

Nuclear Free Local Authorities briefing



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Subject: How Ireland can benefit from a 'Renewables Revolution' in its future energy policy

1. Background to briefing

This briefing has been developed by the NFLA Policy Advisor Pete Roche, with some additional information provided by the NFLA Secretary, Sean Morris. It is the third of a series of four reports looking at future energy policy in Ireland, England, Scotland and Wales. It promotes the NFLA's approved policy that a combination of a wide renewable energy mix, microgeneration and energy efficiency can provide the energy needs for each country without recourse to new nuclear power generation.

The Scottish energy system was considered in NFLA Policy Briefing 76 – '**Scotland's electricity needs – can they be met from renewables without recourse to nuclear?**' and this will be updated shortly. English energy policy, and positive local government involvement within it, was considered in NFLA Policy Briefing 86 – '**Realising English 'Renewables Revolution' in future energy policy**'. A briefing on Welsh energy policy is also being developed.

"To the Germans, "energy revolution" is spelled j-o-b-s."
Ulrich Beck, German Sociologist and member of the special expert commission appointed by Chancellor Merkel in the wake of the Fukushima disaster, 30th July 2011. (1)

2. Introduction

Ireland's boom years of the 1990s saw an average annual rate of GDP growth of 9% - three times the European average. Energy demand over the past twenty years has virtually doubled. The transport sector saw particularly high growth in primary energy demand with car ownership growing from 31% of adults in 1990 to 55% in 2007.

This has left Ireland with a legacy of dependency - almost 90% of the energy it uses is provided by imported fossil fuels. And yet Ireland is endowed with some of the most powerful wind and waves on the planet, plentiful solar energy and sustainable biomass. The country has the potential to produce an estimated 300% of its energy demand with renewable energy. (2)

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The Irish Republic's contribution to the EU's commitment under the Kyoto Protocol is to limit its growth in greenhouse gas emissions to 13% above the 1990 levels in the period 2008-2012. (3) The EU has adopted a much more challenging reduction target for 2020. Ireland is expected to reduce emissions from sectors not covered by the EU Emissions Trading Scheme (EU ETS) by 20% compared with 2005. (4)

At the same time, of the almost 1.5 million households in the Republic, 60,000 (4.3%) are estimated to live in persistent fuel poverty and a further 160,000 or so experience intermittent fuel poverty – making a total of almost 15%. (5) One study for the Sustainable Energy Authority of Ireland (SEAI) puts the figure as even higher at more than 300,000 households or 19%. (6)

In Northern Ireland the Department for Social Development says a staggering 44% of the population live in fuel poverty. (7) According to the Public Health Policy Centre the Republic of Ireland and Northern Ireland have among the highest levels of excess winter mortality in Europe, with an estimated 2,800 excess deaths on the island over the winter months. Increases in fuel prices are likely to frustrate efforts to tackle fuel poverty on the island by driving already-poor households deeper into debt and plunging 'new' households into fuel poverty. Improving the thermal efficiency of the island's dwelling stock is imperative to tackle fuel poverty and reduce greenhouse gas emissions. (8)

This means that the whole island of Ireland faces two urgent and over-riding challenges which are sometimes seen as being in conflict with each other —to rapidly reduce greenhouse gas emissions using sustainable technologies, at the same time as tackling fuel poverty, and, in the case of the Northern Ireland Executive, eliminate fuel poverty by 2016.

It is difficult to see how the two Governments can meet both climate change and fuel poverty objectives without extremely ambitious energy efficiency and micro-generation programmes. A climate change focus that reinforces the solutions to fuel poverty means a greater emphasis on capital investment in the energy efficiency of our housing stock. (9)

Most of the properties standing today will still be in use in 2050, by which date greenhouse gas emissions will need to be cut by 80% for the health of the planet. A set of policies which can cut emissions from the domestic sector, but at the same allow those suffering from fuel poverty to maintain a warmer, healthier home will be required. To do this every house will need excellent insulation and some form of Low and Zero Carbon Technology – microgeneration or a connection to a community heating scheme. This means carrying out the refurbishment of virtually all the almost 2.2 million dwellings on the island over the next 40 years or 55,000 dwellings every year between now and 2050.

Irish local authorities can play a crucial role as the main providers of social housing in the Republic by leading the way in energy efficiency and microgeneration programmes, and by setting the right local economic development frameworks so that Ireland can realise its renewable energy goals. From fuel poverty busting solar panel installations on council housing to energy efficient street lighting schemes, to wood fuel biomass boiler installations in schools, councils can demonstrate how sustainable energy schemes can be used to tackle climate change and fuel poverty.

