

SAFE ENERGY E-JOURNAL No.65

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This briefing does not deal with the UK Government's proposed new reactor programme. For an update on developments to do with new reactors see here:

<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo74.pdf>

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1 Scotland's Electricity Supplies

In Scotland policymakers and industry have been grappling with the implications of the announcement by ScottishPower that Longannet coal-fired power station will close in early 2016. (1) Some people are asking whether Scotland can keep the lights on when the 2,400MW power station closes, given that it currently supplies around 25% of Scotland's electricity?

In the longer term, Hunterston B nuclear station and Torness are both due to close in 2023, although EDF Energy has expressed a desire to extend the life of Torness until around 2030.¹ Will replacement baseload capacity be required for Longannet and the two nuclear stations?

Baseload, Intermittency and Energy Security

A baseload power station is one that is generally operated continuously twenty-four hours a day, seven days a week (24/7). It is designed to produce enough electricity to meet some or all of a region's continuous electricity demand. Baseload plant is usually able to produce electricity at a low cost compared to other forms of supply, but is often not particularly easy to turn on and off quickly. It will most likely have very high fixed costs and low marginal costs – in other words it is relatively expensive to keep open, even if not operating, but doesn't cost much extra to operate. Peak load plant, on the other hand, doesn't cost much to keep open, but is relatively expensive to operate.

Some politicians blame an increase in renewable generating capacity for helping to seal Longannet's fate. (2) They say that renewables may force the closure of baseload capacity but cannot make sure the lights stay on 24/7 because they are intermittent and don't generate when the wind isn't blowing or the sun isn't shining? WWF Scotland says Longannet's commercial future has been undermined by the European Union's Industrial Emissions Directive (IED), the UK carbon price and

¹ It was announced at this year's Torness Local Liaison Committee Meeting on 19th March 2015 that EDF Energy has already started the process of applying for a life extension and the Office for Nuclear Regulation expects to give them the go-ahead later this year.

transmission charges. It says the argument that renewables are undermining its profitability is utter nonsense.

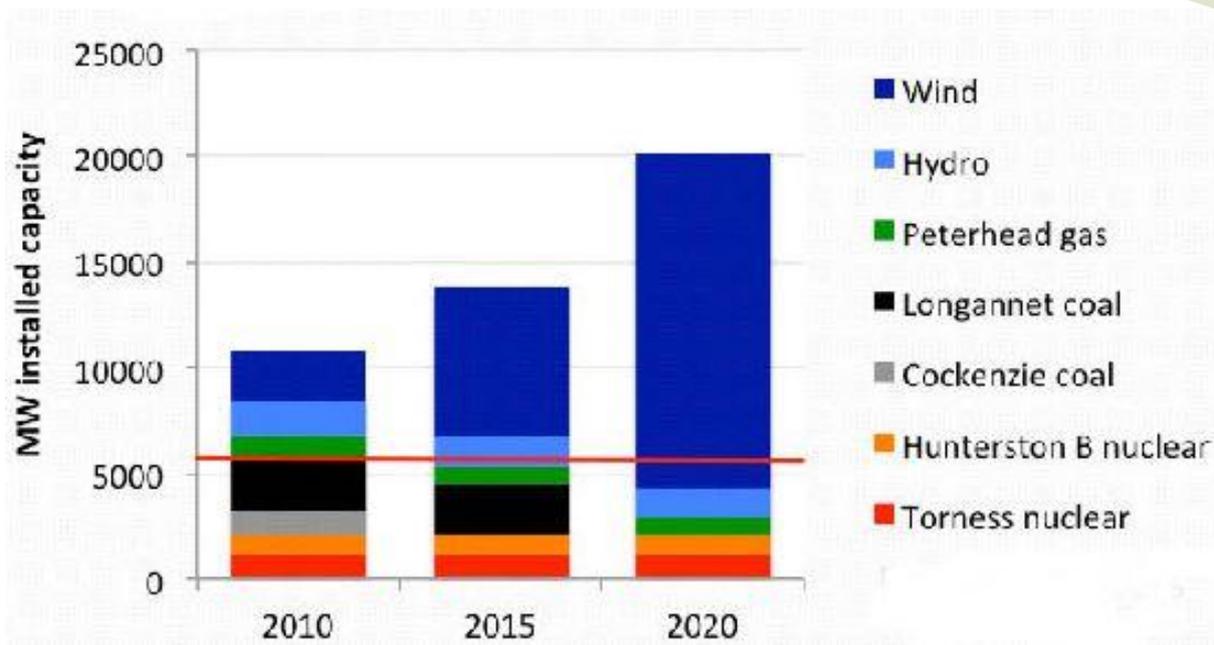
Too much renewable electricity?

