy is at the heart of that ambition. Scotland already meets nearly 30% of its electricity demand (equivalent), and nearly 3% of heat from renewable sources. Both measures and the approach taken currently lead the way in the UK.

To ensure the momentum of onshore wind deployment is kept, the government committed to providing the right kind of financial support alongside a supportive planning system which provides clear spatial and policy direction, continues to engage local communities, and balances the need to protect the environment alongside the need to continue to make progress to renewable electricity targets. These measures included:

- Market incentives - Support for large onshore wind farms is given by the Renewables Obligation, which is banded to give different levels of support according to what has been deemed necessary to encourage the range of renewables technologies. The Feed-In Tariff provides support for smaller wind farms up to 5 MW in capacity.
- Grid - the grid transmission charging and underwriting issues identified will be addressed through project TransmiT.
- Planning - The planning system must continue to balance environmental sensitivities with the need to make progress on renewables targets, and support planning authorities in maximising opportunities. Planning Authorities should also be

encouraged to complete the spatial frameworks required by Scottish Planning Policy, deliver development plans which clearly set out the spatial and policy context for renewables and implement development management procedures that allow for appropriately designed and sited onshore wind proposals to emerge.

- Community Engagement - this should take place from an early stage so that communities are fully aware of what is proposed and the benefits that could be provided. To help ensure this happens local planning officers are required to review the pre-application consultation process documentation of which is submitted with the application.

The first 2020 Renewable Routemap for Scotland Update was published in October 2012. The Update identifies 'Public Perceptions' as an ongoing cross-cutting challenge for Scottish Government. The report states that Scottish Government respects the views of those who have concerns about renewable energy and renewables technologies, and welcomes the often vigorous debate to be had around these issues. The report affirms Scottish Government's intentions to continue working with all stakeholders to ensure that the facts are represented accurately to the people of Scotland.

A recent evaluation of renewable energy policy across the UK's devolved nations (Cowell et al 2013) found that through a combination of factors, Scotland is seen as a leader in how it has rolled out large-scale renewables. Scotland's success appears to have resulted from a combination of stating renewables targets, a well-developed energy sector, a high degree of policy coherence and consensus amongst business and political elites, plus a clear vision and leadership for the country's energy future.

The pro-renewable stance in Scotland is seen throughout the planning policy framework and is also reflected in the consenting rates for onshore wind power, which have always been higher in Scotland than in England. In the 2007–2010 period (coinciding with the SNP government) there were 1492 MW worth of planning approvals against 1428 MW of wind power capacity planning refusals (i.e. 51 per cent vs. 49 per cent) in England, whilst in Scotland there were 3226 MW worth of planning approvals as opposed to 2316 MW worth of planning refusals (i.e. 58 per cent vs. 42 per cent) (Toke et al., 2013: 62).

6.4 Onshore Wind Energy Targets

The Scottish Government target is for renewable sources to generate the equivalent of 100 per cent of Scotland's gross annual electricity consumption by 2020 (50% by 2015). Similarly, a target has been set for renewables sources to provide the equivalent of 11 per cent of Scotland's heat demand by 2020. On 27 June 2013 the Scottish Government published the report Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027: The Second Report on Proposals and Policies (RPP2). This fulfils the duty placed on Scottish Ministers by Section 35 of the Climate Change (Scotland) Act 2009, to lay before the Scottish Parliament a Report on Proposals and Policies setting out specific measures for reducing greenhouse gas emissions to meet Scotland's ambitious statutory targets. This sets a target of reducing emissions by 80 per cent by 2050, including emissions from international aviation and shipping. It also sets a world-leading interim target for a 42 per cent cut in emissions by 2020. Interviewees envisaged that onshore wind would contribute to this target through appropriate siting and the public recognising the value of onshore wind in climate change terms, and having the opportunity to share in the resource through equity and benefit schemes.

6.5 Grid Infrastructure

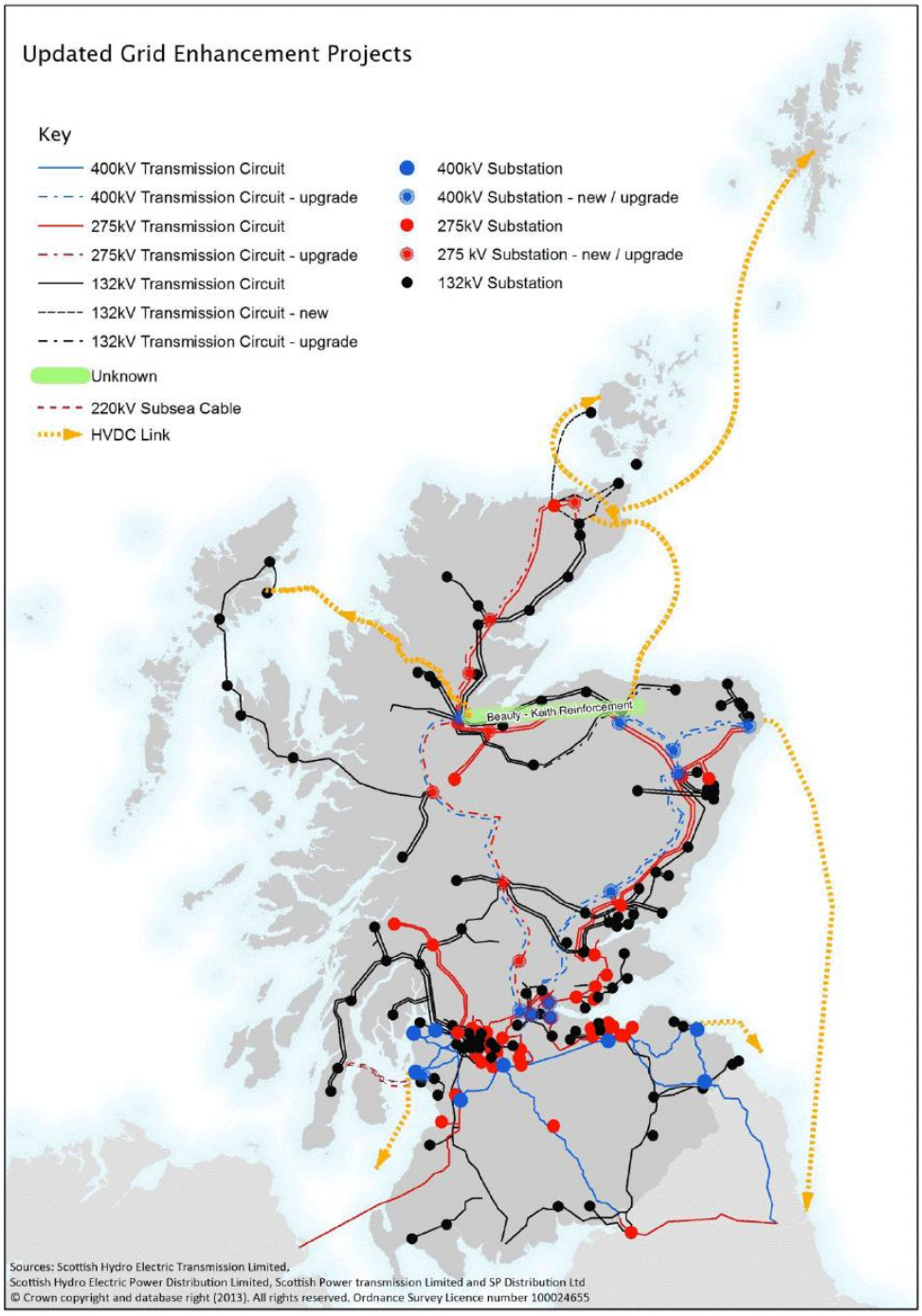
The Scottish Government published an initial draft Electricity Generation Policy Statement (EGPS) in November 2010, to support the Climate Change Report on Proposals and

Policies (RPP). The RPP is required under the Climate Change (Scotland) Act 2009 to set out proposals and policies for meeting annual emissions reductions targets from 2010 to 2022.

A further revision of the EGPS was published in draft in March 2012 for consultation. The 2012 draft set out the pathway to meeting the Scottish Government target of delivering the equivalent of at least 100% of gross electricity consumption from renewables by 2020 (50% by 2015). It set out how Scotland generates electricity, and gave an overview of the changes needed to meet Scottish Government targets and deliver a low carbon generating mix. One of the main targets is to seek on-going transmission upgrade and reinforcement across Scotland, including work to address some of grid access issues faced by developers in Scotland's islands, and increased connections to other parts of the UK and wider interconnection capable of supporting the projected growth in renewable capacity and connecting Scotland to export markers in the UK and Europe[55]. The anticipated grid upgrades are shown in Figure 6.2.

[55] Scottish Government (2013) Electricity Generation Policy Statement

Figure 6.2
Grid enhancement projects in Scotland



Source: National Planning Framework 3 Main Issues Report

6.5.1 The Beauly Denny Overhead Power Line

<u>The context</u>

The Beauly-Denny Overhead power line provides recent experience in terms of the development of national grid infrastructure which may have resonance in Ireland. The purpose of the development was to increase the transmission capacity between the Highlands and central Scotland, so as to accommodate the growing level of renewable

generation in the north of Scotland. The double circuit 400kV overhead transmission line would replace the existing single circuit 132kV overhead transmission line which runs between Beauly and Denny, and provide greater and more reliable capacity in the north of Scotland.

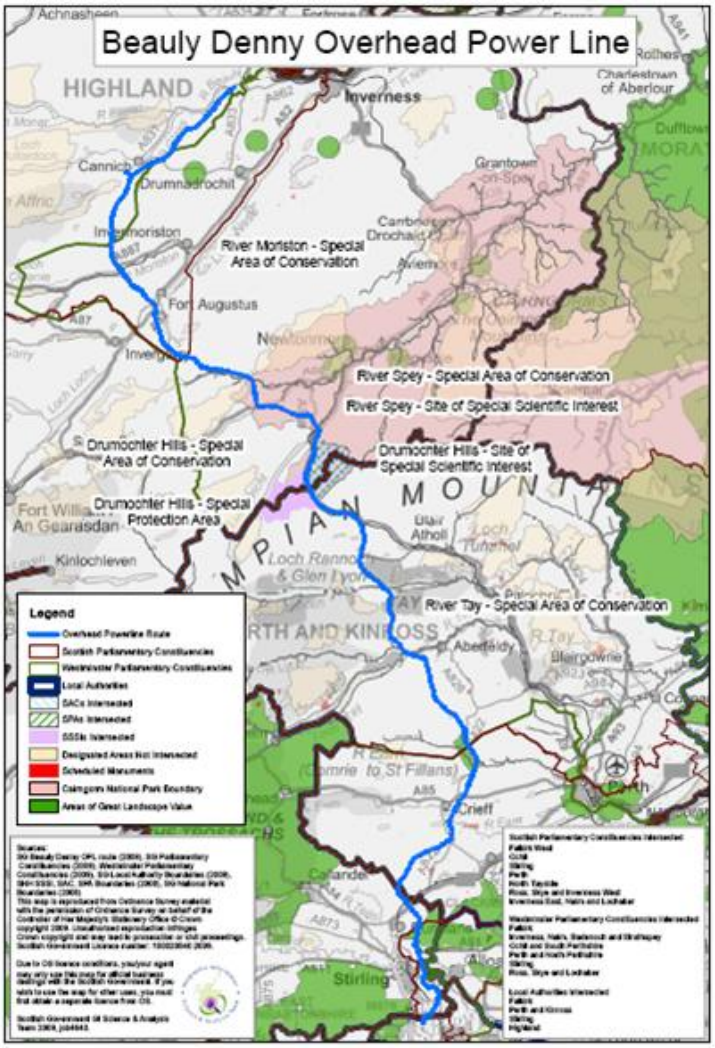
This upgrading and reinforcement of the electricity grid in Scotland is supported by UK and Scottish national policies, and the National Planning Framework 2. The Scottish Government has identified an annual target of 50% of electricity demand to be supplied from renewable sources by 2020. The UK Electricity Networks Strategy Group report published in March 2009 envisages an even more significant range of scenarios for generation of up to 11.4 GW of energy from Scotland by 2020, compared to NPF2 predictions of 8 GW.

The proposed overhead transmission line is 220km (137 miles) long between Beauly, west of Inverness, and Denny, near Falkirk. The line passes through five planning authority areas (The Highland, Perth & Kinross, Stirling and Falkirk Councils, and Cairngorms National Park). The line passes through a number of natural habitats including approximately 51.7km (32 miles) of woodland. The line would not cross any National Scenic Areas, but would cross one Area of Great Landscape Value at the Ochil Hills. The line has the potential to affect 9 Natura European protected sites*.

The route of the upgraded line is similar to the existing line but diverges by up to 2km over certain stretches thereby affecting new communities and residences. Figure 6.3 shows the route of the upgraded power line.

It was identified by the Scottish Government Energy Consents and Deployment that the upgrade of the line had the potential to enable 4.2 GW of renewable energy applications.

Figure 6.3
Beauly Denny Overhead Power Line



Source: Scottish Government

<u>The process</u>

The public consultation included the publication of the proposed route, in July 2005, followed 18 months of public consultations held by the two companies (Scottish Hydro Electric Transmission and ScottishPower Transmission), based on documents and draft routes published in January 2004 and in June 2004. A further period of formal public consultation on the companies' proposal took place, in line with the procedure for considering Section 37 applications.

The formal process of consultation concluded on 30 April 2006 but discussion continued with statutory consultees throughout the process. The five Planning Authorities within whose boundaries the proposed development falls had concerns about some aspects of the application.

The applications were originally received by the Energy Consents Unit on 28th September 2005. The Public Local Inquiry was held over 5 sessions between February and December 2007.

