Nuclear Free Local Authorities
briefing

Date: 28th July 2014 **No.124**

Subject: **NFLA All Ireland Forum response to the Irish Government's Green Paper on Energy Policy in Ireland.**

1. Overview of report

This report has been developed by the NFLA Policy Advisor, on the request of the NFLA All Ireland Forum. It provides its model submission to the Irish Government in reference to the Green Paper on Energy Policy in Ireland.

The Green Paper is asking for views on the shape of Ireland's future energy policy. A number of questions are posed in the Green Paper, but submissions do not have to be restricted to answering these. If individual Councils wish to make submissions they need to be sent by email by 31st July 2014 to greenpaper@dcenr.gov.ie or in writing to Energy Policy and Planning Unit, Republic of Ireland Government, Department of Communications, Energy and Natural Resources, 29-31 Adelaide Road, Dublin 2.

2. Background to NFLA response

This model submission, from the Nuclear Free Local Authorities (NFLA) All Ireland Forum, focuses on those parts of the Green Paper most related to nuclear energy and local authorities.

According to the Green Paper, cheaper gas has prompted the US to switch from coal-fired to gas-fired electricity generation. This shift has flooded the EU market with cheap US coal, which, along with the collapse in carbon prices, has dramatically increased coal-fired generation in the EU as the market responds to price signals.

This has meant that the Moneypoint coal-fired power station is able to produce electricity at lower prices and operate as baseload, whereas newer, cleaner, more efficient and less carbon-intensive gas-fired plants are operated less often.

Moneypoint is Ireland's only coal plant. It is nearing the end of its useful life, and is expected to close by 2025. Its total output of 915 MW supplied about 17% of electricity demand in 2013. The decision on how to replace Moneypoint's power generation will have to be taken soon. A decision on the role of coal in the Irish fuel mix needs to be seen in the broader context of sustainability, competitiveness and security of supply. If, consideration is given to using Moneypoint for future generation using coal, the issue of carbon capture and storage (CCS) for climate mitigation would also need to be explored.

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The Green Paper asks whether it might be the right the time to consider in greater depth the potential economic and technical **implications, of introducing a small nuclear reactor to replace the Moneypoint coal-fired power station** and to test public acceptance of nuclear generation located on the island of Ireland.

Electricity, heat and transport use energy in Ireland in approximately equal proportions. Natural gas provides around half of Ireland's fuel for electricity generation and peat and oil provides around a further 10%. Some 44% of Irish households used oil to heat their homes in 2011, with 34% using gas heating. Overall this means that almost 90% of Ireland's primary energy is provided by fossil fuel – most of which is imported. However, the importance of renewable energy has been increasing with 19.6% of electricity generated provided from renewable energy sources in 2012 (against a target of 40% by 2020); 5.2% of heat was provided by renewable sources in 2012 (against a target of 12% by 2020) and 2.4% of energy for transport was provided by renewables sources compared to a target of 10% by 2020. (1)

In previous reports, the NFLA All Ireland Forum has previously (2) pointed to estimates that as much as 300% of Ireland's energy demand could be provided by renewable resources. (3)

3. Small Nuclear Reactors

The International Atomic Energy Agency defines a small reactor as one with a capacity under 300MW compared with the two 1,600MW reactors planned for Hinkley Point C in Somerset or the two 660MW reactors at Hinkley Point B.

On 14th July the UK's outgoing Minister for Business and Energy, Michael Fallon, told Parliament that:
"*The* [UK] *Government is in the early stages of its consideration of small modular reactors (SMRs) and is awaiting the outcome of a feasibility study, led by the National Nuclear Laboratory with the support of a consortium formed from industry. The study will make initial recommendations on the economic, technical and commercial case for SMRs, and will inform the evidence base for any further development or action. Should industry or any other body propose to deploy an SMR in the UK then the independent regulators will ensure compliance of the design with safety, security and environmental legislation*." (4)

The House of Commons Energy and Climate Change Committee is taking evidence at the moment on SMRs. (5) The three companies developing SMRs which gave evidence to the Committee on 14th July called for greater co-operation between the UK and US regulators to smooth the reactors' path through the licensing process. (6)

The Generic Design Assessment (GDA), which was carried out by the Office for Nuclear Regulation and the Environment Agency, of the EPR reactor-type EDF Energy is proposing to build at Hinkley Point took almost five years from March 2008 to December 2012. The Regulators started preparatory steps to carry out a GDA for the Advanced Boiling Water Reactor-type which Hitachi-GE wants to build at Wylfa on Anglesey and Oldbury in Gloucestershire, in January 2013. This process is expected to take until 2017. A GDA for an SMR reactor might also be expected to take at least four years, so is unlikely to be ready before around 2020. As the Irish Government does not have a nuclear regulatory infrastructure it would have to rely on regulators in other countries such as the UK or USA.