The Scientific Alliance Scotland (SAS) highlights a related ‘problem’. It says the Scottish government’s green energy dash will generate massive amounts of wasted electricity that cannot be used, sold or stored and will cost the taxpayer billions of pounds. By 2020 it says wind farms will produce far greater levels of heavily subsidised power than needed. A lack of infrastructure will prevent excess energy being exported to other countries but generous compensation payouts for wind farm owners who cannot find a buyer for their energy will continue to be borne by the consumer via their energy bills. (3) The Scientific Alliance’s Professor Jack Ponton says the cost implications of producing this surplus will run into billions of pounds, just as Scotland’s cheapest source of electricity – Longannet coal-fired power station - is closed. He says this crisis is entirely a consequence of reducing Scotland’s ability to balance electricity demand by rapidly increasing the variable supply from wind generated power. Wind power is intermittent, it is not secure, and it cannot be stored in the quantities required.

During 2014 £53.2m was paid out to wind farm companies across the UK to switch off their turbines because their electricity was not needed or would have overloaded the grid. These are known as constraint payments. But the Department of Energy and Climate Change point out that “*National Grid has been paying coal and gas generators – and others – to change their planned output well before wind farms joined the mix. The impact on energy bills is negligible.*” National Grid say the cost passed onto consumers was “*only a few pence*” per year.

Maf Smith, Deputy Chief Executive of trade body RenewableUK, said: “*National Grid’s latest figures show that the costs of varying the output of gas are four times higher than the cost of constraining wind so far this financial year. Just to put these figures into their proper context, less than 3% of potential wind generation was called off by National Grid in 2014, which means that more than 97% was generated as planned. By using more of the cheapest form of renewable energy we have, onshore wind, we can actually drive down the cost of producing electricity and cut people’s bills*”. (4)

Ponton argues that in 2010, Scotland had a secure and balanced electricity supply, comprising one gas, two nuclear, and two coal-fired power stations and a suite of hydroelectric stations providing power on demand of about 8.4GW. There was a nominal wind capacity of just over 2.5GW. With approximate peak demand of 6GW, Scotland’s electricity needs were “safe and secure”. (5)



By 2020, assuming that consented wind farms totalling 8.68GW are built, the Scottish Government will have surpassed its 100% renewable generation pledge by nearly 20%. But the closure of Longannet will mean Scotland will only be capable of providing 4.4GW of power at the “*flick of a switch*”, 1.6GW below the safe threshold. Although the 15.8GW of wind capacity operating above 10% capacity should cover the shortfall, in periods of low wind when wind farms operate below expected capacity, “*significant shortfalls will occur*”. This is the argument that we need to continue to have a certain level of baseload power available – roughly indicated by the orange horizontal line in the chart above.

A variation of this argument was recently put forward by Tom Greatrex, Labour's former shadow energy minister. He argued that there is an increasing imbalance in energy generation mix north of the border, meaning Scotland is more reliant on importing energy during spikes in demand or when the wind is not blowing. (6) But as Dave Toke, reader in Energy Policy at Aberdeen University points out the UK has a single electricity system so it doesn't matter one iota if a coal plant in Scotland stops generating because balancing supply and demand occurs on a GB level, not a Scottish level - that would not have changed even if Scotland had voted yes in the referendum.

Economy, Energy, and Tourism Committee

The National Grid, in evidence to the Scottish Parliament's Economy, Energy, and Tourism Committee, made it absolutely clear that the notion that Scotland would in some way be insecure when Longannet closes is wrong. Once the ‘western bootstrap’ (an undersea grid connection between Hunterston and Deeside) is in place, there won't be a need for any fossil fuelled generation in Scotland, even for voltage control. (7)

The Longannet closure announcement was made after its owner ScottishPower failed to win a crucial contract from National Grid to balance demand in Scotland between April 2016 and September 2017. National Grid confirmed that it had awarded a £15m contract to SSE's Peterhead gas-fired power station to provide voltage support services. The deal will see Peterhead provide

services before the upgrades to the high-voltage transmission network are completed in 2017, but after that even Peterhead won't be necessary. (8)

As far as Ponton's accusation that wind in Scotland is heavily subsidised and will cost taxpayers billions of pounds is concerned - renewable energy plays a tiny role in energy bills – support for them represents about 4% of energy bills, according to the Committee on Climate Change. (9) The single biggest driver of energy bills in recent years has been the volatile wholesale price of fossil fuels.

Addressing fears of what would happen when Hunterston B closes in 2023 and perhaps Torness if it cannot secure a life extension, both National Grid and Ofgem emphasised to the Scottish Parliamentary Committee that the electricity system is evolving. They stressed that by the mid-2020s there will be more diversity in types of renewables, more demand response, and interconnection, so less need for local generation. Carbon Capture and Storage (CCS) might also be available for baseload. But they also stressed that market signals (including transmission, capacity market etc.) would change if there are genuine risks to security of supply in Scotland.