The Beauly Denny application received in the region of 20,000 objections at the time of the Public Local Inquiry. An example, of one of the objections came from the Beauly Denny Landscape Group (led by the John Muir Trust, JMT) who presented evidence against the development due to the potential:

- Adverse impact on the landscape caused by the proposed line;
- Adverse impact on the landscape in areas where additional generating capacity would be installed which is only made possible by this line;
- Failure in the Environmental Statement to establish a need for the proposed line;
- Failure to address in the Environmental Statement the poor economic viability of wind turbines in Northern Scotland in the medium and long term future, in relation to the nature and extent of consumer subsidy and the likely consequences on required transmission capacity; and
- Failure to address in the Environmental Statement reasonable alternatives to the proposed line, including failure to explore a sub-sea cable solution.

The procedure for the decision making was also questioned as JMT considered this a matter of national concern (Scotland and UK) which should be considered within the context of overall energy generation, transmission and use. This would entail a full public consultation[56].

Following completion of the Public Local Inquiry the Report was submitted to the Scottish Ministers on 18th February 2009. Consent was granted in 2010, the first section of the line was energised in 2013, construction will continue for a further eight years. The developers consider that the new infrastructure has already brought many benefits including £86million contribution to the Scottish economy, excellent training opportunities with the potential to export expertise and removal of 1000 smaller pylons that have been replaced by the new line[57].

The development of the Beauly Denny overhead line illustrates some of the complexities of grid infrastructure improvements over corridor routes and several planning authorities. There are several useful considerations that might be relevant in the Irish context including:

- The balance between national and local processes;
- The context within which public consultation is undertaken (for example, national policy or local development);
- The socio-economic impact at local and national scales; and
- The need for clarity on land use and landscape policies.

6.6 Planning Regime

Onshore wind farms were first consented in Scotland in the mid-1990s. At the time the principal planning legislation was the Town and Country Planning (Scotland) Act 1972. This Act was superseded by the Town and Country Planning (Scotland) Act 1997 which, following the publication of the Scottish Executive's White Paper Modernising the Planning System in 2005, was amended by the the Town and Country Planning (Scotland) Act 2006[58] which came into force in August 2009, along with planning regulations which interpret the law. Part

[56] See: www.jrt.org
[57] http://www.sse.com/BeaulyDenny/GeneralFAQ/
[58] See: http://www.legislation.gov.uk/ukpga/1997/8/contents

II of the Act deals with Development Plans and Part III deals with Control of Development. The provisions contained within the 2006 Act aimed to create a more inclusive and efficient planning system with greater community involvement.

The Scottish Government's national planning policy is set out in Scottish Planning Policy 2010, and associated Strategic Environmental Assessment (SEA), i.e. national planning policy on important land use matters, along with the National Planning Framework 2[59] (NPF2), which sets out the government's strategy for Scotland's long term spatial development[60]. Core principles of the SPP include that the planning system should be genuinely 'plan-led' and that planning authorities should support communities/small businesses (urban and rural) in developing renewable energy projects in an environmentally acceptable way.

In relation to forward planning requirements Paragraph 187 states that:

'…Development Plans should provide a clear indication of the potential for development of wind farms of all scales, and should set out the criteria that will be considered in deciding applications for all wind farm developments including extensions. The criteria will vary depending on the scale of development and its relationship and the characteristics of the surrounding area, but are likely to include:

- *Landscape and visual impact;*
- *Effects on the natural heritage and historic environment;*
- *Contribution of the development to renewable energy generation targets;*
- *Effect on the local and national economy and tourism and recreational interests;*
- *Benefits and disbenefits for communities;*
- *Aviation and telecommunications;*
- *Noise and shadow flicker; and*
- *Cumulative impact.*

When identifying areas with potential constraints on wind farm development, Paragraph 190 states that planning authorities should consider the following:

- *The historic environment;*
- *Areas designated for their regional and local landscape or natural heritage value;*
- *Tourism and recreational interests;*
- *Likely impacts on communities, including long term and significant impact on amenity;*
- *Impact on aviation and defence interests, particularly airport and aerodrome operation, flight activity, tactical training areas, aviation and defence radar and seismological recording; and*
- *Impact on broadcasting installations, particularly maintaining transmission links.*

[59] NPF2 advises that the key elements of the spatial strategy to 2030 include the promotion of development which helps to reduce Scotland's carbon footprint and facilitates adaptation to climate change and the realisation of the potential of Scotland's renewable energy resources to facilitate the generation of power and heat from all clean, low carbon sources.
[60] The proposed NPPF3 was laid before Parliament in January 2014 for scrutiny until March 2014.

In relation to wind turbines and separation distances between wind turbines proposals and settlements, Paragraph 190 of the SPP recommends a separation distance of up to 2km between areas of search and the edge of cities, towns and villages to guide development to the most appropriate sites and to reduce visual impact. Paragraph 190 also highlights that decisions on individual developments should take into account specific local circumstances and geography.

6.6.1 Spatial planning

Given the dynamic nature of wind turbine development the Scottish Government now provides a web-based resource which addresses and updates guidance on key emerging planning issues. The Specific Advice Note on Onshore Wind Turbines was last updated in July 2013 and states that planning authorities should provide a spatial framework for wind farms >20MW in the development plan as well as detailed criteria to be applied in assessing wind turbine applications. It further states that planning authorities should secure support from local communities, wind power operators and other stakeholders on policies and procedures. In summary the *Onshore Wind Turbines (2013)* provide the following advice and guidance:

- Provide greater clarity on where groups of wind turbines can be located by ensuring that a spatial framework for wind farms >20MW has been set out in the development plan and addressing the potential below 20MW where appropriate
- Suggest detailed criteria to be applied in assessing wind turbine applications:
    - Establish protocol and key consultees for involvement in spatial planning, policy making, pre-application work and applications for wind turbines
    - Identify proportionate levels of information to service pre-application discussions and to assess applications on wind turbines
    - Secure support from local communities, wind power operators and other stakeholders on policies and procedures
    - Ensure planning conditions and agreements for wind turbine approvals are reasonable and appropriate.

The Process for Preparing Spatial Frameworks for Windfarms was first published in February 14, 2011, and has experienced a series of updates, with the most recent version being published in August 2012. The guidance advises that assessments of the capacity of planning authority areas to accommodate further wind farm developments should be based on analyses of real and relevant constraints, taking account of cumulative impacts, and areas of search should not be artificially constrained. The guidance affirms that no renewable energy targets have been set for local authority areas and judgments about the proportionality of an authority's contribution to the achievement of national targets are not a relevant consideration.

The SNH Guidance - Assessing the cumulative Impact of On Shore Wind Energy Developments (2012) document was updated in 2012 and whilst it focuses mainly on cumulative landscape and visual amenity impacts at a strategic planning i.e. forward planning and development management level. Cumulative impact is defined as '*the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together*'. The SNH Guidance states that cumulative impacts should be considered in strategic planning (i.e. forward planning) and in development management stages of the approval process.

6.7 Planning System

6.7.1 Governance

Local Planning Authorities (LPAs) have responsibility for determining planning applications for wind farm development where the generating capacity is less than 50MW.

In Scotland, any application to construct or operate an onshore power generating station with a capacity of over 50 megawatts (MW) or install and keep installed an overhead electric line requires the consent of Scottish Ministers under section 36 or 37 of the Electricity Act 1989 (the 1989 Act) respectively. Such applications cover new developments as well as modifications to existing developments and permission can of course either be refused or granted (with or without conditions). Where consent is granted, deemed planning permission may also be granted. Applications for the construction or operation of an onshore power generating station of 50MW or less are made to the relevant planning authority.

In 2008, Scottish Government introduced revised scoping procedures for onshore developments, helping developers understand constraints and key opportunities, and promote the delivery of more comprehensive environmental statements at application. The online guidance has also helped make the process more transparent and accessible to stakeholders. However, it was noted by one interviewee that whether planning was a help or a hindrance to wind energy development depends whose view is sought. Developers tend to treat it as a burden but a process they have to go through. Often the consultation element is found to be too broad possibly including the views of too many individuals and organisations. On the other hand communities and opposition groups often see planning as being pro-developer, sometimes resulting in a ‘tick box’ exercise that is required by policy but is not necessarily that meaningful for the community. The pre-application consultation that came into force in 2009 has the potential to improve this through earlier engagement, but there is still a need to see communities having more of an influence upon new developments.

6.7.2 Regulations

Certain wind farm developments require the proposals to be subject to an Environmental Impact Assessment (EIA) either due to their size or if they are likely to have a significant effect on the environment, by virtue of factors such as its size, nature or location. The requirement for EIA comes from European Directive 2011/92/EU. In Scotland, the EIA Directive has been brought into Scottish law through a number of Scottish Statutory Instruments relevant to individual consenting regimes.

The findings of the EIA are presented in an Environmental Statement (ES), which accompanies the planning application. Statutory Consultees (Regulator) including SNH, SEPA and Historic Scotland, have a duty to provide relevant environmental information held by them to further the EIA process, particularly providing it to applicants and proposers preparing an environmental statement, unless the information is held in confidence (SNH, 2009).

6.8 Key Process Support Mechanisms

6.8.1 Financial Support

The Renewables Obligation (RO) remains the key incentive for the build of new, large scale renewable electricity generating capacity across Scotland. While its future beyond 2017 depends very much on the outcome of the current electricity market reform proposals, changes emerging from a recent review of technology bands and related consultations took effect from April 2013.

The key changes and proposals affecting the RO in Scotland are as follows:

- Reduction in onshore wind support by 10%;
- Retention of support for hydro generation at the current level;
- Introduction of a 10 MW capacity ceiling for dedicated, wood-fuelled biomass generating stations.

The Scottish Government has also allocated extra funding to help planning authorities deal with renewable planning applications[61]. The £300,000 funding will be available to help those planning authorities who have experienced a significant increase in the number of planning applications for wind turbines, putting pressure on their ability to meet statutory deadlines.

In October 2012, the First Minister announced the opening of the Scottish Government's £103m Renewable Energy Investment Fund (REIF)[62]. The fund will prioritise investments in marine energy, community renewable projects and renewable district heating. It is designed to complement existing public and private sector finance schemes available in Scotland, providing bespoke investment deals typically involving loans, loan guarantees and equity finance alongside co-investment partners. REIF will be delivered by the Scottish Investment Bank on behalf of the Scottish Government and its enterprise agencies, with the first deals expected to be completed by the end of the financial year 2012/13. The majority of the investment opportunities in the 'community renewables' category are expected to arise from community-led renewable projects between £1 million and £3 million with a funding gap of about 10-20 percent. There are also likely to be larger and more bespoke deals involving community investments into projects led by private developers.

In addition to the above, extensive strategic funding is being made available to the offshore renewable energy sector, including wind, to maximise the socio-economic gains from this opportunity. Although much of this funding is aimed at infrastructure such as ports and the offshore wind supply chain, the commitment to skills development may also benefit the onshore wind industry.

Table 6.2
Summary of Scotland's Support Mechanisms compared to Ireland

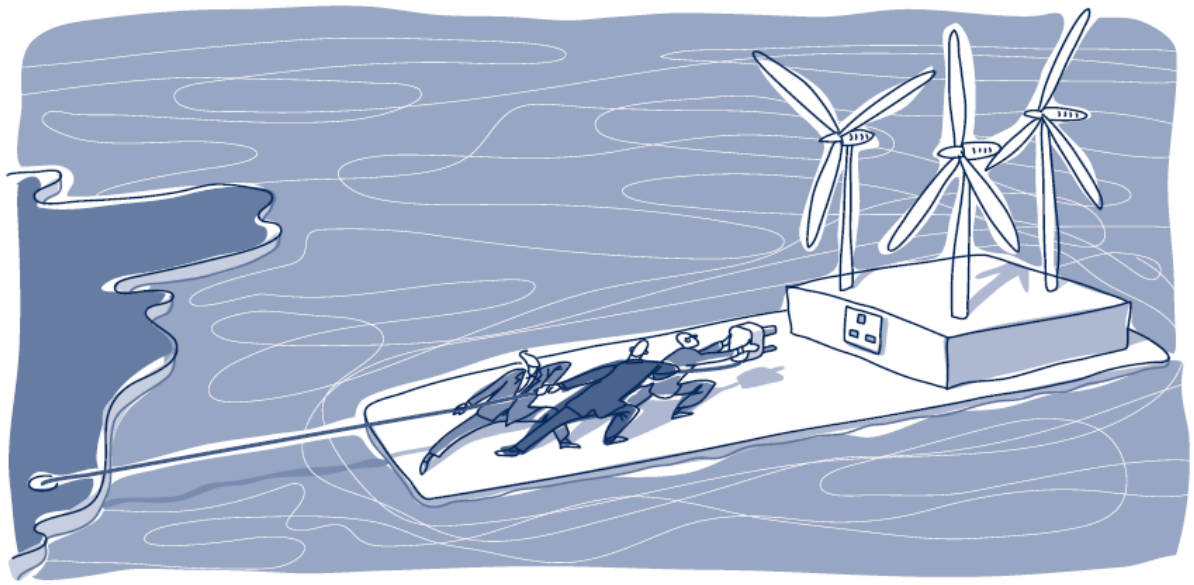
Mechanism	Scotland	Ireland
Price/Feed-in-Tariff	£21.65p (€26.39) kWh up to 100kWH	Onshore wind (above 5MW) €0.07/KWh. Onshore wind (equal to or less than 5MW) €0.07/KWh. Contracts for Difference has replaced Renewable obligation Certificates. Strike price for onshore wind has been reduced by £5/MWh (£95 for 2014/15 to 2016-17 and then £90[63])

[61] Source: 2020 RENEWABLE ROUTEMAP, FOR SCOTLAND – UPDATE, 30th October 2012 See: http://www.scotland.gov.uk/Resource/0040/00406958.pdf
[62] http://www.scotland.gov.uk/News/Releases/2012/10/renewable-investment10102012
[63] Scottish Government (2013) '2020 Renewable Routemap for Scotland- Update'

6.9 Intermediary bodies

In areas where developers may have weak local ties the role of an intermediary (or go-between) may be important (Ellis 2012). There have been examples in the UK where a community liaison officer has been recruited (often from the local community) to provide this important link with the community that the developer may have difficulty of accessing and/or maintaining. Examples tend to be in the offshore sector (Islay tidal array – local development officer funded by ScottishPower, and Islay offshore wind farm – fishing community officer funded by Scottish and Southern Energy).