Of course the GDA is only part of the process of planning a new nuclear programme. The UK finally decided to go-ahead with new reactors in January 2008 (7) and yet the first new reactor at Hinkley Point is not expected to be operational until at least 2023 – fifteen years later. It is possible that the Irish Government could act more quickly, but unlikely because it would be establishing a system of nuclear regulation completely from scratch. Given that the first SMR is not expected to be operational in the US until 2023 the possibility of having such a reactor up and running in Ireland by 2025 is remote. (8)

4. Economics of SMRs

The idea behind these Small Modular Reactors (SMRs) is that by mass-producing major components as standard modules in factories, and shipping the modules to sites for assembly rather than having each reactor custom-designed and built, substantial cost savings can be realised. Supporters also say they would be inherently safer than conventional designs.

SMRs have been receiving a lot of attention in the USA and elsewhere as a possible way of introducing nuclear generating capacity in smaller and more affordable increments. The NFLA shares the view of the Union of Concerned Scientists (UCS) say small is not necessarily beautiful. (9)

UCS says just because these reactors are cheaper doesn't mean to say they are cost effective. Economies of scale dictate that, all other things being equal, larger reactors will generate cheaper power. SMR proponents suggest that mass production of modular reactors could offset economies of scale, but a 2011 study concluded that SMRs would still be more expensive per kWh than current reactors. (10) Even if SMRs could eventually be more cost-effective than larger reactors due to mass production, this advantage will only come into play when many SMRs are in operation. But utilities are unlikely to invest in SMRs until they can produce competitively priced electric power. This 'Catch-22' suggests the technology will require significant government financial help to get off the ground. Dr. Mark Cooper, senior fellow for economic analysis at the Vermont Law School's Institute for Energy and the Environment agrees with UCS that SMRs are likely to have higher costs per unit of output than conventional reactors. (11)

SMRs are unlikely to breathe new life into the increasingly moribund U.S. nuclear power industry, according to the Washington-based Institute for Energy and Environmental Research (IEER). They will probably require tens of billions of dollars in federal subsidies or government purchase orders, they will create new reliability vulnerabilities, as well as serious concerns in relation to both safety and proliferation. (12) By spreading SMRs around the globe we will increase the proliferation risk because safeguarded spent fuel and numerous small reactors would be a much more complex task than safeguarding fewer large reactors. (13)

5. Safety of SMRs

The safety of the proposed compact designs is unproven—for instance, most of the designs call for weaker containment structures. And the arguments in favour of lower overall costs for SMRs depend on convincing the US Nuclear Regulatory Commission to relax existing safety regulations. The Fukushima accident has resulted in new safety requirements for existing and new reactors around the world. So the challenge is to lower the cost of nuclear reactor systems while increasing their levels of safety and security. (14)

Proponents also point out that smaller reactors are inherently less dangerous than larger ones. While this is true, it is misleading, because small reactors generate less power than large ones, and therefore more of them are required to meet the same energy needs. Multiple SMRs may actually present a higher risk than a single large reactor, especially if plant owners try to cut costs by reducing support staff or safety equipment per reactor.

Due to SMRs' alleged safety advantages, proponents have called for shrinking the size of the emergency planning zone (EPZ) surrounding an SMR plant from the current standard of 10 miles (in the USA) to as little as 1000 feet, making it easier to site the plants near population centres and in convenient locations such as former coal plants and military bases. However, the lessons of Fukushima, in which radiation levels high enough to trigger evacuation or long-term settlement were measured at as much as 20 to 30 miles from the accident, suggest that these proposals, which are based on assumptions and models that have yet to be tested in practice, may be over-optimistic, to say the least.