A future without baseload

In an electricity system that isn't able to export surpluses, baseload power which operates 24/7 would actually constrain the expansion of renewables because renewable electricity would only be able to supply that percentage of demand which is not covered by baseload. In fact what a renewable system needs is not baseload but flexible back-up which can be turned on and off quickly to provide electricity at peak times when renewables are not producing much. This is where Combined Heat and Power Stations will come into their own.

Michael Liebreich, CEO of Bloomberg New Energy Finance agrees "*...there are plenty of ways of managing intermittency in renewables without resorting to expensive backup power.*"

"First, you improve your resource forecasting. Second, by interconnecting the grid over larger areas, much of the variability of renewable energy can be evened out. Third, just when an increased proportion of renewable energy means you start losing control over supply, the introduction of digitally controlled smart grids gives you better control of demand. Finally, there is power storage, currently mainly in the form of pumped hydroelectric power but, in future, most likely in the form of batteries for electric vehicles. The cost of each of these techniques is coming down just as rapidly as the cost of renewable energy." (10)

There are at least six ways of dealing with a system which has limited baseload capacity:-

1. Firstly reducing demand by implementing energy efficiency measures is the priority. But demand management measures which can shift demand from peak times can also be implemented.
2. By using the right mix of renewables intermittency can be reduced. Renewables are not just wind and solar, but include other sources such as geothermal energy and anaerobic digesters.
3. By increasing grid connections to other countries, electricity can be imported at peak times when indigenous renewable production is low, and so that surpluses can be exported.

4. By storing surplus renewable electricity which can be called upon when wind and solar production is low. An extra 600MW of pumped storage (hydro schemes which can pump water back up the hill when there is a surplus of electricity) has already received planning consent bringing the total capacity up to 1,340MW. Another three schemes which would double the capacity have been proposed.
5. By calling on combined heat and power stations working in conjunction with heat storage to generate electricity at peak times.
6. By using surplus renewable electricity to generate heat which can be stored for later use.

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2 Scotland & the Levy Control Framework

First Minister, Nicola Sturgeon has demanded a veto over Britain's energy policy. The First Minister said UK ministers should take key decisions only after "*consultation and agreement*" with the Scottish Government. Ms Sturgeon was speaking after a meeting of the Scottish Energy Advisory Board, a panel she chairs with Professor Sir Jim McDonald of Strathclyde University. She set out a list of specific demands, including an assurance that subsidies for Scotland's onshore windfarms will not be changed without the blessing of SNP ministers in Edinburgh. She also called on the UK Government to commit to major offshore wind projects, where Scotland has lost out because of the higher costs of maintaining turbines in deeper coastal waters. Ms Sturgeon also urged the UK



Government to cut transmission charges for generators in remote parts of Scotland further than already planned. (1)

The Tories have said they plan to end subsidies for onshore wind farms from 2016. But the Scottish Government's renewable energy targets may prove difficult to implement if this causes an effective moratorium on onshore wind.

Alongside having a say on onshore wind subsidies, Sturgeon has also called for the government to ensure there is sufficient budget to deliver new offshore wind projects, following industry fears the funding pot has already been used up. The Scottish Government also wants sufficient flexibility within the so-called Levy Control Framework (LCF), which controls the amount of money which can be levied on electricity bills to subsidise green energy projects, to allow the renewables sector to invest with confidence and deliver further cost reductions.

Tackling higher transmission charges for remote Scottish generators, addressing concerns over the future of feed-in tariff subsidies, and delivering long-promised support for carbon capture and storage (CCS) technology, hydro pumped storage projects, and island grid connections are also on the Scottish Government's wish list. (2)

A new report from the Policy Exchange think-tank says the LCF budget may already be exhausted. The £7.6bn budget that is meant to provide subsidies for renewable energy schemes through to 2020/1 using money raised from consumers' bills may already have been allocated. A host of large renewable energy projects already in the pipeline may have to be abandoned unless more money is provided. (3)

The new government will have to decide the level of LCF cap for the decade after 2020, soon. In the current state of the public finances only an optimist would assume a rise much above the current level, if any at all. Given there's only so much money to go round, if nuclear power is allowed to grab a huge share of the UK's energy finance pot this will seriously diminish the funds available to develop renewable energy on both side of the Border. An analysis by Dave Toke, reader in Energy Policy at Aberdeen University, suggests that spending on Hinkley Point C and later nuclear reactors will obliterate spending on renewables. Under the LCF consumers will probably be paying around £1bn every year after 2023 to subsidise Hinkley, which, barring any changes to the LCF, means there won't be any further money available for subsidies until 2027, by which time Sizewell C could be ready to start gobbling up subsidy money. (4)