In considering the requirements to deliver ambitious renewable energy targets in Scotland and the UK, intermediary bodies are seen as a useful method of providing support and technical advice. One example is The Crown Estate who are accelerating socio-technical change and de-risking the installation and connection of offshore wind capacity.



Source: Sustainable Consumption Institute, University of Manchester (May 2013)

Another example is the Community and Renewable Energy Scheme (CARES), supported by Scottish Government and delivered through Local Energy Scotland. CARES, which is seen as having potential value in Ireland, is discussed further under section 6.10.

6.10 Community Equity and Community Benefits Initiatives

6.10.1 Community Equity

Previous empirical research (Warren, C.R. and McFadyen, M. (2010) has explored the possible influence of different development and ownership models on attitudes to wind farms—i.e. community-owned versus privately developed wind farms in Scotland. Based on a survey of public attitudes towards small onshore wind farm developments in South-West Scotland, the study surveyed the impact of ownership on acceptance of wind farms and impacts on tourism. The results indicated that community ownership reinforces acceptability and that wind turbines do not impact on tourists' intentions to come back. The study concludes that "*community ownership does not fully transform existing views, but it reduces existing negative attitudes and strengthens existing positive attitudes*" (Nadaï et al., 2009: 3). Local ownership requires a redistribution of the costs and benefits and as such can address issues of distributional justice.

The 2020 Routemap to Renewable Energy *(Section 3.9)* affirms the Scottish Government's intentions to maximise the benefits for communities from renewables and to transform the level of opportunity for local ownership of energy by setting a target of 500 MW community and locally-owned renewable energy by 2020.

Scottish Government estimates that there is already at least 147MW of renewables capacity in community and local ownership, spread across 3,400 sites[64]. CARES was recently recognised by the OECD as an example of good practice in bottom-up approaches to renewable energy[65]. It is delivered by Local Energy Scotland, a nationwide consortium which provides support, advice and financial assistance to community groups and rural businesses who wish to generate renewable energy or gain benefit from local commercial renewable energy schemes.

To date the CARES loans scheme has offered 42 projects loans totalling £4 million which will produce 56MW of renewable energy. A further £28.5 million will be available over next 3 years. In addition to this Scottish Government is providing assistance through:

- A new £0.5 million package of support announced to encourage innovative solution to grid access and;
- Helping communities reach financial closure and maximise their contribution in community led renewable energy projects.

6.10.2 Community Benefit

Scotland Government has put in place a range of measures promoting community benefit. This includes:

- The Community Benefits Register which is intended to improve transparency about community benefits from commercial schemes and help communities negotiate with developers. It will also build an evidence base to demonstrate the added value that renewable energy, particularly onshore wind, is bringing to Scottish communities.
- Support under CARES to help communities negotiate benefit;
- Developing good practice guidance for Community Benefit for onshore renewables, and looking to industry to develop protocol;
- Obligation under CARES that rural businesses provide at least £10,000/MW benefit to be eligible for a pre-planning loan;
- Exemplary practice on public estate, for example, £5,000/MW rate negotiated by Forestry Commission (Scotland) is more than twice the industry standard.

The issue of community benefit and the wider benefit to the community was discussed with interviewees. One interviewee considered it important that communities should benefit from 'community benefit' including the wider community. As noted above wind energy projects can take a substantial amount of effort and time to develop, usually over years. It may be that those of the community who provided the main effort to develop a project may not wish to share benefit more widely with those who have not been involved in driving the project forward. However, in the long term and from a social responsibility point of view sharing the

[64] Source: 2020 RENEWABLE ROUTEMAP, FOR SCOTLAND – UPDATE, 30th October 2012 See: http://www.scotland.gov.uk/Resource/0040/00406958.pdf

[65] OECD (2012), *Linking Renewable Energy to Rural Development*, OECD Green Growth Studies, OECD Publishing. http://dx.doi.org/10.1787/9789264180444-en

benefits may be worthwhile and help address potential issues such as community cohesion and distributive justice.

One example, the proposed Cove Community Wind Farm (CCWF) for five 92-metre turbines was expected to produce annual income of more than £300,000 for villagers in Cove, Kilcreggan, Peaton, Ardpeaton and Portkil. There were plans to share the benefits with the wider community, beyond those who were driving the project, which helped support the application. This may have reduced possible opposition from neighbouring communities.

CCWF has now folded due to planning issues and incomplete lease agreements with landowners. It is of note that the latter may have been due to a lack of capacity in terms of legal and contractual skills held within the community. However, according to recent research by University of Edinburgh many community projects are successful even where there is a lack of such skills[66].

It was noted by another interviewee that although community benefits are a regular feature of wind farm developments it is not discussed as part of the planning process or community engagement as it is not considered in the consenting of the wind farm. It is possible that this is a missed opportunity for transparency and agreement with the community which could be part of the pre-application consultation, including design of the community benefit package and its governance. Some local authorities (e.g. The Highland Council) have provided policy guidance which although not binding (it is not within planning legislation) has provided clarity, a level of standardisation and transparency to enable the process. The Highland Council policy is summarised in the box below.

Table 6.3
Example of Community Benefit Policy

The Highland Council, Community Benefit Policy
The Council's policy applies to all onshore renewable energy developments. It seeks a minimum payment to community benefit funds equivalent to £5,000 per Megawatt of installed capacity per year (Retail Price Index linked with 2011 as the baseline year). The Council will seek to negotiate concordats with developers in Highland to achieve this figure. These concordats will ensure that developers operate within the Council's policy and that developers negotiate directly with the Council on behalf of communities to secure the greatest level of benefit possible. The Council will decide on the communities that will benefit from this approach in each individual circumstance by applying the following 3 Allocation Factors: • Proximity to the Site • Visual Impact • Number of Residences The Council's policy is that benefits should be widely spread across all of Highland. The Council has agreed a 3 tier system of benefit to ensure this: • All of the first £100,000 per year of benefit will remain with local communities within a Local Fund; • Above that level, local communities will retain 55% of the benefit; • 30% will go to a wider Area Fund; and • 15% will go to The Highland Trust Fund.

The Highland Council approach is interesting as it addresses several factors; the level of benefit, the definition of community according to proximity issues, the wider communities and the region as a whole.

[66] Haggett, C (2013). Social Assets in Community Renewables

However, community benefit was seen by some interviewees as over simplistic and not necessarily a way to address potential socio-economic issues within the community. Community equity was considered more likely to bring social acceptance. Community benefit can be switched off; equity is more enlightened and sustainable.

6.10.3 Community Renewable Energy Toolkit

The purpose of Community Renewable Energy Toolkit[67], commissioned by the Scottish Government and Energy Saving Trust (first published in 2009 and last updated in March 2011), is to contribute towards the achievement of Scotland's renewable energy targets by galvanising and guiding community groups to find ways of maximising community involvement and benefits from renewable energy. The toolkit is structured to allow communities to work through what their options will be and to direct them towards further help and guidance. Section 3.3 focuses on 'Wind Energy- Small Wind Turbines', and provides a selection of top tips for communities considering installing wind turbines. Section 6 focuses on projects developed and owned by community Organisations and deals with issues such as community consultation, developing trusts and community capacity building.

6.11 Key process challenges

6.11.1 Community acceptance

Community engagement and consultation

Community engagement and consultation was seen by interviewees as a key process challenge to community acceptance. The requirement for Pre-application consultation was viewed as a positive step, this needs to be more than awareness raising and notification, for example, complaints have arisen that there are not enough mechanisms to feed back views into the process, and for their views to be evidenced in terms of impact or change. Developers could use it to listen to and address local concerns from an early stage which could set a positive tone to the engagement from the outset resulting in more enthusiasm for engagement and acceptance at a later stage. This was seen as very important from the community perspective as these are long term relationships which need to be nurtured from the outset with visible senior level commitment from the developer, ongoing open, genuine dialogue avoiding corporate speak such as 'project realignment' with frequent visits to the community. Good consultation is an 'art form', developers need to show they are listening to concerns and how they are taking these into account stated one interviewee.

For the larger developers pre-application can be more challenging as there is a reluctance to engage until a well-worked proposal is in place which in turn makes it more difficult to change. Developers are often able to show that they are listening to local concerns but not instigating change because of them. The example, of Fintry, (see above), however, illustrates how a constructive proposal from the community can be incorporated into the overall proposal. Another example is the Marine Energy Tidal Project of Islay where the developer employed a local project officer to negotiate with the fishing community in particular. This has worked well, although it was noted by the interviewee that it can still take time for people to realise what is happening in their area and not necessarily have taken note of the previous consultation. For example, the Islay Energy Trust undertook a community led socio-economic scoping study in response to the offshore wind farm proposal in 2010. This still has validity but it has taken time for people to be aware of it. This reinforces the need for frequent engagement and consultation, for example, even if the project has not changed it may bring new people or new thinking to the discussions.

[67] See: http://www.scotland.gov.uk/Resource/Doc/917/0115761.pdf

Another interesting point raised in the interviews was the need for cultural change within the corporate developers, particularly those whose traditional roles may have been energy supply but they have now branched into energy generation (often through acquisition). This has meant that long term good will and relationships with communities that may have been built up over many years are at risk, particularly when corporate culture may not be consistent across the organisation.

Although local authorities are tasked with ensuring that there has been sufficient pre-application consultation (developers must document this), one interviewee noted that they frequently do not have the capacity to make this form of assessment. Local authority officers do not necessarily have the training to evaluate the quality of engagement nor is there an accepted methodology of what forms good practice including what impacts can or should the engagement have.

Table 6.4
Example of deliberative engagement

The University of Edinburgh ClimateXChange is running a Citizen's Jury project to explore the deliberative engagement process in the context of wind energy development. Juries are recruited to provide a random stratified sample (spread of ages and incomes) of people not already involved in the wind energy debate. Locations were selected to include three settlements of roughly the same size. One with long established wind farm, one with a possible wind farm, one with an active proposal for a wind farm. The locations are Borders, Perth and Kinross and Argyll and Bute. The two key questions asked of the jury are: 1. What are the principles for deciding on wind farms in Scotland? 2. What should the national policy be and what does this mean in terms of trade-offs? The jury members attend two full day sessions. The first with presentations from Expert Witnesses (including Scotland Against Spin, Scottish Renewables and Renewables UK and academics). The second without experts involving facilitated discussion, led by the University. The final session will be early February 2014 with the report written up for summer 2014.

Source: ClimateXChange

Opposition groups

The role of active opposition to wind farms is a key process challenge to be considered. Interviewees noted how online mobilisation means that different groups are connecting together and the debate is becoming increasingly national. This can be positive but it also means that bad experiences (for example tick-box consultation) at one location are widely communicated and shape expectations and process elsewhere. This presents a risk that expectations that new consultation processes will be meaningless might lead to cynicism and a lack of enthusiasm to participate in the consultative process. This spreading of local experiences at regional and national scales can shape national attitudes to wind and renewable energy.

The development of national opposition groups such as Scotland Against Spin is leading to local opposition groups connecting to wider networks which offer support and guidance. As one interviewee noted this inevitably shapes expectation and experiences as well as shaping (and in some instances narrowing) the range of issues and concerns that are expressed in the planning process. A further interesting aspect to national groups is their ability to engage in the centralised process. It has been noted that while local opposition groups are influential at the local level they are much less influential in the more centralised and (national) policy driven appeals process. As such the impact of objections might be in delaying final planning decisions but not necessarily having a major influence on the final outcomes.

Media

Negative press stance and local opposition, are closely related. One interviewee said that it is hard to see which came first, but that the overall effect has been to reduce quality of public debate on the issues around future energy supply. Another interviewee felt that there was very little middle ground or opinion expressed through the press.

In terms of scale of wind farm development it is sometimes assumed that the larger scale developments are likely to be the more contentious however, this is not always the case, projects of the 'wrong type' or in the 'wrong place' are likely to lead to opposition regardless of the instigating actor (community or corporate).

6.11.2 Communication and messaging

Discussions with consultees highlighted some relevant communication issues which are influencing the level of community acceptance of onshore wind. These included:

- Messaging – the need to adapt the narrative to 'how wind energy is good for me' to talk about community benefits rather than green issues or climate change.
- Role of press – the stance is very negative. The press do not provide an alternative to onshore wind and the carbon implications of this; the impression is that they do not wish to engage to that level. The debate is therefore reduced and polarised.
- Alternative routes – it may now be necessary to by-pass the press control by getting positive views out via intermediaries and other bodies (not government) for example, NGOs and more generalised messages about energy.

6.11.3 Proximity and legacy issues

The consultations indicated that the onshore wind farm industry has some negative legacy issues to address. These are mainly based around proximity issues. In the case of onshore wind, in a minority of cases, proximity to turbines may affect residents' lives due to noise, visual or shadow flicker impacts. Individuals experiencing this may have very real concerns over the effect this has on their health, well being and livelihoods and as one consultee mentioned, they live next to the problem, there is no break from it. Such proximity issues can lead to individuals developing an anti-wind stand which may also draw in other issues and develop into objections against wider issues such as policy, whereas better siting of the wind farm or turbines could possibly avoid this. In a number of cases developers provide compensation or buy properties which are viewed as no longer fit for their original purpose.