UCS argues that promoting the idea that SMRs do not require 10-mile emergency planning zones and encouraging the NRC to weaken other safety requirements just to facilitate SMR licensing and deployment is not the way forward. (15)

6. The future for SMRs does not look promising

The key weakness in the argument over developing SMRs is that there simply is not a market for them in the US, as it is difficult to find business for a technology that has not been developed, licensed or proven. The US Nuclear Regulatory Commission does not even have requirements or guidelines in place to license SMRs. For the global nuclear industry it costs a lot of money to be innovative. Building a supply chain from scratch, with few investors willing to bank on an unknown technology or customers willing to buy is virtually impossible. (16)

Of the four companies looking at SMR designs in the US, the Babcock & Wilcox Company (B&W), with their 180MR mPower reactor, was the first company to receive cost-sharing funds from the U.S. Department of Energy (USDOE). However, it has now had to cut 200 staff from its workforce, and slashed spending from $60 to $80 million per year to less than $15 million, and restructured its management. It is currently trying to sell up to 70% of the business (B&W plans to keep a 20 percent share and Bechtel will still own 10 percent), but it does not at present look like other companies wants to buy the business. As of November 2013, B&W had already invested more than $360 million in the Tennessee Valley Authority's Clinch River site in Tennessee, which was to be home to two mPower SMRs.

Westinghouse, which was once considered a clear favourite to win the second round of USDOE funding, was not only passed over for consideration, but eventually decided to pass up the opportunity to develop its 225-MW SMR in exchange for focusing on its global AP1000 market.

The Holtech SMR 160MW reactor lost out in the battle for USDOE funding to NuScale Power LLC which appears to be the only company staying in the race. NuScale just completed negotiations with the USDOE for its cost-sharing program, and is opening a regional operations centre in Charlotte. The company has signed an agreement with the USDOE to build a NuScale Power SMR demonstration unit at the Savannah River Site. The USDOE said it would provide $217 million in matching funds over five years to NuScale. But NuScale only gets the federal funds if it can match them with money from private investors, who so far have been wary of the technology. The company hopes to submit its design certification in the latter half of 2016. And it plans to have its first plant operating commercially by 2023. (17)

The Executive Director of the Bulletin of Atomic Scientists, Kennette Benedict, concluded that: "*Without a clear-cut case for their advantages, it seems that small nuclear modular reactors are a solution looking for a problem. Of course in the world of digital innovation, this kind of upside-down relationship between solution and problem is pretty normal. Smart phones, Twitter, and high-definition television all began as solutions looking for problems. In the realm of nuclear technology, however, the enormous expense required to launch a new model as well as the built-in dangers of nuclear fission require a more straightforward relationship between problem and solution. Small modular nuclear reactors may be attractive, but they will not, in themselves, offer satisfactory solutions to the most pressing problems of nuclear energy: high cost, safety, and weapons proliferation*." (18)

7. Diverting resources from renewables

Dr. Mark Cooper expresses perhaps the most serious problem from the point of view of developing an effective climate and energy policy for Ireland. He notes that large-scale development of "small modular reactors" (SMRs) in the USA would cost around $90 Billion – an amount that likely would be diverted from development of much more cost- and climate-effective renewable energy. It would undermine the effort needed to create the physical and institutional infrastructure to support the emerging electricity systems based on renewables, distributed generation and intensive system and demand management. Whether the reactor is large or small, nuclear power is among the least attractive climate change policy options because it is too costly, too slow, and too uncertain. (19)

8. Tackling climate change quickly

When it comes to tackling climate change, early reductions in carbon emissions are much more beneficial than reductions just prior to 2050 because this will mean a much more dramatic cut in cumulative emissions by 2050. Unlike nuclear power most renewables can be installed in a very short period of time.