3. **Energy Consumption**

The Republic of Ireland's current annual energy requirement is about 190,000 Gigawatt hours (GWh)¹ per year (or 190 billion kWh) divided almost equally between power, heat and transport. (10) Despite the economic crisis from 2007 onwards, demand for energy has stayed close to its boom-time level and not fallen in proportion to economic contraction. Overall energy use remains almost twice the level it was before the economic boom and the average use per capita is some 40% higher. (11)

¹ A Gigawatt-hour is a million kilowatt-hours, or units of electricity, but the 190,000 GWh figure includes energy used for heat and transport as well as electricity.

The speed of growth in energy consumption over the past twenty years hasn't allowed the adoption of energy efficient behaviours and practices – while many other European countries managed to slow or reverse growth in energy consumption even as their economies were growing through energy efficiency Ireland's energy demand continued to rise. Energy requirements could increase by as much as 20% by 2020 if there are no efficiency improvements.

The Irish Government has set a target to achieve a 20% increase in energy efficiency by 2020 to mitigate this potential increase in energy requirements. (12) It is also committed to a target of delivering 16% of all energy from renewable sources by 2020 - 40% of electricity from renewable sources, 12% of heat and 10% of transport. (13)

The Sustainable Energy Authority of Ireland (SEAI) was set up by the Irish Government in 2002 as Ireland's national energy authority with the aim of playing a leading role in transforming Ireland into a society based on sustainable energy structures, technologies and practices. (14)

In March 2010 SEAI launched its five year strategic plan which aims to make new energy savings worth €6 billion over its lifetime and support 5,000 - 10,000 jobs every year. The plan sets out the opportunities and actions for Ireland to become a global leader in both the use of sustainable energy and clean technology where Ireland already has a considerable competitive advantage.

Within 25 years, SEAI Chief Executive, Professor Owen Lewis, says there are real opportunities for Ireland to reduce its import dependence and its carbon emissions, while at the same time creating jobs and enhancing competitiveness. Ultimately he wants to see Ireland exporting electricity to Europe. (15) This plan says this is far from a lofty aspiration. Ireland has the best wind and ocean energy potential in the world, and the sustainable energy agenda is already creating jobs. (16)

The Strategic Plan sees an increase in wind energy and local generation over the next five years, along with a large number of existing buildings being retrofitted to a high efficiency standard. By 2025 renewable energy should be providing 50% of Ireland's electricity supply within an active smart grid with marine energy starting to make a significant contribution. By 2035 Ireland should be exporting green electricity to Europe.

On renewable heat the Strategic Plan aims to remove any regulatory barriers to Combined Heat and Power and District Heating. For buildings the plan wants to see high energy efficiency as the norm for new buildings; a growing number of energy positive buildings (producing more energy than they consume) and a 20% energy saving by 2020.

The Strategic Plan was followed in November 2010 by a series of road maps on Ocean Energy; Bio Energy and Energy Efficiency. (17)

The Energy Efficiency road map says that residential carbon emissions could be reduced by 90% by 2050 through a sustained programme of retrofits and regulation improvements. (18) A Large scale roll-out of Low and Zero Carbon technologies (LZCT) will enable a shift from fossil based energy sources to a sector based largely on renewable energy sources and highly efficient micro-generation technologies. This kind of deep level retrofit programme could maintain around 10,000 jobs.

The Ocean Energy Plan estimates that ocean energy (wave and tidal power) has the potential to provide up to 29GW by 2050. (19) The Bio-Energy Roadmap proposes supplying 27% of total transport primary energy demand, 28% of total electricity demand and 40% of total heat demand through bio-energy by 2050. (20)

4. **Wind Energy and Ireland**

According to SEAI the accessible onshore wind resource by 2020 is around 36,701 GWh – so it could provide more than half of Ireland's electricity consumption. (21) SEAI also says that ultimately:

"There is enough onshore-accessible wind for about 100 percent of our electricity requirements." (22)

Wind energy accounted for 10% of all electricity in 2009 – an output of 2,955 GWh. (23) Total installed capacity reached 1,264 MW (Megawatts) by January 2010, compared to a peak demand in the Irish Republic of about 5,000 MW. Wind farms with an additional combined capacity of 219 MW for onshore wind and 52 MW for offshore wind had target connection dates during 2010. There is a further 155 MW contracted and a further 3,900 MW is proposed within the planning process. So wind capacity could exceed peak demand very soon.

According to *Travers* Ireland could provide 50% of its electricity from wind by 2020. This would only require an additional 170 6MW turbines offshore and 1,350 3MW turbines onshore. These additional turbines would create an extra 11,000 jobs. If it were to achieve this it would *"stand out as a world beacon on how to capture clean energy and stride towards energy independence"*. (24)

Experience from Denmark, where wind energy already provides 20% of electricity used, suggests that extra grid connections between Ireland and the UK and mainland Europe will be required to export surplus wind-powered electricity and import electricity when the wind doesn't blow.