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3 Renewable Heat

Scotland risks missing its renewable heat target of 11% by 2020 unless a “*major change of mindset*” is adopted, according to the trade body Scottish Renewables. It already missed an interim target of 3.5% by 2012 by 0.5%. The Scottish Government also wants to move to largely decarbonised heat sector by 2050 with significant progress by 2030. The country is going to have to “kick its addiction” to gas-fired boilers if it is to meet these ambitious targets. The benefits of decarbonising heat use are not only environmental, but could save consumers money and boost the local economy. (1)

According to the Committee on Climate Change (CCC) the current pipeline of projects does not provide enough capacity to achieve the 2020 target. (2) So Scotland is not on track to meet its 2020 renewable heat target.

There are various ways that renewable heat could be introduced. One way would be to rely heavily on air source heat pumps. These would replace gas central heating with efficient electric heating using individual household heat pumps. According to a report by Element Energy and the Energy Saving Trust the additional annual electricity demand caused by high ASHP uptake is likely to be no more than 9% of total forecast electricity demand in 2030. But high heat pump uptake could cause excessive strains on local electricity networks, and without a capital grant scheme fuel poor households are unlikely to be able to afford to buy an Air Source Heat Pump heating system. (3)

A more affordable way of moving to renewable heating systems would be to rely more heavily on communal heating systems. In order to meet the renewable heat targets Element Energy suggests that around 350,000 Scottish dwellings being connected to (renewables-fed) district heating by 2030. Meeting this level of district heating uptake is equivalent to 50% of all households in Aberdeen, Dundee, Edinburgh and Glasgow being connected to district heating systems by 2030. This level of uptake would require strong leadership from the public sector and firm commitments to develop large scale schemes connecting a mix of building types. To achieve this the Scottish Government will need to consider further action to facilitate heat networks, for example through a Scottish equivalent of the Heat Networks Delivery Unit; requiring consideration of district heating in new developments; and obliging local authorities to connect to existing heat networks where technically possible to provide anchor loads.

The Scottish Government’s draft heat generation policy document proposed a target for district heating (not necessarily renewable), of 1.5 TWh of heat to be delivered by district heating by 2020 and it is committed to connect up to 40,000 homes to heat networks by 2020. Under the Element Energy scenario 350,000 households would need to be connected to heat networks a decade later with 4TWh of renewable heat being provided. The challenge will be to build the social and political momentum necessary to introduce new local energy production and distribution on the scale required. (4)

Other Advantages of CHP

Another advantage of promoting a renewable heat strategy dominated by Combined Heat and Power (CHP) generators is that CHP could be the backbone of an energy system dominated by renewables. CHP generators can produce both saleable heat and electricity and can rapidly ramp up and down over short periods of time. This means they can be used to balance power grids in order

to compensate for fluctuating renewables like wind and solar power. (5) In Germany, for instance, as wind and solar PV take on a greater proportion of total electricity production, CHP plants are expected to take on the role of providing more flexible electricity generation. At the moment CHP plants focus on meeting the demand for heat. Electricity production is seen as a useful by-product. In future the focus will switch to providing electricity when the output from wind and solar is low. (6)

The CHP stations built to supply 4TWh of heat each year would also be generating electricity – perhaps as much as 1.75 - 2.0TWh/yr, with a peak capacity of around 525MW.² This compares with around 9-10TWh/yr produced by Longannet, and a capacity of 2,400MW. The advantage of using a CHP station to produce electricity quickly when fluctuating renewables like wind and solar power are not able to supply, rather than using a combined cycle gas turbine for instance, is that a CHP plant can reach an efficiency of 80% plus. This compares with the efficiency of CCGTs, which in the UK which range between 49% and 52%. CHP stations could feed their heat into storage facilities when demand for heat from the district heating systems is low. In five years' time, Germany expects a quarter of its electricity to be provided by CHP generation.

The use of surplus renewable electricity to produce heat for storage

The successful combination of CHP and renewables elsewhere in Europe has been attracting increasing attention. (7) For instance Denmark currently relies on wind power for nearly 30% of its electricity and combined heat and power (CHP) plants supply 50%. Plans are in place to increase wind power up to 50% by 2050. The challenge associated with this system is that as the share of wind power rises, there will be less demand for electricity from CHP plants, meaning that this energy could be wasted. One solution, known as a smart energy system, requires flexible energy conversion and storage technologies to be incorporated. CHP plants could be provided with heat pumps and additional storage capacity to store additional energy on windy days. (8) So district heating systems could absorb large quantities of surplus wind-generated electricity by using heat pumps and electric heaters for heating water. When demand for electricity is high, but the wind is low, CHP plants could sell electricity but store heat if there is no demand for it at the time. (9)