Inappropriate decisions at local and national level can also be very damaging and indicate an inconsistency in the application of good practice. One example, given was Clyde wind farm which was seen of inappropriate scale to the surrounding topography. This illustrates the risks of 'wrong type' and wrong place' projects as one instance (such as Osterlid in Denmark) can have a negative impact on the wind sector, community trust, public perception and media relationships.

Table 6.5
Example of community equity in commercial wind farm

Context	Process	Outcome
Earlsburn Wind Farm, near Stirling, Scotland. Two local (Fintry) householders seeking community renewable intitiative in local area.	Discussions started 2003. Fintry Development Trust saw an opportunity to develop a joint venture with developer/owner rather than a standalone	FREE distributes a community benefit fund to the value of £35k per annum to residents of three local councils: Carron Valley & District and Cambusbarron

Developer (West Coast Energy and Falck Renewables) conducting community consultations.	community project. Developer submitted plans for a 14 turbine wind farm and the Fintry community responded by lobbying for an additional turbine 100% owned by the community (total population of 500 adults) via 'Fintry Renewable Energy Enterprise'. Stirling Council resolved to grant planning permission in July 2004 and the permission was issued in February 2006. Turbines were installed during the winter of 2006-2007 and the wind farm became fully operational in December 2007. In 2008, a further 9 x 2.5MW turbines (Earlsburn Extension) supported by local communities and granted consent. A community benefit fund was established in relation to the extension rather than equity.	Community Councils in the Stirling Council area, and Denny & District Community Council in the Falkirk Council area. The Earlsburn Wind Farm Community Benefit Fund is managed by the Scottish Communities Foundation and provides grants to support charitable activities that: • Enhance quality of life for local residents • Contribute to vibrant, healthy, successful and sustainable communities • Promote community spirit and encourage community activity • All awards are agreed by a panel of local people

6.12 Key Insights from Scotland

<u>Positive aspects</u>

- There appears to be, amongst government and business at least, a widespread buy-in to the renewable energy strategy being pursued by the Scottish Government.
- Scotland has a specific policy target for community owned renewable energy of 500MW. Ireland could consider adopting a specific target for 'community' projects.
- Scotland's wind energy industry is supported by an innovative regulatory and legislative regime, particularly the binding targets derived from the Climate Change Act and planning guidance at each level of government.
- There are some innovative methods of public engagement being trialled, such as the 'citizen jury' project.
- There is a public register of community benefits for onshore renewable. This is worth considering as a recommendation for Ireland to improve transparency. The new UK Community Energy Strategy (DECC, 2014) aims to introduce a similar register in England in 2014.
- Obligatory and accountable pre-application consultation is seen as positive in terms of social acceptance.
- There has been local leadership on community benefits (Highland Council) – similar to some Irish councils – e.g. Mayo – this could be improved by a standardised national approach that is then implemented by local councils. This could consider not just €/MW but also procedural justice aspects such as processes of governance and distribution.

Challenges

- The impacts of negative media coverage are an ongoing issue and the use of intermediaries to push out positive messages is seen as one way around this.
- There are risks of presuming community projects are necessarily non-contested.
- The difficulty of sustaining voluntary roles for community members over many years in RE projects is recognised.
- There are complaints about noise and the Scottish dB level (36Db) for wind farms may need to be reviewed.
- There is greater clarity required about top-ministerial support for RE/Wind including the public stance taken and level of listening shown. This could be important for Irish politicians too.
- The emergence of a national level pressure group – Scotland against Spin (SAS) – and the joining up of localised protestors using the internet to exchange and connect is a challenge in Scotland as well as in Ireland. However, SAS is looking to work at a policy level.
- There is a lack of capacity amongst local authorities to 'police' the quality of developer consultations with communities. It may be useful for Ireland to look for ways that this can be ensured.
- Consultation can come across as a 'tick-box' exercise and there is a question of how to ensure that genuine opportunities for listening to community concerns and some influence arising from their inputs take place in Ireland.
- Planning policy on participation is seen to favour the affluent and the articulate – Ireland could possibly address this through capacity building measures for all stakeholders, such as, awareness raising, training and education.

Table 6.6
Summary of Key Insights for Scotland

Practice Category	Is it effective?	Context Specific Factors What problem is it trying to solve? Why is it effective? What specific contextual factors contribute?	Relevance For Irish Context?	Further Development
Distributional Justice				
Financial Mechanisms Creating local value Community Benefits	Partial	Does not necessarily deliver social acceptance Can mean some communities gain more than others (inequity) Relies on communities having the capacity to negotiate with developers Is strengthened by pro-active local councils (e.g. Highlands and Islands, who set a level of £5000 per MW)	Very relevant, as this approach is predominant in Ireland to date.	Consider conducting a public opinion survey to investigate the response to community benefit in terms of distributional justice. Questions might include, what is an appropriate level, how is the community defined?
Equity Community ownership target	Yes as it sends the message that the government values community owned and driven projects. Community capacity questionable as projects can take years to develop	To generate revenue, and deliver a range of economic and social benefits such as local regeneration, development of skills capacity, enhancement of social confidence, increase in energy awareness, community cohesion and partnership working and security of energy supply. Target of 500MW by 2020 may be too high but this will depend on the scale of projects that come forward. JV projects may enable community equity in relatively large scale projects which will help meet the target. It takes time for communities to find ways of organising themselves to develop or respond to equity opportunities but this is seen as a better long term goal than benefit which can be switched off at any time.	This would be a positive message to give communities in Ireland and would help to link top down and bottom up approaches. Target alone insufficient – a process to meet the target, including capacity building, perhaps drawing existing intermediary organisations such as Meitheal na Gaoithe and Energy Agencies, would help. JVs could also help align communities, developers and authorities.	Evaluate and consult with communities on appropriate target level Investigate how best to define community in a workable way (see alternative UK definitions that include or exclude depending upon charitable status, source of funding etc.)

Community Benefit	Yes	Community Benefit Register set up to improve transparency. Opt-in scheme so developers can choose whether to enter details. Therefore not comprehensive. Support under CARES to communities to help them negotiate; obligation on rural businesses to provide at least £10,000/MW of community benefit to be eligible for pre-planning loan; commitment to exemplary benefits from schemes on public estate (minimum of £5000/MW); SG Good Practice guidance on Community Benefit from onshore renewable. COVE project provided an example of a community driven scheme that was also considering wider community benefit to those who had not been involved in driving the project. This was considered worthwhile in the long term from a social responsibility point of view. Benefits not usually discussed openly with community as part of engagement process – this is a missed opportunity to get people on board and find out how the development can help them.	Transparency with regards to community benefit in Ireland would engender a more open approach and empower communities in benefit negotiations. No regulation or transparency of levels of community benefit. Standardisation would be beneficial. However, negotiation in itself can be inequitable due to varying resource levels of different communities.	Set up a Community Benefit Register but in the context of distributional justice and consider next to other measures such as equity, local taxation and joint ventures. Consider replicating Highland Council approach – aim to ensure greater transparency and clarity in how communities are able to engage with the benefits issue. Not just financial target, but process of governance as well.
Procedural Justice				
Integrated Planning System	Yes	Key documents are in place following consultation processes including Scottish Planning Policy 2010, Renewables Route Map 2011 and Electricity Transmission Policy Statement 2013. All have been subject to Strategic Environmental Assessment and should guide developments to the most appropriate sites. At the local level there is possibly less guidance, however, recently landscape and socio-economic capacity studies have helped address this to some extent.	A more integrated and comprehensive planning system would be beneficial to Ireland. This would help give certainty to all stakeholders.	Perform gap analysis of policy and planning system for grid and renewable. Take steps to fill gaps and integrate vertically and horizontally such that there is consistency across organisations (i.e. aligning policies) and at every level (i.e. leadership and delivery level)

Public discourse	Yes but challenged by negative media stance and emergence of objector groups.	Pro-active public discourse supports policy, planning and social acceptance. Consistent government process in terms of draft policy, consultation, revised policy, policy acceptance. However, negative media stance and lack of interest in genuine discourse means that messaging with regards energy policy must find other routes. For example, NGOs and intermediaries. Government recognise need to 'remessage' climate change. Negative press coverage and local opposition closely entwined it is hard to separate the influences. Opposition is increasingly online which means good and bad experiences can be shared quickly at regional and national scales.	Genuine and effective discourse between politicians, public and media could provide a more stable back drop to social acceptance of appropriate projects in Ireland. It could help communities to engage more effectively in wind energy deployment.	Establish what is required for effective public discourse; consultation with spatial planning process, addressing of impacts, positive relationships with media.
Consultation	Yes	Requirement for pre-application consultation (2009 Act) (PAN 81 and PAN3/2010) introduced to enforce consultation at an early stage. This has to be recorded in planning application. Could help social acceptance by forcing consultation to be 'meaningful' and allow communities to have more of an influence upon development. Currently consultation is of variable quality across different developers, no consistency. This is exacerbated by the cultural change in the larger developers who may be diversifying or expanding (through acquisition) from traditional roles where they have established goodwill within the community. Credibility is undermined by lack of transparency and sharing of issues that developers face, such as grid connection. A permanently employed community liaison officer based from the local area has worked well. Likely to require capacity building for developers in conducting consultation and for local authorities to ensure it is sufficient (may look for evidence of change in proposal driven by community) before assessment of the planning application takes place.	Evidence suggests that communities sometimes feel that they do not have a meaningful role in the consultation process. Reinforcing the requirement and method of consultation may be beneficial to social acceptance in Ireland.	Consider introduction of pre-application consultation requirements for new wind and grid developments. This can also help set the tone of the whole consultation process. Must ensure it is more than a 'tick-box' exercise. Ensure capacity building is part of any roll out of new engagement consultation or regulation.

Innovative practices	Yes – Citizen's Jury	It aims to solve the feeling of disempowerment and to give responsibility for decision making to the community Jury. Community is engaged via a Citizen's Jury in process whereby experts present the case for and against development. The Citizen's Jury meet once to hear evidence and secondly to make a decision	Goes beyond providing information to communities. Can enable public values to be incorporated into planning and decision-making processes, if conducted properly. Useful way of engaging stakeholders in the totality of decision making rather than focussing effort around single issues such as community benefit. Needs to be carefully considered in relation to other elements of statutory planning processes.	Investigate further May be useful to do a pilot study
Regulations	Partially	Regulations in terms of set back and noise thresholds should resolve proximity issues but there are still too many cases where this is not effectively addressed. Proximity to dwellings should be a key constraint for site selection.	Ireland is consulting on 40dB threshold this is higher than Denmark, Germany and Scotland. Proximity issues can snowball into significant objections and delays in the consenting process. Negative experience result in poor social acceptance legacy.	Consult on a range of thresholds. Explore possibility of compensation (or purchase) where proximity issues cannot be resolved. Include existing as well as future sites.
Intermediaries (provision of expert advice)	Yes	CARES is designed to accelerate progress towards the Scottish Government's target of 500MW of renewable energy to be locally or community owned by 2020, and to maximise the benefits to communities from commercially owned energy. The purpose of the scheme is to support the development of locally-owned renewable energy projects which provide wider community benefits. Loan finance will be available to cover the pre-planning consent (high risk) stage of project development, a high risk cost which is widely seen as a barrier to community groups and smaller businesses who would otherwise wish to develop a project. Preference will be given to proposals that demonstrate the highest value of wider community benefit.	CARES combines the role of intermediary and enabler for community energy schemes. It is funded by central government. A nationwide vehicle such as CARES could provide more accessible and consistent support to communities.	Consider a CARES type body to provide nationwide support and advice. Consult with communities as to a realistic community ownership target and the necessary support to achieve it. This can then inform the remit of a CARES type body.

Place-related impacts				
Spatial zoning	Yes	Scottish Natural Heritage Guidance – Assessing the cumulative impact of onshore wind energy developments (2012). This is a strategic document focusing mainly on landscape and visual amenity impacts of cumulative and combined developments.	Cumulative impacts are of increasing concern to communities and need to be addressed at a strategic level.	Consider relevance to Ireland and possibility of equivalent guidance.

7.0 KEY INSIGHTS FOR IRELAND

7.1 Introduction

This section aims to draw together some of the insights that can be derived from these three country case studies and to highlight aspects that could be considered when reviewing potential future energy pathways in Ireland trajection of energy in Ireland. It outlines a number of issues that could form the basis of interventions that may help support enhanced social acceptance in any future strategy in expanding renewable energy capacity in Ireland over the medium–long term (i.e. 2020-30s).

The review of the three countries illustrates the distinctive nature of energy transition according to economic, political and cultural context and each offers a distinctive perspective on what could inform future practice in Ireland. For example, Denmark highlights the importance of a social model of wind development and how this can be undermined as the scale and nature of ownership of wind energy projects changes in response to the need to expand national capacity. The case of Germany clearly highlights how more fundamental energy transformation can be informed by the notion of energy transition and how this has to integrate a wide range of policy areas and instruments, including encouraging specific renewable technologies through regulatory practices and financial inducements, energy efficiency measures and more social interventions. Finally, Scotland, whose regulatory regime is most similar to that of Ireland, highlights the importance of strong legislative and political leadership in defining the nature of a nation's energy future and while Scotland does not have a complete set of policy competencies over energy, it has identified a number of useful initiatives that can encourage community engagement and social buy in to national targets.