Wind energy, on and off shore, could feasibly produce around 380,000 GWh of electricity per year – or about double Ireland's total energy demand, and thirteen times its current electricity consumption.

5. **Offshore Wind**

Ireland now has its first offshore wind farm – the 25MW capacity Arklow Bank project. The country's National Renewable Energy Action Plan (NREAP) is the first in the EU to include the substantial export of renewable electricity as part of the plan. It recognises the potential for 6,000MW of offshore wind of which 2680MW is in the planning stage with a further 4,000MW feasible within Irish coastal waters. The National Offshore Wind Association of Ireland (NOW) and the Irish Wind Energy Association (IWEA) estimate that another 5,000MW is possible, but there is also an unlimited potential in the Atlantic as deeper water technology develops. According to NOW, Ireland has potentially another 10,000MW of offshore wind capacity available for export or 70 – 80% of its total renewable resource. (25)

Ministers from the British-Irish Council signed an historic agreement in June 2011 to co-operate on exploiting the major wind and marine resource in and around the islands. The states involved agreed to co-operate in the 'All Islands Approach' to energy. UK Minister of State for Energy Charles Hendry pointed out that, whilst Ireland's renewable energy potential is enormous; its demand is only slightly larger than Yorkshire and Humberside, so there has been little incentive to exploit it. More interconnections between Ireland would mean that surplus wind energy could be sold to the UK and Europe. (26) A link connecting the grids of Ireland and Britain is already under construction and will stretch from Rush North Beach, Co Fingal, to Barkby Beach, north Wales. The Irish Sea Inter-Connector will cost £500m and have a capacity of 500MW. However, under the scheme discussed at the British-Irish Council meeting in June, other new links will also be built to open up a market for electricity for wind-farms on the west coast of Ireland whose power could be transmitted under the Irish Sea. (27)

6. Solar Energy

Despite the Irish climate, both solar thermal collectors for water heating and solar photovoltaic panels for generating electricity can operate successfully. If just 0.5% of land was covered in solar thermal collectors and another 0.25% in photovoltaic panels then about 185,000 GWh could be supplied each year – almost equivalent to Ireland's total energy consumption. If just one fifth of households place 10m² solar thermal collectors on their roofs and if energy-conscious companies used photovoltaic panels that replaced just 5% of electricity by 2020 some 3,000 GWh could be produced. (28)

Ireland has already installed solar thermal collectors which supply 250GWh per year which compares well with other European countries. This has been facilitated by support for solar thermal collectors from the government in the form of grants under the 'greener homes scheme'. But Ireland is well behind with regard to installing photovoltaic panels which do not get any kind of government support.

Expense is often seen as a serious barrier to the use of solar energy in Ireland but the costs of solar photovoltaic panels which generate electricity direct from sunlight are falling rapidly. (29) One report says costs are falling so fast that by 2013 solar panels will be half of what they cost in 2009. (30) The technology is advancing too. Soon it could be possible to print solar panels onto paper (31) or even paint them onto walls. (32) This technology could be appearing on computer keyboards to power computers when on stand-by by Christmas this year. Ernst & Young's recent report on the Outlook for the UK solar PV industry points to costs for solar electricity falling so that by 2020 the technology will be economic in the UK without any subsidy. (33) China expects to see parity between the cost of solar and other forms of electricity as soon as 2015. (34)

As a direct consequence of the far-sighted decisions taken by the German Government many years ago, and according to the German solar association, BSW-Solar; the costs of photovoltaic systems are falling rapidly. The average German retail price per kilowatt of power is currently around €2,400 whereas five years ago it was €5,000. This could lead to new solar power plants operating profitably by 2017 without any public subsidy – just two years later than China. (35) Germany plans to generate 50% of its day-time electricity from solar by 2020 – with an installed capacity of 52 GW (up from 17.5GW in 2010) 2,000 MW were installed in the month of June 2010 alone for example. (36) There is a growing realisation globally that solar energy could be the next big thing after the internet. (37)

The Irish Electricity Supply Board (ESB) says it will support 4,000 micro-generation installations (solar PV, small hydro, small wind and CHP) by paying 10% on top of its normal export tariff of 9c/kWh. (38) This is nowhere near the feed-in tariff introduced in Great Britain in April 2010 of up to 43.3p/kWh for solar electricity (plus 3.1p/kWh for each unit of electricity exported to the grid), and will not be sufficient to get an Irish solar PV industry off the ground. (39) At present in Britain there are almost weekly updates of new projects and plans by local authorities to generate their own electricity. Local authorities and social housing providers are starting to take the initiative by installing solar panels in order to tackle fuel poverty and reducing carbon emissions. (40)

In Northern Ireland, Power NI will help PV installers claim ROCs (Renewable Obligation Certificates) on all the electricity generated from solar panels and will also pay for electricity not used onsite. (41) Power NI also offers grants for solar photovoltaics (PV) from the Northern Ireland Sustainable Energy Programme (NISEP) of up to £5,000. Funds are limited and are administered on a 'first come, first served' basis.