Micro-CHP (mCHP) could also play a similar role as a grid support mechanism to cope with capacity constraints and short-term spikes in demand and meet the electrical requirements of other new technologies which require electricity such as electric vehicles and heat pumps. mCHP is an innovative new technology, which has significant potential to reduce carbon emissions. There are several competing technologies, but all would replace a conventional domestic central heating boiler, and produce electricity as well as hot water for heating. (10)

The Germany energy supplier – Lichtblick - is already implementing a novel commercialisation model for mCHP with a view to creating a 'virtual power station' of mCHP units to balance wind in the network. LichtBlick has announced its goal to place 100,000 micro CHP systems with an electric output of 20 kW each into homes and buildings in Germany. The property owner will be provided with the cogeneration unit and a heat storage unit and be guaranteed that the home will be supplied with heat as required. LichtBlick would maintain ultimate control over the cogeneration unit with

² Estimate made by using Table 7A in DUKES here

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/337711/chapter_7.pdf

remote capability to manage the unit. A large heat store decouples the production of heat from that of electricity when necessary. The multiple small units give a sensitive and responsive network of immediate capacity to create a supply of up to 2 GW. (13)

City-scale Heat Pumps

Star Renewable Energy, based in Glasgow, is the first company to offer a city-scale heat pump. This is being used in Drammen, in Norway, to harvest heat from a fjord and deliver it to a district heating network which is heating 6,000 houses. The project has successfully delivered 85% of the heat required by the district heating scheme at one seventh of the cost of gas. Director Dave Pearson says: “*The River Clyde, for example, could offer enough heat for 500,000 houses. The Forth Estuary, being in effect the North Sea is larger than required for all of Edinburgh.*” Pearson is calling for an extension to the Renewable Heat Incentive and for consideration to be given to funding similar projects from general taxation. He says any notion that new district heating networks need to start off based on gas is a colossal mistake that will consign a generation to burning fossil fuels. (11)

Lerwick, on the Shetland Islands, which is already host to the largest district heating scheme in Scotland, could soon be expanded by using a city-scale heat pump. The system is currently heated by burning the islands' household and industrial rubbish, but even though it is importing rubbish from neighbouring Orkney as well as from the Highlands, the sparse population of the north of Scotland means that there is insufficient waste to burn to meet demand from the town's district heating system. (12)

Similarly, in areas not connected to district heating networks, Air Source Heat Pumps (ASHP) could be used to generate heat. But if used in conjunction with heat stores the heat pumps could be operated when electricity demand is low, and therefore cheap rather than at peak times. Sunamp has installed its heat batteries in seven homes owned by Berwickshire Housing Association (mostly electric heated) and three staff homes. The goal was to shift 100% of the electricity demand to power an ASHP heating system to off-peak electricity. Because Sunamp heat batteries are compact they are practical to use in ordinary homes. Initial results are showing significant savings to householders. (14)

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14. See <http://sunamp.co.uk/decc/>

4 Implementing Scotland's Radioactive Waste Policy

A Consultation paper seeking views on the proposed Implementation Strategy to support Scotland's Higher Activity Radioactive Waste (HAW) Policy has been published. The Policy only applies to Intermediate Level Waste, as there is currently no High Level Waste in Scotland. Spent Nuclear Fuel is still not classified as waste and continues to be transported to Sellafield for reprocessing or storage.

Scottish nuclear waste management policy differs from the rest of the UK in that it does not support deep geological 'disposal'. In Scotland long-term management of HAW should be in near surface facilities, which are located as near to the site where it is produced as possible. No definition of "near to the site" is given, but the Strategy presumes "that waste will be dealt with as close as is practicable to the site where it was produced, thus minimising the need to transport the waste over long distances". Developers will need to demonstrate how the facilities will be monitored and how waste packages, or waste could be retrieved. The Strategy sets out the key stages for the effective implementation of the 2011 Policy and outlines key actions that are required from the NDA and the Scottish Government during those phases. **The consultation closes on 7th August.**



Instead of a site-specific approach, the current Scottish consultation explores how best to implement the 2011 policy through a framework. And it makes no direct recommendations for how nuclear waste should be managed under specific circumstances. This is because the Scottish Government views appropriate management solutions as dependent on the site and is trying to avoid being too prescriptive.

The development of this draft strategy has been guided by a Scottish Government led Project Board comprising the Nuclear Decommissioning Authority (NDA), waste producers and owners, local government, Scottish Environment Protection Agency (SEPA) and Office for Nuclear Regulation (ONR). The Committee on Radioactive Waste Management (CoRWM), and representatives of the local Site Stakeholder Groups and the Nuclear Free Local Authorities (NFLA) were observers on the Group and actively participated in discussions.