For instance, while Hinkley Point C will not be able to contribute to energy security and reducing dependence on fossil fuels for another ten years, the solar industry could deliver the same amount of electricity every year as is expected to be produced Hinkley Point C within 24 months and at a comparable cost, according to Mark Turner, a director of Lightsource Renewable Energy. Solar could provide energy security quickly, reduce electricity bills and protect the environment at the same time. Turner says that while solar power will not be the entire solution it could provide quite a large percentage of the energy mix completely free from the vagaries of the global fossil fuel markets. (20)

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 $10m^2$ 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. (21)

Nuclear supporters tend to argue that without an energy storage breakthrough renewables cannot provide the same level of base load power as nuclear. (22)

The argument that renewable energy is not up to the task because "the sun doesn't shine at night and the wind doesn't blow all the time" is overly simplistic. There are a number of renewable energy technologies which can supply baseload power. The intermittency of other sources such as wind and solar photovoltaic can be addressed by interconnecting power plants which are widely geographically distributed, and by coupling them with peak-load plants such as gas turbines fuelled by biofuels or natural gas which can quickly be switched on to fill in gaps of low wind or solar production. Numerous regional and global case studies – some incorporating modelling to demonstrate their feasibility – have provided plausible plans to meet 100% of energy demand with renewable sources. (23)

9. Empowering Energy Citizens

One of the priority aims of the Green Paper is to "empower energy citizens". This appears to mean that householders can install energy efficiency measures or small-scale renewables. Consumers can also switch between retailers, and the introduction of smart meters will allow consumers to monitor use. But the NFLA sees no mention of promoting small-scale suppliers and community energy.

In other parts of Europe, such as in Denmark and Germany, there are hundreds of different types of companies involved in providing energy including local authorities, community co-operatives, small companies, farmers and individuals. Even in pro-nuclear Britain people are beginning to get seriously excited about the prospects for community energy. The sector is shifting from a niche activity run by hard-core pioneers to a potentially disruptive force that can be tapped into by any community. In January 2014, the UK Government launched a community energy strategy. This was only able to happen because there was already enough activity on the ground to make it look credible. (24)

A community-led renewable energy revolution in the UK is beginning to take shape. From Brighton to Bristol and Westmill in Oxfordshire to the Western Isles, people and communities are beginning to take control of their own energy and find that it can be enormously empowering, boosting a sense of what's possible among individuals and the community as a whole, and bringing a host of economic benefits to boot. Community Energy is about much more than just

producing low carbon energy – it's about 'energy democracy': a changed relationship between people and energy, from one where consumers are at the mercy of large profit-making energy providers and fluctuations in the market, to one where communities control, generate and benefit from their own energy supply. Many communities in Britain are fractured by social divisions and low collective self-esteem, and community energy projects can help address this malaise. (25)

One such community energy project is the Drumlin Wind Energy Co-operative in Northern Ireland. The Co-op will enable individuals and local organisations to become members and invest for a reasonable financial return in this new local enterprise. To date it has raised £2.7 million to build four 250kW WTN turbines on four separate sites in Northern Ireland (Cavanoneill, Aghafad, Ballyboley and Parkgate). Drumlin Co-op intends to build on this success and has launched a second share offer to raise up to £1.2 million for two further sites at Ballyrobert, Co. Antrim and Cavanakill, Co. Armagh each with a 250kW turbine. (26)

Similar projects are also being considered across a number of areas in the Republic. In March 2014 the Westport Renewable Energy Co-operative was established, and Energy Co-operatives Ireland is working on a number of other projects. (27)

Research by the UK's Energy Saving Trust has shown that by 2050 microgeneration, which includes small-scale renewables owned by individuals and communities, and combined heat and power plants, could provide 30–40% of the UK's electricity needs. In the NFLA's view, there is no reason why Ireland couldn't beat that.

10. Other issues - Farming Energy

The Green Paper does not discuss the possibility of renewable energy opportunities in farming at all. Yet a quiet revolution is underway on the other side of the Irish Sea as more and more farmers are investing in renewable energy. According to the UK's National Farmers Union, one in five of its members had produced clean electricity from solar or wind by the end of 2012. (28) Between 2011 and 2012 there was a 28% increase in the number of biogas plants, capable of providing both renewable electricity and heat from farm waste.

Yet, the current on-farm renewables capacity in Britain is tiny compared with Germany. By the end of 2010, German farmers owned over 10% of the country's renewable energy capacity, equivalent to over 5,700 MW. Compared with the UK's 78 biogas anaerobic digesters, there were 6,000 digesters in Germany by 2010, with plans to double capacity by 2020. But the German example just shows the potential that could be realised here.