7. Ocean Energy

Ireland has some of the best wave resources in the world. The average practically available resource is around 32,000 GWh per year – roughly equivalent to Ireland's current electricity consumption. The practical tidal energy available is around 2,600 GWh per year. (42) A

medium-term government target is to install 500MW of wave and tidal capacity in Ireland by 2020, which could produce about 650 GWh of electricity per year.

Two of the world's most advanced wave energy devices are designed and manufactured by Irish companies, Wavebob (43) and Ocean Energy. (44) Prototypes are being tested at a test site in Galway Bay. For tidal energy Openhydro, (45) based in County Louth and Marine Current Turbines which has its SeaGen anchored in Strangford Lough offer the best hope. Sea Gen is the world's only commercially operating tidal turbine feeding 10MWh per tide into the UK grid. (46)

8. **Biomass**

Readily available sources of biofuel, such as wood processing residues and recycled vegetable oil, which do not compete with food or stress land-use, could provide 12% of Irish transport needs – equivalent to 5,000 GWh per year. (47) A further 2,300 GWh could be generated if forestry wastes were used for heating and power generation, rising to 4,600 GWh over the next twenty five years as more trees are planted. Other biomass sources include methane from landfill sites which could provide around 158 GWh per year, and animal manure from agriculture which could be used to generate 140GWh worth of heat and power.

9. **Energy Efficiency**

Travers estimates that around 33,600 GWh of energy could be saved every year in Ireland by implementing a range of measures in homes, business, the public sector and transport. Over 1 million of Ireland's 1.7 million homes could benefit from investing in energy efficiency measures and cut energy bills by around €700 per year. On a national level an average investment of €65m each year to 2020 would achieve a 20% improvement in energy efficiency with an average payback to the economy of €340m per year – a huge return on investment. (48)

10. **Jobs**

In 2009 a study by the High Level Group on Green Enterprise for the Irish Government highlighted the potential to create more than 80,000 jobs in the renewable energy industries, retrofitting building for energy efficiency and managing waste in Ireland. (49) In 2010 alone 5,000 workers were employed retrofitting 60,000 Irish homes and actually saving €300m in future energy costs. (50).

11. **Conclusion**

This NFLA Policy Briefing has shown that the practically accessible renewable resource in Ireland amounts to around 675,000 GWh – or more than three times current demand – an enormous wealth of resources. (51) This provides Ireland with the opportunity to become a major energy exporter – equivalent to recent oil production in oil-rich Oman. Ireland's surplus energy would be enough to supply all the electricity needs of the UK and Belgium combined.

A practical and feasible first step might be to increase the target for the percentage of energy produced from renewable sources in 2020 from 16 to 20%.

With some of the worst levels of fuel poverty in Europe – almost a fifth of households in the Republic and up to 44% of the population in Northern Ireland, energy efficiency programmes and housing refurbishments must be a priority. Developing grid connections and continuing with research in wave and tidal energy can help Ireland build a renewable energy manufacturing base and maintain its global lead in ocean energy.

Extending feed-in tariffs to solar PV could help local authorities across the island of Ireland play a major role in the Europe-wide local energy revolution, as well as helping to tackle fuel poverty.

Local authorities in Ireland can lead the way in energy efficiency and micro-generation programmes. From fuel poverty busting solar panel installations on council housing to energy efficient street lighting schemes, to wood fuel biomass boiler installations in schools, councils can demonstrate how sustainable energy schemes can be used to tackle climate change and fuel poverty at the same time as making major savings in energy costs. Along with developing an industrial strategy to ensure authorities can make the most out of the upcoming boom in the offshore wind and ocean energy industries. Local authorities clearly have a major part to play in moving Ireland towards a sustainable energy future.

12. Annex: Energy in Numbers for the Irish Republic

Total Energy Consumption 2010	190,000 GWh (Gigawatts per hour a year)
Onshore Wind by 2020 (SEAI)	36,701 GWh
Feasible resource on & off shore	380,000 GWh
Peak Demand in Irish Republic	5,000MW
Offshore Wind Resource	21,000MW
Solar PV and thermal feasible programme	185,000 GWh
Ocean Energy practical resource	34,600 GWh
Biomass practical resource	10,000 GWh
Energy Efficiency savings	33,600 GWh
Total Practical Resources	675,000 GWh

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