The 2011 Policy recognises the need to ensure that storage facilities are capable of managing waste in the long-term. Long-term does not mean indefinite storage but it may mean waste is stored for many decades. The NDA is developing a new baseline for HAW to be measured for its sites in Scotland, which assumes that it will be stored on the site at which it arises for about 300 years.

However, part of the Strategy is to identify which wastes may or may not be suitable for disposal in a future near surface disposal facility. So during the first phase of the Strategy up to 2030 the Scottish Government will work with the NDA, other waste owners, suitable waste management organisations and Regulators to help develop a near surface disposal concept for waste suitable for this management route.

A significant proportion of HAW waste in Scotland will not arise for decades because the current plan is for Magnox and AGR reactors to be left in a safe and quiescent state until at least 2070 when reactor dismantling commences. Hunterston A will enter a care and maintenance phase on 2022 and Chapelcross will do the same in 2028. Hunterston B and Torness are both currently scheduled to close in 2023 and enter the care and maintenance in 2033. All four reactors will still be in the care and maintenance phase until at least 2070. Dounreay is currently expected to reach its proposed Interim End State in 2029/30, by which point all the Strategy waste is expected to be in two ILW stores on the site. Consequently the first generation of storage facilities for waste arising in the next 10-15 years are likely to follow existing plans with stores being constructed at Dounreay and at each of the Magnox decommissioning sites for the wastes arising at those sites.

So, during Phase 2 (2030 – 2070) all HAW will either be in safe and secure storage or still within the reactors on the power station sites. The Strategy says this provides time to develop plans for the siting and construction of new near surface disposal facilities suitable for the disposal of a significant portion of HAW in Scotland.

Phase 3 – 2070 onwards

Under current plans reactor dismantling is expected to take place at the decommissioned sites in Phase 3 when over 60% of the HAW in Scotland is expected to arise. The consultation document says *“The availability of suitable disposal facilities at this stage will be important to avoid the need to build more stores for the retrieved waste.”* Wastes that are not suitable for near surface disposal will



still require ongoing storage. While this is an acceptable part of waste management long term storage does not mean indefinite storage but it may mean waste is stored for many decades.

Near Surface Disposal

The Scottish Government has asked the NDA and the Scottish sites to identify which wastes may or may not be suitable for disposal at some future date in near-surface disposal facilities. Any such facilities will need to comply with the comprehensive guidance document "*Near-surface Disposal Facilities on Land for Solid Radioactive Waste: Guidance on Requirements for Authorisation (GRA) produced by the UK Environmental Regulators*".

Initial results from Magnox and EDF Energy indicate that there may be a range of waste management and near surface disposal opportunities that could be technically suitable for a good proportion of the HAW streams arising at the Chapelcross, Hunterston A, Hunterston B and Torness sites. A significant future work programme will be required before a fully underpinned near surface disposal solution is deemed viable.

Given the different type of reactors that existed at Dounreay initial results have shown that the majority of the waste arising at the site would not currently be suitable for near surface disposal due to relatively high concentrations of long lived alpha containing waste. The work to look at the wastes and the different management options has been initiated and the results of the work will be published in due course.

The Consultation Document is using the word "*disposal*" to refer to the idea that there is "*no intention to retrieve the waste*". So it is not exactly the same as the dictionary definition of disposal which is to "*get rid of something*". On the other hand it is not the same as placing waste in a Deep Geological Repository (DGR) either. In a DGR, although waste may be retrievable for a while, the repository will eventually be sealed making the waste inaccessible. Scottish Policy requires that disposal facilities should be monitored and that there should be a capability to retrieve waste packages and waste if necessary.

One of the fundamental principles of the 2011 Policy is that developers and operators of facilities must engage with stakeholders and in particular local communities where any facilities may be located, throughout the process of managing the waste.

Scottish Government 15th May 2015 <http://www.gov.scot/Publications/2014/12/8263>

Consultation Document <http://www.gov.scot/Resource/0046/00464771.pdf>

5 Scotland and Solar Power

Not very long ago if you mentioned solar power and Scotland in the same breath you would probably have been telling a joke. But times are changing, and increasing numbers of our homes are installing solar panels, and several companies are planning solar farms. A Scottish branch of the Solar Trade Association (STA) has been established. Scotland now has 35,000 homes and 600 businesses



currently benefitting from solar technology. Forster Energy, a member of the Scottish STA, was involved in the development of the 2014 Commonwealth Games Athletes Village, which boasts over 700 homes with installed solar-energy systems.(1)

New analysis of the weather in April 2015 showed that homes with solar panels installed were able to generate 100% of their electricity needs over the month, and generate a small surplus. Despite warnings that a cut in government tariffs for purchasing electricity would kill the industry, companies providing solar panels have done well, with a reduction in the cost of systems helping keep demand healthy. The time it takes to see a return on the cost of equipment remains a barrier, but it is coming down all the time. Scotland is warming to solar. (2)

The STA estimates that there are 25,000 hectares of south-facing commercial roof-tops in Scotland that could be used to generate clean home-grown energy. Solar panels in Glasgow can generate over 90% of the energy that the same number of panels would produce in London, showing how strong the case for solar is in the country.