This chapter identifies a number of themes that emerge from reviewing how Denmark, Germany and Scotland have approached their own energy transformation:

- *Energy as a social concept*

  It is clear that in the case of Germany and Denmark (at least) that there is a wider appreciation of energy as part of a complex socio-technical system, so that government strategies, while expressed as (for example) technical targets for generating a proportions of energy by renewables, need to be supported not just by infrastructure or financial instruments, but also initiatives that encourage "softer" social development and engagement with energy, such as community ownership, addressing fuel poverty issues or broader social dialogue on the nation's energy future. A broader appreciation of the social dimension of the energy system also lends itself to a more empathetic approach to understanding the subjective understanding that different socio-demographic groups, or geographical communities may hold in relation to specific energy technologies (such as nuclear) or individual energy projects (such as a locally proposed wind farm), which in turn can help support a more deliberative approach to public participation.

- *Leadership and the role of targets*

  These international country cases also highlight the importance of government action being guided by long term targets (in the case of Germany and Scotland to 2050 and in the case of Scotland, also binding via the Climate Change Act). Long terms targets seem to be essential to the idea of defining the essential goals of any energy transition and while all EU nations, including Ireland, are working towards targets agreed for 2020, more far-reaching targets clearly help identify the nature of the long term investment needed for more wholesale energy transformation. Such targets are

also indicative of the nature of leadership in shaping a nation's energy future – both Germany and Scotland have sought to encourage a broad consensus around the direction of change in their energy systems and while this may not a sufficient on its own to secure wider social acceptance of specific technologies, it is clearly a necessary factor.

- *Integrating regulatory regimes*

  The idea of a long-term government wide approach to energy transformation implies a need to integrate practice across a number of policy areas, ensuring that practice in one area (e.g. financial support) supports, rather than frustrates other aspects of transition, such as encouraging greater social acceptance. This does have implications for a variety of spheres of public and civic activity, including planning policy and consenting, community development, agricultural and landscape policy etc. As noted in the case of Denmark, these often come together most effectively at the local level and integration can be best achieved under the auspices of locally developed strategies specifically on energy or climate change.

- *Trade-offs between scale and acceptance*

  The case of Denmark appears to confirm observations from some of the (Irish) national case studies and from the research literature that there appears to be a generally negative correlation between the scale of wind energy projects and a decline in community acceptance. This appears to relate to not only the greater impact of large scale projects, but also the ownership profile that tends to be association with major projects requiring substantial investment funds, so that they tend to be associated with corporate, rather than community of cooperative interests. Clearly there are increased pressures to expand overall renewable capacity (balanced with energy efficiencies), which in turns demands an increase in project scale. Therefore perhaps one inevitable trade off is between scale and social acceptance. If scale is required to achieve targets (both for decarbonising and economic) it should be recognised that this will necessitate a new, approach to energy policy involving enhanced investment in social engagement so that suitable projects are generally found socially acceptable.

- *Creating opportunities for diverse niche exploitation*

  Related to the point above, it is clear that an energy transformation requires an exploitation of a wide range of types and locations for renewable energy projects. This may mean that Ireland will need to develop its capacity in technologies other than onshore wind (such as biomass and ocean energy), but will also need to ensure that its substantial onshore wind resource is maximised by diverse range of developers (from individual landowners to large scale corporate interests), with different sites offering unique opportunities for different type of project. Such an approach will require a more sophisticated approach to financial support and regulatory practice.

- *Approaches to community benefits*

  Different countries appear to have adopted very different approaches to securing broader benefits from wind energy developments for the local population. For example, in Denmark despite traditionally having high levels of social acceptance, the notion of community benefits funds, as developed in Ireland and across the UK, is not included in the range of intervention mechanisms as co-ownership and cooperative arrangements have been seen to be adequate for sharing the benefits from wind energy projects. Similarly in other countries, wind energy projects

contribute directly to the local tax base, thus directly benefitting local communities without special fund arrangements. Instead in Ireland and the UK, there has been a reliance on voluntary agreements (supported by industrial protocols) for delivering such benefits, which have some positive impacts, but also face a range of difficulties in terms of their levels, administration and how they are perceived by local communities. This review therefore suggests that the notion of "community benefit" needs to be broadened, shifting the focus in Ireland from solely enhancing community benefits packages offered by developers to considering action on different mechanisms. To assist in this, it is possible to consider at least four mechanisms for delivery of community benefits, all of which could potentially be enhanced in an Irish context:

- Voluntary schemes run by individual companies or under industrial protocols;
- Regulatory defined schemes – such as standardised infrastructure levies, community benefits registers etc;
- Incentives for promoting community and co-ownership schemes;
- Schemes linking local development with local tax revenues.

- *Threats from a poor industrial practice*

  There is a specific example from Denmark (the Østerild Test Centre) that appears to have had a disproportionate impact on social acceptance of wind energy projects in Denmark. Because of problems of site design, location and the approach taken to engage with key interests, this project proceeded to attract high levels of opposition and media coverage. This appears to have then acted as a catalyst to broader social concerns about the nature of wind energy projects and as a consequence made it increasingly difficult to establish schemes, even well designed and executed ones, in other parts of the country. This clearly highlights the onus on all those involved in the wind energy industry to maintain the highest standards in project design and community engagement, with the poorest practice disproportionately influencing community attitudes to the sector.

- *Trust as a key concept*

  It is also clear that a key aspect of social acceptance is the extent of trust between the key parties involved in any wind energy project, including developers, local communities, regulatory agencies and other interests, such as those in the NGO[68] community. There may be a range of opportunities to build trust nationally, or in the context of specific projects including open and transparent decision-making, credibility in key institutions and the development of good local relationships. Different approaches may be needed depending on the scale of the project, or the nature of the parties involved, but the case studies do highlight the benefits that can be derived from intermediaries (such as the Danish Wind Task Force), or advocate organisations, such as Local Energy Scotland.

7.2 Energy transformation in Ireland

The purpose of this work was to understand some of the characteristics of the transition pathways of the three jurisdictions studied. When taken together and considered within the Irish context the key insights have provided a focus for operationalising a strategy for energy transformation in Ireland. These are summarised below:

[68] Non-Governmental Organisation

Governance and institutional capacity

The importance of integrated policy making on energy, infrastructure, climate change and planning issues across central government departments was noted as particularly effective in all jurisdictions but especially the holistic Energiewende approach in Germany. The main features of this included:

- Integrated planning at local and national scales (including the issue of spatial zoning – such that individual communities can see how their local area may change as a result. International examples of this include, TAN8 in Wales and German priority areas for wind).
- Established intermediaries focussing on three distinct areas of intervention - including technical advice to County Councils (e.g. Danish Wind Turbine Task Force), guide to developers on participative processes and intermediaries to help communities invest in their own projects and respond to those from external developers (e.g. Community Energy Scotland and Wind Turbine Task Force).
- Pre-application consultation with affected communities: not just about financial aspects of projects (experience in Germany indicated that this could lead to neglect of important procedural issues), but policy, contracting out (or not) the means of securing carbon budgets, equity and siting issues – scale, visual impacts, ensuring wide and early participation by affected residents and settlements
- Consistency across local authorities (addressing problems with projects straddling administrative boundaries) – for example Germany has experienced lack of coordination and consistency across municipal boundaries.

Strategic objectives and public discourse

- Consistent long-term (over successive governments) leadership was seen as a key characteristic to success in the countries studied. Energy transformation is a long term process of socio-technological change (decades) and requires clear leadership. In Ireland this would imply sustained Ministerial and TD buy-in and a clear role for county councils.
- Although not covered in detail in this study, effective communication at the national level is seen as a key factor. The energy transition process would require a communication strategy to inform and engage with all stakeholders. This would seek to balance messages concerning onshore wind in relation to other renewables, and other non-renewable energy sources (particularly natural gas and offshore wind).
- The process of developing an energy transformation strategy from the ‘bottom up” would benefit from a national debate on the merits of alternative pathways of decarbonisation. Key themes would include:

    - energy independence/export to UK
    - spatial zoning - wind avoidance areas
    - local distribution of benefits (ownership and taxation)

  The aim of this would be to ensure buy in of industry, local authorities, civil society.

Socio-economics

- Captured appropriately the socio-economic benefits of wind energy could facilitate the long term adjustments to infrastructure that could maximise the value of wind

resource and decarbonise infrastructure such as electrification of transport. For example,

- Currently policy stability for sectoral growth is supported by the long term financial return to investors (e.g. Feed in Tariffs);
- Local taxation from company to council (as in Germany) – with the potential to ring fence spend on local measures such as energy conservation;
- Local ownership obligation (as in Germany) and building upon dairy cooperative structure (as in Denmark);
- Affordable share price issues to promote community equity (as in Denmark);
- Prioritisation of share issues for local residents (such as within 4.5km in Denmark)
- Enabling landowner and community-led projects to create local value (for example, community target in Scotland).
- While community benefit can be encouraged for many reasons, this is not necessarily reliable as a strategy of social acceptance and there is poor evidence that it actually works for this purpose (as experienced in Scotland and England).

Technical issues

- Some of the key insights related to technical issues that could support the deployment of wind and community driven projects, such as:

  - Grid integration (e.g. priority dispatch for wind as in Germany);
  - Smarter, more flexible ways for securing the effective regulation of the environmental impacts of wind energy developments. For example, develop regulation concerning permissible noise levels (e.g. low frequency noise in Denmark) rather than explicit set-back distances;
  - Supply side related to demand side issues (e.g. reduction, load shifting in response to intermittent renewables, smart metering and variable tariffs, smart grids) as exemplified in Denmark and Germany.

7.3 Fuinneamh Feasta - Energy for the Future

Building on the key insights from the international analysis it is suggested that Ireland considers developing an overarching plan to stimulate and drive forward the energy transition. It is possible that this could be developed under a uniquely Irish banner, such as, Fuinneamh Feasta. The purpose would be to integrate Ireland's specific national and cultural approach to an energy transition, along the lines of the concept of 'Energiewende' in Germany. This would be developed through an iterative process of consultations which would commence with the scope of the plan. Based on the key insights it would consider the following measures as a starting point:

- Aligning national and local levels in planning regime;
- Giving wind preference for dispatch into the grid;
- Mandatory maximum noise levels;
- Emphasis upon co-ownership, enshrined in legislation;
- Making share purchase affordable;
- Giving priority to local residents in share purchase, to ensure benefits stay local;

- If recommending community benefits, ensure consistency and transparency through national guidelines, and publicly available register;
- Capacity building for local authorities (e.g. wind secretariat);
- Strategic zoning – but only if implemented in a participatory manner;
- Long term FITs, to offer stable climate for investment;
- National debate, as discussed above;
- Public leadership from the civil service and high level politicians;
- Support of pre-application consultation;
- Develop intermediary bodies (e.g. Wind Advisory Board for local authorities); and
- Promote and advertise local value creation (German Wind Energy Association).

8.0 CONCLUSIONS AND KEY INSIGHTS

8.1 Introduction

This international comparative study sets out the key contexts and processes in the development of onshore wind in relation to social acceptance in Denmark, Germany and Scotland. It has done so by providing a conceptual framework in terms of transition theory, discussing the concept of future energy pathways and social acceptance; presenting an overview of the existing policies and practices in the respective countries and exploring the contexts and practices for wind energy deployment and social acceptance. The analysis of the international examples has then been compared and reflected upon to draw out key insights in order to further understand the existing and emerging challenges and opportunities for Ireland. This chapter presents the conclusions of our analyses, key insights and potential areas for further development.

The international research provides a context within which to consider the national research (Wind Energy: The Challenge of Community Engagement and Social Acceptance in Ireland).

8.2 Energy Transformation

The key driver for energy transformation in Europe has been to decarbonise energy capacity; other drivers have included security of supply, reduction of risk, economic growth and technology innovation. Development of new renewable energy capacity across the EU has been greater than the development of fossil fuel capacity for the last five years (EWEA 2013). Within the EU each member state is required to produce a National Renewable Energy Action Plan[69] which provides the framework for an integrated approach by varying degrees in different jurisdictions. Ireland submitted its National Renewable Energy Action Plan to the European Commission in July 2010[70]. The recent announcement (January 2014) from the European Commission states that it intends to introduce a "new governance system" based on "national energy plans". A revised Energy Green Paper for Ireland is currently in progress.

The transformation of energy systems, from one based primarily on fossil fuels to one which has a much greater share of generating capacity from renewable energy involves a complex set of technological, social, economic, regulatory and physical adjustments, over a range of spatial scales and emerging over a number of decades (for example, in Denmark, since the 1970s). Indeed, the early commitment of Denmark illustrates the length of time that transition processes can take to be fully integrated and accepted. Transformation involves a multi-sectoral approach involving not only the energy suppliers, but a changing relationship with energy. This therefore suggests that energy needs to be seen as part of a socio-technical system, not one just based on infrastructure and economic incentives. The challenge of progressing energy transition must be approached to address the multiplicity of issues, i.e. not only focussing on issues such as distributional justice. While all countries have to respond to wider constraints related to factors such as the global energy market and international agreements on issues such as greenhouse gas emissions, each jurisdiction does have the potential to steer this transformation along a range of pathways, initially defined by its existing infrastructure and resources towards a set of predefined goals. This study has looked at the range and nature of the pathways travelled by Denmark, Germany and Scotland.