Small scale wind turbines can generate a significant income for farmers and rural landowners by producing electricity for specific applications or the entire farm. At the same time the farm land is not affected by the turbine and can still be used for crops and grazing livestock. Land owners are ideally placed to maximise the benefits of small scale wind power with an enviable availability of open aspect land that complements the installation of multiple small scale wind turbines. (29)

11. Empowering Local Authorities

The Green Paper says:
"…*the Local Government Reform Act 2014, including the enhanced role for local authorities in promoting sustainable economic development at the local level, and the development of the role of local authorities in fostering citizen engagement, may provide elements of the way forward*."

However, the Green Paper does not seem to go much further than suggesting that local authorities identify and zone areas suitable for renewable energy.

Local authorities in Ireland could lead the way in energy efficiency and microgeneration programmes. From fuel poverty busting solar panel installations on council housing to energy efficient street lighting schemes, to wood fuel biomass boiler and photovoltaic panels 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. In the view of the NFLA, local authorities clearly have a major part to play in promoting renewable energy and energy efficiency.

12. M*oving Ireland towards a sustainable energy future.*

A new report entitled '*City energy: a new powerhouse for Britain*', published by the think tank IPPR (Institute for Public Policy Research), (30) shows how major cities could help to open up the energy market and drive investment in low carbon energy. Turning our cities into energy suppliers could help to bring bills under control, slash fuel poverty by systematically insulating thousands of homes, and generate more low carbon energy. People would be able to get their energy from a trusted source and profits would be reinvested locally. According to the Greenpeace UK Executive Director, John Sauven:

"*Dynamic cities like Bristol and Manchester have already started to take a lead in delivering clean energy for local people. Now it's time for national government to do its bit to support a movement that can bring a more accountable, affordable, cleaner, and smarter energy system*."

The C40 Cities Climate Leadership Group points out that, because cities account for two-thirds of the world's energy consumption and 70% of global $C0_2$ emissions, they will necessarily be the engines of the green economy and can play a key role as purchasers of locally produced power, thereby opening up the energy market. The potential is huge. For example, in Germany the city of Munich has a target to supply the entire municipality of 1 million people with renewable electricity by 2025. The city has already invested €900 million in renewable energy projects and it has plans to invest a total of €9 billion to deliver its 2025 target. The population of Greater Dublin is approaching 2 million and should be considered as an obvious candidate for such ambitious schemes, with the appropriate central government backing.

The NFLA is also finalising a Policy Briefing considered the development of Energy Service Companies (ESCOs) as the driver of such policies. The NFLA Secretariat will shortly submit this report to the Irish Government to provide its views on whether this could be a blueprint for local authorities in Ireland, as it is becoming in Britain.

In the NFLA's view, the Government could establish a Local Authority Energy Unit within the Department for Communications, Energy and Natural Resources to bring together best practice guidance for cities and local authorities relating to energy supply, heat delivery, energy efficiency programmes, renewable energy deployment, and access to finance.

13. Conclusions

In the NFLA's view, the Government should completely drop the idea of opening up discussions on building small nuclear reactors in Ireland. Nuclear power is among the least attractive climate change policy options because it is too costly, too slow, and safety is too uncertain.

Instead the Government should promote the real empowerment of citizens, small companies, including farmers and local government. The Government needs to develop a community energy strategy; work with farming organisations to promote small-scale renewable energy on farms and encourage Local Government to supply electricity, heat, energy efficiency and renewable energy programmes.

Renewable energy technologies and energy efficiency measures have advanced with extraordinary speed over the past decade. The costs of renewable technologies have declined substantially, especially solar photovoltaic cells. These technological and economic changes are likely to transform the energy utility industry. This is already beginning to happen in Germany, where RWE predicts a 20% fall in sales by 2035. (31) Ireland's future energy plans need to reflect these changes. The number of plans for systems based on 100% renewable energy is proliferating and it is becoming increasingly clear that generating systems comprising a mix of different commercially available renewable energy technologies, located on geographically

dispersed sites, do not need base-load power stations to achieve the same reliability as fossil-fuelled systems. (32)

For many empowering communities such renewable energy promotion strategies are the missing piece of the jig-saw in solving the energy‘ trilemma’. They reduce energy costs, help tackle climate change and provide robust energy security. Nuclear reactors, whether large or small, simply perpetuate an old energy system which is fast disappearing around the world. (33)

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