Aberdeen-based BWE Partnership has already received planning permission for a 9.5MW ground-mounted photovoltaic (PV) park to be built on farmland at Carmyllie, near Arbroath. The array will be able to power more than 6,600 homes and power generation is expected to begin early next year. Eastern Scotland – from Angus down to the Borders – is the sunniest area of the country. (3)

And Fife's first commercial solar farms are being investigated near St Andrews and Tayport. (4)

Most investment in renewable energy in Scotland has gone into onshore wind farms, and the country lags behind the rest of the UK when it comes to solar photovoltaics. Over the course of 2014 solar energy capacity over the whole UK almost doubled from 2.8GW to 5GW. (5) Scotland's capacity at the end of 2014 was only 140MW, a rise of 34MW since 2013. Nearly 600,000 households across the UK have gone solar, but only 5% of those are in Scotland. (6)

The great thing about solar is that it can be deployed easily and quickly in towns and cities or in places not suitable for wind turbines. Solar is also complimentary to wind and can share sites and grid connections. WWF Scotland, along with leading solar company Lightsource Renewable Energy have called upon the Scottish Government to do all that it can to help ensure Scotland switches on to the full potential of solar power. Advances in solar PV technology have seen increased efficiency of panels and reductions in manufacturing costs, making solar PV a viable power source to add to Scotland's overall energy mix. Lightsource has already identified around 70 potential sites for ground-mounted solar PV farms in Scotland, as well as opportunity for commercial and domestic rooftop solar PV systems. No other energy technology has delivered the scale of cost reductions seen in solar and no other technology has empowered such vast numbers of everyday people to take control of their power supply. It is vital to retain this momentum.



Saughton House in Edinburgh is one of only two buildings where the Scottish Government has made green improvements – the other is Tweedbank in Galashiels. (7) Saughton House has a total of 12 solar water heating panels, and an electric vehicle charging point. Much of the roof-space is south-west facing and would be ideal for PV modules.

The new Solar Trade Association Scotland branch will be working with the Scottish Government over the coming months to develop a Scottish Solar Energy Policy. The drop in UK-wide subsidies for large-scale solar farms means the focus is likely to be on commercial and public building rooftops and smaller solar farms. Glasgow City Council is said to be working on plans to place ground mounted solar panels on wasteland scattered across the City, and Edinburgh City Council is working with the Edinburgh Community Solar Energy Co-operative to get solar panels on schools and leisure centres across the Capital.

The Scottish Government could kick-start a solar revolution in Scotland and help to boost the establishment of a solar industry by leading by example and installing solar panels on some of its own estate.

Current Scottish Government policy on non-domestic rates results in embedded generation facilities having a significantly higher rateable value compared to energy facilities that supply energy to the national grid. This is a serious anomaly which places disproportionate costs on the most forward-looking and sustainable businesses, and clearly acts as a strong disincentive to investment and could potentially be a significant barrier to useful renewables projects, which would have a positive impact on carbon savings in industry and also electricity users in remote areas. This anachronism needs to be resolved urgently.

- Meanwhile a crowd-funding investment scheme aims to raise £3 million to install some 750 roof-mounted solar PV systems with a total capacity of 2.6MW on social housing owned by

Berwickshire Housing Association. The project – ‘Oakapple Berwickshire’ – is being developed by Oakapple Renewable Energy and Edison Energy. (8)

- One solar developer has estimated that fitting solar panels above car parks could provide enough energy across the UK to power 1.7m homes. By building a car port-style shelter above the car park with panels orientated for maximum solar capture this could provide a new source of energy for hospitals, shopping centres, business parks, offices, airports etc. (9)
- Edinburgh Council is working in partnership with the Edinburgh Community Solar Co-operative (ECSC) to install solar panels on 25 council buildings across the city. The initiative is believed to be the largest community-owned urban renewable energy project in the UK. Share will be offered later in the year to members of the public who want to invest in the £1.5million scheme. (10)