[69] Article 4 of Directive 2009/28/EC on renewable energy requires each Member State to adopt a national renewable energy action plan (NREAP) to be submitted to the European Commission.
[70] National Renewable Energy Action Plan (NREAP) IRELAND First Progress Report (2012)

8.3 Overarching Findings

Combining the findings of desk study, interviews and the study team's own reflections, the international comparative analysis produced the following overarching findings:

- Decarbonisation is a long term process of socio-technical (co-evolutionary) change, which has been highlighted in this report by the experience of energy transition pathways of Denmark, Germany and Scotland, illustrating that this should be seen as an ongoing process over several decades.
- To be effective, the transformation of energy systems should recognise that energy is as much a social concept as a commodity or infrastructure issue. This is highlighted by Lovins' concept of 'hard' and 'soft' energy paths, with the former representing the centralised, infrastructure focussed approach and the latter a more decentralised, socially-focussed (community) approach.
- An emphasis on the social dimension of energy suggests that trust (between and within regulatory bodies, developers, communities and consumers) should become a central concept to the energy transition process. This highlights how a growing scale (and change of ownership pattern) of wind energy projects (as experienced in Denmark) will increase the likelihood of social conflict and reduce trust (see Figure 2.2).
- There are multiple pathways towards a decarbonised energy system involving a range of energy sources, scales of technology implementation, alternative business models and spatial siting. Within these pathways there will be a multiplicity of inter-related areas to address. As a consequence, each country will have a range of pathways that are appropriate to its context depending on its economic, social, environmental context and the type of existing infrastructure and resource base. Despite this variability, there is much scope for international learning and knowledge transfer.
- The historic smaller scale sites (with 1-2MW turbines) and community scale developments have tended to be more socially acceptable, for example, Hilchenbach, Germany. However, with the push to meet targets scale is likely to increase creating the need to negotiate trade offs between scale and acceptance (see Figure 2.2). However, whilst in general, the correlation between scale and acceptance is clear (smaller scale, brings higher acceptance), the Joint Venture/shared equity examples in Scotland (see Earlsburn wind farm), Denmark (20% equity regulation), Germany (70% local value creation), and public involvement in the planning phase do change the rules of the negotiation process, and potentially create a situation where large scale and socially acceptable projects can be developed (such as Middlegrunden offshore wind farm in Denmark). This illustrates a potential inter-action effect between scale and acceptance: if scale is large and ownership is exclusively private, then acceptance is likely to be low. If scale is large and ownership is mixed, acceptance could be higher.
- Threats from poor industrial practices (ripple effects from negative procedural processes) can influence transition pathways; for example, the planning process for the test centre for large scale wind turbines in Jutland, Denmark was seen as closed and not accessible to local people, with the potential to exacerbate opposition to wind projects in a variety of niches, nation-wide. This is clearly a distinctive lesson for Ireland, placing a crucial onus on industry-wide good practice, particularly in the case of large scale, high profile projects but also community driven and small to medium scale projects where resources for assessments may be more limited.

8.4 Insights into Contexts and Practices and their relevance to Ireland

The objectives of this study were to understand the characteristics of wind energy deployment in three countries travelling a pro-active energy transition pathway. By investigating the different contexts and practices of these respective countries key characteristics and initiatives have been highlighted that might help or hinder progress within Ireland. The lens through which this was viewed was that of a social acceptance framework drawing on concepts which help tease out the multiplicity of factors that influence the social acceptance of wind energy and the need for upgraded grid infrastructure to optimise wind and other renewable electricity generating resources.

The key international insights, organised under the following categories, are presented in Table 6.1: Summary of Key International Insights:

- Procedural Justice
- Place Related Impacts
- Distributional Justice

8.4.1 Procedural Justice

Planning System

Transferable lessons in terms of the planning system are highly context specific (i.e. linked to natural law and property rights) and hence insights may be limited. In Germany the two stage consultation process with authorities, stakeholders and general public on spatial planning for wind and grid appears to have established a level of certainty for all stakeholders. Each municipality is effectively obliged to declare at least one zone for wind energy development. However, there are issues when applications are across municipality boundaries. The process has close links with the LARES and potentially what is required is a continued, resourced focus on this for Ireland with consideration of cross-boundary partnerships.

Public discourse

Public discourse was found (e.g. Scotland) to be heavily influenced by the media (often negative) and the greater connectivity of objectors (resulting in local protests becoming national with great speed). The implication of this is that industry practice must always be the best, as one bad experience can create a negative effect across the whole sector. This was particularly the case when projects of national interest may be in the planning process (e.g. Østerild, Denmark, Beauly-Denny, Scotland) and the centralised process may result in less careful consideration of social acceptance issues.

Consultation

Effective consultation is seen as a critical element of social acceptance. It needs to be done early, genuinely and frequently. It is important for achieving procedural justice for all scales of project. Regulation (e.g. in Scotland) has helped ensure that consultation is not just a tick box exercise by making it a pre-planning requisite which is assessed by local planning authorities. In addition to the potential for the introduction of pre-application consultation requirements, capacity building may be necessary for all stakeholders, including possibly deliberative engagement approaches (e.g. the Citizen's Jury pilot in Scotland) which helps participants engage with the totality of the decision making rather than single issues.

Intermediaries

Intermediaries (provision of expert advice) were seen as particularly beneficial (e.g. Wind Turbine Task Force, Denmark) in providing impartial advice (technical and planning) and engaging the community. A nationwide intermediary may help make better connections between national and local institutions and processes. Elements of this role are already provided by SEAI, IWEA and Meithal Na Gaoithe but there may be a need for a one stop shop approach for communities such as CARES, Scotland.

Research and development

In Germany the role of industry and science was noted as having an important role in the political and social change process required by the energy transition. Research and development can help drive technology innovation which may help reduce place-related impacts such as noise and visual effects which can be barriers to social acceptance. The Sixth Energy Programme approach includes strategic, inter-ministerial and international research with an overarching programme to harmonise and maximise value added.

Governance of community benefits

Whilst it was found that in Scotland community benefit was, in terms of governance, subject to guidance (e.g. Highland Council and CARES) and a public domain register (Scottish Government) it was not necessarily thought of as the panacea for social acceptance by communities and academics. For example, the register in Scotland is an important step in making this more transparent, however, without it being obligatory the information provided is limited to what the developer finds acceptable to reveal.

8.4.2 Place related impacts

Proximity

As mentioned above place related impacts can be a barrier to acceptance, especially for nearby residences. This is particularly complicated in Ireland due to the dispersed settlement pattern. The research suggests that proximity to dwelling should be a key constraint in site selection. In addition, there are interesting measures limiting thresholds of impacts such as 20dBA for night time levels (Denmark), Ireland is currently consulting on 40dBA (until February 2014) and in Germany the maximum exposure to shadow flicker per day is 30 minutes. Cumulative impacts of such effects from wind farms are of increasing concern to communities and are starting to be addressed strategically, for example SNH's guidance on the cumulative impact of onshore wind energy developments (2012).

Spatial Zoning

Spatial zoning is a tool that has been effectively used in several countries (e.g. Germany and Wales) although it tends to lend itself more to identifying areas that are not suitable for development rather than preferred areas. As a process however, it has the potential to engage all stakeholders to develop a consensual approach that could tie in with national planning, landscape strategy and tourism planning where potentially conflicting policy interests need to be resolved.

Summary

Procedural justice is as important and often intertwined with distributional justice. In Ireland there are some sound processes such as LARES that can continue to be built upon. This mirrors to an extent practices elsewhere, such as the German approach to identifying zones

for wind energy development. It is possible that there are lessons to be learnt from the consultation processes in Germany and closer investigation of these may be worthwhile.

Public discourse and the role of the media is an area for concern and underlines the importance of best practice but also of pro-actively engaging public and communities in discussions and debate about future energy pathways. Without this, responses to single projects are likely to continue to be reactive and subject to influence by the media and anti-campaigns.

Resolving proximity issues is critical to social acceptance. Government and industry need to show that they are listening to communities and residents and acting to address unacceptable impacts.

8.4.3 Further development to address procedural justice issues

Procedural justice is pivotal to increasing social acceptance. The key findings of the international research presented a number of measures and initiatives that warrant further development. These are as follows:

Energiewende – an equivalent holistic socio-technical approach in Ireland has the potential to address many of the issues of social acceptance and community engagement. This is discussed further in the National Report referred to Fuinneamh Feasts (Energy for the Future). The concept would be built from the bottom up, with local consultations that feed into the process. It would incorporate NREAP and the Green Energy Paper and provide the overarching approach from a social perspective.

Community Benefit 1– Increasing the transparency of different community benefit packages may help to standardise the approach and provide communities with a more informed negotiating position. Consider replicating Highland Council approach which provides a process of governance as well as the financial guidance. Consider setting up a Community Benefit Register for Ireland but in the context of distributional justice and consider next to other measures such as equity, local taxation and joint ventures. Negotiate with IWEA to ensure industry disclose benefit details fully and promptly.

Public discourse - The combination of the integrated planning system and informed public discourse provides a wider and deeper backdrop within which the public may support specific projects. This may help counter balance negative media and anti-wind campaigns stimulating genuine and effective discourse between politicians, public and media which could provide a more stable back drop to social acceptance of appropriate projects in Ireland and in turn help communities to engage more effectively in wind energy deployment. It is suggested that Ireland reviews existing activities and their potential impact (e.g. communication and education campaigns) and considers measures required to support public discourse.

Community consultation and engagement – The quality of consultation and engagement has been shown to have a direct effect on the level of support or objection to new developments. It is worth considering developing communication standards for community engagement. Investigating ways of ensuring that these are applied at all scales of development. Consider the introduction of pre-application consultation requirements for new wind and grid developments. Consider capacity building for all stakeholders before any roll out of new engagement consultation/regulations.

Deliberative engagement – the Citizen's Jury approach currently being trialled in Scotland is worth investigating further. It could be a complementary activity to public discourse initiatives to develop understanding of the issues and decision making involved in wind farms. It may

also reach members of the public who are currently not engaged. A pilot study may be useful.

Intermediary – Technical advice is provided by a number of bodies in Ireland (e.g. SEAI and IWEA). The role of the Wind Turbine Task Force in Denmark and CARES in Scotland demonstrate the value of such intermediaries in terms of social acceptance. It may be timely to review the roles of different organisations in Ireland and any gaps in provision of intermediary support. Consider how an intermediary role may facilitate social acceptance (for example, making better connections between national and local institutions and processes) and the remit and delivery of such a role.

Place-related impacts – The international research found a number of initiatives designed to reduce or mitigate place-related impacts. These are important factors in social acceptance as the study interviews indicated, poor industrial practice and proximity issues can lead to challenging projects which in turn can fuel local and national objections to wider issues. There is currently a targeted review in relation to Noise, Proximity and Shadow Flicker in Ireland (consultation runs until February 2014). However, there may be additional value in consulting on a wider range of noise thresholds, set back distances and shadow flicker regulations. It may also be worth exploring the possibility of compensation (or purchase) where proximity issues cannot be resolved for existing as well as future sites. It is suggested that this is devised and co-produced with local authorities; otherwise, it is less likely to succeed.

8.4.4 Distributional Justice

A community business tax is suggested (similar to the German model) which ensures that proportionally more benefits are distributed within the locality of the wind farm than leaving the area to be accrued elsewhere (e.g. in the location of the headquarters of developer/operator). This would help to address the balance of distributional impacts compared to benefits for the local community. It could be an additional measure to the local commercial rates already raised from wind farms.

It is worth considering the incentivisation of repowering (as in Germany) as this could help make the most of existing sites. It would also provide an opportunity for communities to renegotiate terms such as equity and benefit as well as to address other areas of concern such as habitat management and restoration. In addition repowering can stimulate the reuse and recycling market for turbine components which can provide local economic opportunities.

Community equity is generally seen as a more effective route to creating local value than community benefit and was noted as a more important aim by interviewees (Scotland, Denmark and UK). In addition to it potentially yielding more value it gives people an active role, long term in the project (enhancing the chances of procedural justice). Affordability of share prices would need to be considered and the appropriate level of equity (20% in Denmark, 51% in Germany, and a target of 500MW in Scotland). Such a scheme needs to be devised and designed with key stakeholders to understand the requirements and likelihood of success. The development of community equity guidelines would be beneficial.

From wider research including the UK, there are a number of Joint Ventures which may provide model approaches. Including JVs between local authorities and companies (e.g. Woking Council), plus community examples such as Neilston Community Wind Farm in Scotland. It is worth considering whether adopting a regulatory approach obliging companies to share equity would assist an energy transition or not. And if such regulation should suggest a target figure as a floor or ceiling, for example the Danish target of 20% may be

considered low compared with instances of certain projects such as Neilston (50%) and the German Burgerwindparks.

Summary

Creating local value is likely to be a way of increasing social acceptance and community engagement in wind energy and the associated grid power lines. Measures that improve the distributional justice of the costs and benefits of developments have long term implications for communities over the project's operational life time. This is particularly important in areas of socio-economic deprivation. It is therefore suggested that initial policies attempt to improve and standardise the current benefit offers, whilst putting in place new regulations to encourage equity (and JVs) in the medium and long term. The opportunity to allow people to buy equity only really arises at the development stage so the longer the equity approach is put off the more limited the scope for applying it, although there is potential to apply it at other stages of the project such as repowering and change of ownership. The potential for joint ventures and ways of building capacity within the community (through intermediaries or public bodies) would also be useful to explore. A community business tax would be a further measure that ensures the redistribution of profits to the host community.

8.4.5 Further development to address distributional justice issues

Distributional justice can be addressed in a number of ways, such as community tax, feed-in-tariffs, community benefit and community equity. The following initiatives are seen as warranting further exploration:

Community Business Tax (Germany) - Conduct cost/benefit analysis of introducing such a mechanism which ensures that a higher proportion of tax is retained in the local community.

Feed-in-Tariff – REFIT incentivises new sites but could also be used to incentivise repowering older sites. This can help optimise energy generation from existing sites which are already familiar in the landscape. Repowering can also provide and opportunity for renewed consultation and community engagement including arrangements for equity and/or benefit.