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1. Machinery Market 23rd April 2015 <http://www.machinery-market.co.uk/news/9949/STA-launches-new-branch-in-Scotland>
 2. Herald 4th May 2015 <http://www.heraldscotland.com/comment/herald-view/solar-in-scotland-whos-laughing-now.125015128>
 3. Scottish Energy News 23rd April 2015 <http://www.scottishenergynews.com/work-on-scotlands-largest-solar-park-to-begin-this-year/>
 4. The Courier 13th May 2015 <http://www.thecourier.co.uk/news/local/fife/bid-lodged-for-fife-s-first-major-solar-farms-1.874766>
 5. Sunday Herald 12th April 2015 <http://www.heraldscotland.com/business/company-news/solar-power-comes-of-age-in-scotland-as-investment-boom-could-see-building-of-.122904768>
 6. WWF Scotland Press Release 29th December 2014 http://www.wwf.org.uk/about_wwf/press_centre/?unewsid=7429
 7. Scotsman 26th December 2014 <http://www.scotsman.com/news/environment/snp-makes-no-green-upgrades-at-official-buildings-1-3644606>
 8. Scottish Energy News 29th April 2015 <http://www.scottishenergynews.com/funding-for-new-borders-housing-solar-heating-project-reaches-1-3m/>
 9. Business Green 18th May 2015 <http://www.businessgreen.com/bg/news/2408834/solar-car-parks-could-power-17-million-uk-homes-developer-claims>
 10. Herald 25th May 2015 <http://www.heraldscotland.com/news/environment/edinburgh-launches-community-owned-solar-project.127011109>

6 Tackling Fuel Poverty with Energy Efficiency

A joint venture between environmental charity Changeworks, the Energy Saving Trust and Everwarm, funded by the Scottish government, will begin work in September as part of a contract worth £224 million over seven-years. Energy Saving Trust director of government services Mike Thornton emphasised that the scheme will give people living in fuel poverty “*really practical*”

support". He said: "The initiative provides a more integrated step-by-step service to customers, from the initial referral through to the installation and beyond. Each customer will receive their own personal adviser and be supported through any complex issue or challenge they may face. This project will continue to help improve the lives of people in Scotland by making their homes warmer and more comfortable." (1)

As many as 28,000 fuel poor and vulnerable households could make their homes easier and cheaper to heat under the scheme. The scheme will install insulation, heating and low carbon or renewable measures in the homes of households who are identified as living in fuel poverty, with a wider range of options for people living off the main gas grid including solar thermal and biomass systems. People living in more remote parts of the country will get the same level of service. The new scheme encompasses all the measures that were available under the previous Energy Assistance Scheme, which closed in March, with the addition of new measures like flat or pitched roof insulation, glazing and hybrid wall insulation. (2)

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1. Utility Week 22nd April 2015 <http://www.utilityweek.co.uk/news/scottish-government-to-launch-national-energy-efficiency-drive/1124482>
 2. Scottish Government 22nd April 2015 <http://news.scotland.gov.uk/News/Tackling-fuel-poverty-186d.aspx>

7 Local Energy

Speaking at the opening of All-Energy – the UK's largest event for the energy sector – the leader of Glasgow council outlined the city's plans for growth and sustainability. As part of Glasgow's 'Energy and Carbon Master Plan', Councillor Gordon Matheson spoke of carbon reduction projects through a variety of initiatives such as a new recycling and a renewable energy centre. He also highlighted the city's green street-lighting project – 'a first of its kind in the UK' – which will see the replacement of 10,000 street lanterns with low energy versions along main arterial roads leading into the city.

Scottish Energy News 7th May 2015 <http://www.scottishenergynews.com/city-chief-lays-out-plans-to-make-glas-gow-even-greener-in-low-carbon-future/>

The UK's largest community-owned wind farm – Beinn Ghrideag, near Stornoway – has successfully completed construction. This milestone has seen 3 x 3MW Enercon wind turbines installed on-site, with first energy production expected to be achieved in early summer.

Scottish Energy News 7th May 2015 <http://www.scottishenergynews.com/sgurr-energy-helps-britains-biggest-community-owned-wind-farm-to-construction-completion/>

Plans to install 25 solar PV arrays on suitable public buildings around Edinburgh are developing. The Edinburgh Community Solar Co-op supported by Energy4All is developing this exciting project. Membership of the Co-operative will be opened up later this year when the public will be offered the opportunity to purchase £250 shares in the scheme.

<http://www.edinburghsolar.coop> .



8 Climate Emissions – Public Sector Reporting

Public sector bodies in Scotland should be compelled to report climate emissions targets and progress, the Scottish Parliament's Rural Affairs, Climate Change and Environment Committee (RACCE) has recommended. But the committee said imposing financial penalties on those who did not meet targets would be counter-productive.

BBC 17th May 2015 <http://www.bbc.co.uk/news/uk-scotland-scotland-politics-32771652>

RACCE letter to the Minister for Environment, Land Reform and Climate Change, Aileen McLeod MSP, 17th May 2015

http://www.scottish.parliament.uk/S4_RuralAffairsClimateChangeandEnvironmentCommittee/General%20Documents/20150517_Letter_to_Minister_re_climate_reporting.pdf