Community Equity 1 – a scheme similar to the Danish 20% equity is worth exploring. It would be important to assess affordable share prices in Irish context (examples have ranged from €125 to €2500) and the appropriate level of equity to be released to community members (is 20% too high or too low?). An equity scheme for Ireland should be devised and designed with key stakeholders (community and developers) to understand requirements and likelihood of success. Public bodies may also wish to look at social justice/affordability issues.

Community Equity 2 - a target such as Scotland's 500MW community ownership target is worth considering to drive forward community ownership but is likely be more effective if supported by other measures both financial and intermediary. Investigate how best to define community in a workable way (see alternative UK definitions that include or exclude depending upon charitable status, source of funding etc.). Consider the appropriate target level. It would also be worthwhile exploring the potential for Joint Ventures.

Community Equity 3 – The option to purchase scheme in Germany gives preference to local investors in share distribution. This works well in the context of Energiewende and may work comparably in Ireland with the potential for a holistic context developed with the ETP and county level plans. Further development could include; each county reviewing potential areas where community driven wind farms would be more appropriate; identifying support required such as; capacity, finance, planning advice, legal negotiations; developing equity

guidelines. It would also be worthwhile considering applicability for new power lines. Evaluating and consulting with communities on appropriate target level would contribute to procedural and distributional justice and help increase social acceptance.

Table 8.1
Summary of Key International Insights

Practice Category	Country	Is it effective?	Relevance for Irish Context
Distributional Justice			
Creating local value			
Financial Mechanisms	Germany	Yes, law mandating 70% of profit into municipal area.	As larger scale developments come forward in Ireland driven by the need to meet targets (and as an economic opportunity) such a mechanism will help redistribute benefits locally. It would give a positive message to host communities and encourage economic development in the area.
Feed In Tariffs	Germany	Yes but of diminishing influence.	Incentivising repowering may be worth considering for Ireland. This could help make the most of existing sites which are currently part of the landscape. It would provide an opportunity for communities to renegotiate terms such as equity and benefit.
Community Benefits	Scotland	Yes to an extent	No regulation or transparency of levels of community benefit. Standardisation would be beneficial. However, negotiation in itself can be inequitable due to varying capacity levels of different communities.
Equity			
Option to purchase	Denmark	Enables those living close to sites with turbines to have the option of purchasing 20% shares.	Equity is seen as a more sophisticated route to creating local value than community benefit. Gives people an active role in a project, not just being a passive recipient of benefit offers. However, an affordable price is essential – need to be sensitive to this in Ireland. Potential to link with Meitheal Na Gaoithe.
Option to purchase	Germany	Yes (recent research suggests that 51% of German renewable energy is citizen owned[71]). 'Burgerwindparks' (Citizens' wind farms)	Worth considering areas where community driven approach may be more appropriate than external corporate approach. Alternatively, Joint Venture may work. Guidelines for equity provision may help create more level playing field between communities and developers in Ireland.

[71] Morris, C. (2013) Citizens own half of German renewable energy. Available at http://energytransition.de/2013/10/citizens-own-half-of-german-renewables/

Community ownership	Scotland	Yes as it sends the message that the government values community owned and driven projects (not just corporate driven ones). Community capacity questionable as projects can take years to develop.	Could send out a signal of strong leadership from Irish Government about the types of wind project they want to see more of. Target alone insufficient – a process to meet the target, including capacity building, perhaps drawing existing intermediary organisations such as Meitheal na Gaoithe and Energy Agencies, would help. JVs could also help align communities, developers and authorities.
Joint Ventures	Scotland	Yes, there is potential for joint ventures (e.g. between companies and communities) to develop onshore wind farms in a socially acceptable way that ensures local benefits.	Has the potential to ameliorate conflicts between communities and companies. Will depend upon willingness of private sector to adopt alternative business model.
Procedural Justice			
Policy and Planning			
Energiewende	Germany	Yes, especially as the two stage process involves consultations with authorities, stakeholders and general public. However, the northern areas are now resisting the cumulative effect of their contribution to national targets and expect a balance of effort/acceptance from the more populated and wealthier southern areas.	A more integrated and comprehensive planning system would be beneficial to Ireland. This would help give certainty to all stakeholders.
National Energy Transition Policy	Scotland	Yes	An even more integrated and comprehensive planning system may be beneficial to Ireland. This would help give certainty to all stakeholders.
Register of Community Benefits	Scotland	Yes An emerging resource – only works if companies prepared to voluntarily disclose benefit details.	Transparency with regards to community benefit in Ireland would engender a more open approach and empower communities in benefit negotiations.
Public discourse			
Education and research programme	Germany	Yes	The combination of the integrated planning system and informed public discourse provides a wider and deeper backdrop within which the public may support specific projects. May help counter balance negative media and anti-wind campaigns.

Positive discourse	Scotland	Yes but challenged by negative media stance and emergence of objector groups.	Genuine and effective discourse between politicians, public and media could provide a more stable back drop to social acceptance of appropriate projects in Ireland. It could help communities to engage more effectively in wind energy deployment.
Consultation			
Community consultation and engagement	Denmark	Recently experience of consenting process and community engagement has been less positive, especially in relation to large scale developments.	Procedural justice is important at all scales of project, and particularly at larger scales where developer is external to the community and impacts are larger. One case of poor practice can affect the whole sector.
Community consultation and engagement	Scotland	Yes	Ensure that consultation perceived to be more than a tick-box exercise, and the consultation opportunities are perceived to be meaningful by communities or objectors.
Citizens' Jury approach	Scotland	Too soon to know but one to watch	Goes beyond providing information to communities. Can enable public values to be incorporated into planning and decision-making processes, if conducted properly.
Intermediaries (provision of expert advice)			
Wind Turbine Task Force	Denmark	Yes	Could help to build capacity amongst local authorities and to increase standardisation across local council boundaries. Could help develop trust in the technical data related to the planning and environmental impacts of wind energy in Ireland if this does not currently exist.
Clearingstelle	Germany	Yes, in terms of dispute resolution	A central point with the legal and technical knowledge to address disputes may be useful in Ireland. In particular it would help gather data on issues of dispute, establish standards for resolving these and limit the negative effect of unresolved disputes on the rest of the industry.
Community And Renewables Energy Scheme (CARES)	Scotland	Yes	CARES combines the role of intermediary and enabler for community energy schemes. It is funded by central government. A nationwide vehicle such as CARES could provide more accessible and consistent support to communities in Ireland.
Place-related impacts			
Noise	Denmark	Yes	Addressing potential noise impacts in this way is likely to reduce one of the sources of objection to wind projects. It could offer a clear message that developers and industry are listening to communities who are effected by noise.
Noise and Shadow flicker	Germany	Yes	Addressing immediate environmental impacts has been found to dissipate in-acceptance. Persistent environmental nuisance for one household can trigger a much larger scale objection.

'Cumulative landscape impacts'	Scotland	Yes but relatively new	Cumulative impacts are of increasing concern to communities and need to be addressed at a strategic level.
Proximity	Scotland	Partially	Ireland is consulting on 40dB threshold this is higher than Denmark, Germany and Scotland. Proximity issues can snowball into significant objections and delays in the consenting process. Negative experience result in poor social acceptance legacy.
Place-related impacts			
Spatial zoning	Germany	Helps to ensure that areas deemed not suitable for wind energy (e.g. 'wild lands') development are preserved. May be better at identifying areas that are NOT suitable for development rather than vice versa (see Wales, Cowell interview).	Must be implemented in a participatory and consensual manner, with all key stakeholders, including local authorities. Could tie in with a national planning or landscape strategy. Also with tourism planning. Could help to clarify and standardise local authority positions

9.0 CLOSURE

This report has been prepared by SLR Consulting Limited (informed by academic guidance from Queen's University Belfast and University of Exeter), with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of National Economic and Social Development Office no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Appendix A

REFERENCES

Agnolucci, P. (2007). Wind electricity in Denmark: a survey of policies their effectiveness and factors motivating their introduction. Renewable and Sustainable Energy Reviews, 11, pp. 951-963.

2012 Amendment of the Renewable Energy Sources Act -EEG-

Aitken, M. (2010) Wind power and community benefits – Challenges and opportunities. Energy Policy, 38, 6066-6075.

Barry, J. Ellis, G. Robinson, C. (2008). Cool rationalities and hot air: A rhetorical approach to

understanding debates on renewable energy. Global Environmental Politics, 8, 67–98.

Batel, S. Devine-Wright, P. and Tangeland, T (2013) Social acceptance of low carbon energy and associated infrastructures: A critical discussion, Energy Policy 58: 1-15

Breukers, S and Wolsink, M. (2007) Wind power implementation in changing institutional landscapes: An international comparison, Energy Policy 35: 2737–2750

Buchan (2012) The Energiewende- Germany's Gamble, The Oxford Institute for Energy Studies

Catney, P. MacGregor, S, Dobson, A. Hall, S.M. Royston, S. Robinson, Z. Ormerod, M and Ross, S. (2013) 'Big society, little justice? Community renewable energy and the politics of localism', Local Environment: The International Journal of Justice and Sustainability

Chmutina, K. Sherrif, G. and Goodier, C. (2013): Success in international decentralised urban energy initiatives: a matter of understanding?, Local Environment: The International Journal of Justice and Sustainability

Comhar (2011) Community Renewable Energy In Ireland, Policy Paper, Comhar and Trinity College Dublin.

Community Benefits from Wind Power- A Study of UK Practice & Comparison with Leading European Countries- Report to the Renewables Advisory Board & DTI

Cowell, R. (2010). Wind power, landscape and strategic, spatial planning—The construction of 'acceptable locations' in Wales, Land Use Policy, Vol, 27, No.2, pp. 222-232

Cowell et al (2012) Wind Energy and Justice for Disadvantaged Communities, Joseph Rowntree Foundation

Cowell, R., Bristow, G., Munday, M. and Strachan, P. (2008) Wind Farm Development in Wales:

Assessing the Community Benefits, A Research Project for the Welsh Assembly Government (WAG) WAG: Cardiff.

Cowell R., Bristow, G. and Munday, M. (2011) Acceptance, acceptability and environmental justice: the role of community benefits in wind energy development, Journal of Environmental Planning and Management, 54(4): 539-557

Cowell, R. Ellis, G., Sherry-Brennan, F. Strachan, P.A. and Toke, D. (2013) Promoting Renewable Energy in the UK What Difference has Devolution Made?. A research project

funded by the Economic and Social Research Council (RES-062-23-2526) Initial Findings, 23rd January 2013

Danish Commission on Climate Change Policy (2010) Green Energy- the road to a Danish energy system without fossil fuels

Danish Energy Agency (2011-2012) Evaluation of legal buyers system on the Act on Promotion of Renewable Energy, Climate, Energy and Building Committee.

Danish Energy Agency (November 2009):"Wind Turbines in Denmark", www.ens.dk

Danish Wind Turbine Owners' Association (2009), *'Cooperatives – a local and democratic ownership to wind turbines*', http://www.dkvind.dk/eng/index.htm

Danish Wind Turbine Association (2009): Danish Survey, Megafon http://www.windpower.org/download/359/091009_Megafon_Befolkningsunders%F8gelse.pdf

Danish Energy Agency, Statistic, www.ens.dk

Danish Energy Agency (2008): "Renewable energy act", www.ens.dk

Danish Ministry of Climate, Energy and Building, DK Energy Agreement, March 22 2012 (http://www.stateofgreen.com/)

Department of Energy and Climate Change (2011) UK Renewable Energy Roadmap

Department of Environment, Community and Local Government (2013) Target Review in relation to Noise, Proximity and Shadow Flicker

Department of Environment, Heritage and Local Government (2006) Planning Guidelines for Local Authorities in Wind Energy Development.

Devine-Wright, P. (2007) Reconsidering public attitudes and public acceptance of renewable energy technologies: a critical review. Manchester: University of Manchester,

Devine-Wright, P. (2009). Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. Journal of Community & Applied Social Psychology, 19(6), 426-441.

Devine-Wright, P. and Howes, Y. (2010) Disruption to place attachment and the protection of restorative environments: a wind energy case study. Journal of Environmental Psychology, 30, 271-280.

Devine-Wright, P. (2011) Public engagement with large-scale renewable energy: breaking the NIMBY cycle. Wiley Interdisciplinary Reviews: Climate Change, 2, 19-26

Devine-Wright, P. (2011) Place attachment and public acceptance of renewable energy: a tidal energy case study. Journal of Environmental Psychology, 31, 336-343.

Devine-Wright, P. (2011) From backyards to places: public engagement and the emplacement of renewable energy technologies. In: Devine-Wright P, (Ed.) Public Engagement with Renewable Energy: From NIMBY to Participation. London: Earthscan, pp. 57-70.

Devine-Wright, P. (2012) Explaining 'NIMBY' objections to a power line: The role of personal, place attachment and project-related factors. Environment and Behavior, 45, 761-781

Devine-Wright, P. (2011) Public engagement with large-scale renewable energy: breaking the NIMBY cycle. Wiley Interdisciplinary Reviews: Climate Change, 2, 19-26.

EirGrid Group Annual Renewable Report 2012

Eirgrid (2010) Grid 25, A Strategy for the Development of Ireland's Electricity Grid for a Sustainable Future

Ellis, G. , Barry, J. and Robinson, C . (2007) 'Many ways to say 'no', different ways to say 'yes': Applying Q-Methodology to understand public acceptance of wind farm proposals', Journal of Environmental Planning and Management, 50 (4): 517 – 551

Ellis, G. Cowell, R. Sherry-Brennan, F. Strachan, P. and Toke, D. (2013) 'Planning, energy and devolution in the UK', TPR, 84(3): 397-409

Eltham, D. Harrison, G. P. Allen, S. (2008) 'Change in public attitudes towards a Cornish wind farm: Implications for planning', Energy Policy 36: 23–33

Evans, B. Parks, J. and Theobald, K. (2011) Urban wind power and the private sector: community benefits, social acceptance and public engagement, Journal of Environmental Planning and Management, Vol. 54 (2): 227–244

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research policy, 31(8), 1257-1274.

Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. Research policy, 36(3), 399-417.

German Wind Energy Institute (DEWI) statistics. Available on: http://www.wind-energie.de/en/infocenter/statistics

German Wind Energy Association 'Community Wind Power- local energy for local people' document. Available on: www.wind-energie.de/en

Haggett, C. (2008) Over the Sea and Far Away? A Consideration of the Planning, Politics and Public Perception of Offshore Wind Farms, Journal of Environmental Policy & Planning, 10(3): 289-306

Haggett, C (2013). Social Assets in Community Renewables

Haggett, C. (2013) 'The Social Experience of Noise from Wind Farms'

Hall, N. Ashworth, P, Devine-Wright, P. (2013) Societal acceptance of windfarms: Analysis of four common themes across Australian case studies, Energy Policy 58: 200-208

Hopkins, R. (2008) The transition handbook: from oil dependency to local resilience. Chelsea Green Publishing.

Horbaty, R. Huber, S. and Ellis, G. (2012) 'Large-scale wind deployment, social acceptance', WIREs Energy Environ 1: 194–205

Huber, S, Horbaty, R. and Ellis, G. (xxxx) 'Social Acceptance of Wind Power Projects: Learning from Trans-National Experience'.

Humphreys, E. Tipperary Institute, Social Capital – The Explanatory Factor in Effective Socio-economic Regeneration of Disadvantaged Neighbourhoods.

International Renewable Energy Agency: Renewable Energy Country Profile- Denmark (http://www.irena.org/REmaps/countryprofiles/Europe/Denmark.pdf)

IEA Wind Task 28, 'Social Acceptance of Wind Energy Projects- Winning Hearts and Minds', State of the Art Report, Country Report of Denmark'

IEA wind (2013) Expert Group Summary On Recommended Practices 14. Social Acceptance of Wind Energy Projects

IEA, Energy Policies of IEA Countries- Germany 2013 Review

IEA, Policies and Measures Database. Available on: http://www.iea.org/policiesandmeasures/pams/germany

Iglesia, G. Del Rio, P and Dopico, J. A. (2011) Policy analysis of authorisation procedures for wind energy deployment in Spain, Energy Policy 39: 4067-4076

IRENA-GWEC: 30 YEARS OF POLICIES FOR WIND ENERGY See: http://www.irena.org/DocumentDownloads/Publications/GWEC_Germany.pdf

Jobert, A. Laborgne, P. and Mimler, S. (2007) Local acceptance of wind energy: Factors of success identified in French and German case studies, Energy Policy 35: 2751–2760

Jolivet, E. and Heiskanen, E. (2010) Blowing against the wind—An exploratory application of actor network theory to the analysis of local controversies and participation processes in wind energy, Energy Policy 3: 6746-6754

Jones, C. and Eiser, J. (2009) 'Identifying predictors of attitudes towards local onshore wind development with reference to an English case study', Energy Policy 37: 4604–4614

Jones, C. and Eiser, J. (2010) ' Understanding 'local' opposition to wind development in the UK: How big is a backyard?' Energy Policy 38: 3106–3117

Jones, C. Orr, B. and Eiser, J. (2011) 'When is enough, enough? Identifying predictors of capacity estimates for onshore wind-power development in a region of the UK', Energy Policy 39: 4563-4577

Journal of Ecocriticism. ISSN 1916-1549, Vol 5, No 2 (2013) Challenges to an Irish Eco-Criticism John Foster

Kemp, R. (2011). The Dutch energy transition approach. In International Economics of Resource Efficiency (pp. 187-213). Physica-Verlag HD.

Ladenburg, Jacob (2007): 'Attitudes towards on-land and offshore wind power development in Denmark; choice of development strategy', Renewable Energy 33 (2008) 111–118

Ladenburg, Jacob (2008): "Visual impact assessment of offshore wind farms and prior experience". Applied Energy 86 (2009) 380–387

Lantz, E., Wiser, R., Hand, M. IEA Wind Task 26, The Past and Future Cost of Wind Energy, WP

Lipp, J. (2007) 'Lessons for effective renewable electricity policy from Denmark, Germany and the United Kingdom', Energy Policy 35: 5481–5495

Multilateral Working Group on Solar and Wind Energy Technologies (2011) Opportunities for Economic Value Creation along the Solar and Wind Value Chain

Lipp, J. (2007) 'Lessons for effective renewable electricity policy from Denmark, Germany and the United Kingdom', Energy Policy 35: 5481–5495

Local Environment (2013): Exploring how stakeholders in two community wind projects use a “those affected” principle to evaluate the fairness of each project's spatial boundary, Local Environment: The International Journal of Justice and Sustainability

Loorbach, D. A. (2007). Transition management: new mode of governance for sustainable development. Erasmus University Rotterdam.

Lovins. A.B. 1977. Soft Energy Paths: Toward a Durable Peace, Penguin: Harmondsworth.

Maal-Bared, R. (2006). Comparing environmental issues in Cuba before and after the Special Period: Balancing sustainable development and survival. Environment international, 32(3), 349-358.

Mander (2008) 'The role of discourse coalitions in planning for renewable energy: a case study of wind-energy deployment', Environment and Planning C: Government and Policy 26: 583-600

McLaren Loring, J. (2007). "Wind energy planning in England, Wales and Denmark: Factors influencing project success." Energy Policy 35(4): 2648.

Morris, C. (2013) Citizens own half of German renewable energy

Munday, M. Bristow, G. and Cowell R. (2011) 'Wind farms in rural areas: How far do community benefits from wind farms represent a local economic development opportunity?', Journal of Rural Studies 27: 1-12

Musall, F. D. and Kuik, O. (2011) Local acceptance of renewable energy—A case study from southeast Germany, Energy Policy 39: 3252-3260

Nadai A. and Van der Horst D. (2010). Wind power planning, landscapes and publics. Land Use Policy 27, 181-184.

Parkhill, K.A., Demski, C., Butler, C., Spence, A. and Pidgeon, N. (2013) Transforming the UK Energy System: Public Values, Attitudes and Acceptability – Synthesis Report (UKERC: London).

Parks, J.M. and Theobold, K. (2011) Public engagement with information on renewable energy development: The case of single semi-urban wind turbines, Public Understanding of Science, 22(1): 49-64

Renewable Energy Partnership (2004) To Catch the Wind, Community Ownership of Wind Farm

Rogers, J.C. Simmons, E.A. Convery, I. and Weatherall, A. (2008) 'Public perceptions of opportunities for community-based renewable energy projects', Energy Policy 36: 4217–4226

Rogers, J.C. Simmons, E.A. Convery, I. and Weatherall, A. (2012) Social impacts of community renewable energy projects: findings from a wood fuel case study, Energy Policy 4:, 239-247

Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: transition management in public policy. foresight, 3(1), 15-31.

Rowe G, Frewer LJ. A typology of public engagement mechanisms. Science Technology and Human Values 2005, 30:251–290.

Schweizer-Ries P, 2010, “Environmental-psychological study of the acceptance of measures for integrating renewable energies into the grid in the Wahle-Mecklar region (Lower Saxony and Hesse)”. Forschungruppe Umweltpsychologie

Scottish Government (2010) Community Renewable Energy Toolkit

Scottish Natural Heritage Commissioned Report No. 591 (2013) Research and guidance on restoration and decommissioning of onshore windfarms.

Simmie, J. (2012) Path Dependence and New Technological Path Creation in the Danish Wind Power Industry, European Planning Studies, 20:5, 753-772

Strachan, P.A., Cowell, R., Ellis, G., Fionnguala Sherry-Brennan, F. and Toke, D. (unpublished, 2013) Promoting community renewable energy in a corporate energy world: policy developments in the UK and the impacts of devolution. Paper under review.

Sustainable Energy Agency Ireland (2003) Attitudes Towards the Development of Wind Farms in Ireland

Szarka (2006) 'Wind power, policy learning and paradigm change', Energy Policy 34: 3041–3048

TLT Solicitors (2007) Bankable Models which Enable Local Community Wind Farm Ownership. A report for the Renewables Advisory Board and DTI

Toke (2005) 'Explaining wind power planning outcomes: Some findings from a study in England and Wales', Energy Policy 33: 1527–1539

Toke, D. Breukers, S. and Wolsink, M (2008) 'Wind power deployment outcomes: How can we account for the differences?', Renewable and Sustainable Energy Reviews 12: 1129–1147

Toke, D. Sherry-Brennan, F. Cowell, R. Ellis, G. and Strachan, P. (2013) 'Scotland, Renewable Energy and the Independence Debate: Will Head or Heart Rule the Roost?', The Political Quarterly, Vol. 84(1): 61-70

Van den Ende, J., & Kemp, R. (1999). Technological transformations in history: how the computer regime grew out of existing computing regimes. Research policy, 28(8), 833-851.

Warren, C. Lumsden, C. O'Dowd, S. and Birnie, R. (2005) ‘Green on Green’: Public perceptions of wind power in Scotland and Ireland, Journal of Environmental Planning and Management, 48(6): 853-875

Warren, C.R. and McFadyen, M. (2010) 'Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland', Land Use Policy 27: 204–213.

Welsh Assembly Government (2005) Technical Advice Note (TAN) 8: Renewable Energy, WAG, Cardiff.

Wind Energy in the BSR 2 (2011) Planning and licensing procedures for wind farms in the South Baltic Region- A guide for potential investors

Wolsink (2007) Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation, Energy Policy 35: 2692–2704

Wolsink, M. and Breukers, S.(2010) 'Contrasting the core beliefs regarding the effective implementation of wind power. An international study of stakeholder perspectives', Journal of Environmental Planning and Management, Vol 53 (5): 535-558,

Wolsink (2012) Undesired reinforcement of harmful 'self-evident truths' concerning the implementation of wind power, Energy Policy 48: 83-87

Wustenhagen, R. Wolsink, M. and Burer, M.J. (2007), Social acceptance of renewable energy innovation: An introduction to the concept. Energy Policy, Vol.5 (5): 2683-2691.

Zoellner, J. Schweizer-Reis, P. and Wemheuer, C. (2008) Public acceptance of renewable energies: Results from case studies in Germany, Energy Policy 36: 4136–414

SLR

global environmental solutions

AYLESBURY
7 Wornal Park, Menmarsh Road,
Worminghall, Aylesbury,
Buckinghamshire HP18 9PH
T: +44 (0)1844 337380

BELFAST
24 Ballynahinch Street, Hillsborough,
Co. Down, BT26 6AW Northern Ireland
T: +44 (0)28 9268 9036

BRADFORD-ON-AVON
Treenwood House, Rowden Lane,
Bradford-on-Avon, Wiltshire BA15 2AU
T: +44 (0)1225 309400

BRISTOL
Langford Lodge, 109 Pembroke Road,
Clifton, Bristol BS8 3EU
T: +44 (0)117 9064280

CAMBRIDGE
8 Stow Court, Stow-cum-Quy,
Cambridge CB25 9AS
T: + 44 (0)1223 813805

CARDIFF
Fulmar House, Beignon Close, Ocean
Way, Cardiff CF24 5PB
T: +44 (0)29 20491010

CHELMSFORD
Unit 77, Waterhouse Business Centre,
2 Cromar Way, Chelmsford, Essex
CM1 2QE
T: +44 (0)1245 392170

DUBLIN
7 Dundrum Business Park, Windy
Arbour, Dundrum, Dublin 14 Ireland
T: + 353 (0)1 2964667

EDINBURGH
No. 4 The Roundal, Roddinglaw
Business Park, Gogar, Edinburgh
EH12 9DB
T: +44 (0)131 3356830

EXETER
69 Polsloe Road, Exeter EX1 2NF
T: + 44 (0)1392 490152

FARNBOROUGH
The Pavilion, 2 Sherborne Road, South
Farnborough, Hampshire GU14 6JT
T: +44 (0)1252 515682

GLASGOW
4 Woodside Place, Charing Cross,
Glasgow G3 7QF
T: +44 (0)141 3535037

HUDDERSFIELD
Westleigh House, Wakefield Road,
Denby Dale, Huddersfield HD8 8QJ
T: +44 (0)1484 860521

LEEDS
Suite 1, Jason House, Kerry Hill,
Horsforth, Leeds LS18 4JR
T: +44 (0)113 2580650

LONDON
83 Victoria Street,
London, SW1H 0HW
T: +44 (0)203 691 5810

MAIDSTONE
19 Hollingworth Court, Turkey Mill,
Maidstone, Kent ME14 5PP
T: +44 (0)1622 609242

NEWCASTLE UPON TYNE
Sailors Bethel, Horatio Street,
Newcastle-upon-Tyne NE1 2PE
T: +44 (0)191 2611966

NOTTINGHAM
Aspect House, Aspect Business Park,
Bennerley Road, Nottingham NG6 8WR
T: +44 (0)115 9647280

SHEFFIELD
STEP Business Centre, Wortley Road,
Deepcar, Sheffield S36 2UH
T: +44 (0)114 2903628

SHREWSBURY
Mytton Mill, Forton Heath, Montford
Bridge, Shrewsbury SY4 1HA
T: +44 (0)1743 850170

STAFFORD
8 Parker Court, Staffordshire Technology
Park, Beaconside, Stafford ST18 0WP
T: +44 (0)1785 241755

WARRINGTON
Suite 9 Beech House, Padgate Business
Park, Green Lane, Warrington WA1 4JN
T: +44 (0)1925 827218

WORCESTER
Suite 5, Brindley Court, Gresley Road,
Shire Business Park, Worcester
WR4 9FD
T: +44 (0)1905 751310