

SAFE ENERGY E-JOURNAL No.76

December 2017

The content of this e-journal was for the most part originally prepared for Nuclear Free Local Authorities and is reproduced, as adapted, with their permission but without liability for its contents.

This briefing does not necessarily 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/NuClearNewsNo103.pdf>

1 Dounreay

Councillor Feargal Dalton, chair of NFLA Scotland has written to Cabinet Secretary Roseanna Cunningham to highlight important new information about the Dounreay decommissioning contract revealed by the BBC Radio 4 'File on 4' Programme. (1)

In August this year Ms Cunningham raised serious concerns about the environmental and safety record of the Dounreay nuclear plant in a letter to UK energy minister Richard Harrington. In the letter she complained of a disappointing lack of progress across a range of projects and how that sits oddly with the planned reduction in workforce at the site. (2)

Shortcomings in safety performance at Dounreay were also identified in the Nuclear Decommissioning Authority's (NDA's) annual report (3) and criticism of the environmental management at the plant by the Scottish Environment Protection Agency (SEPA). (4)

Earlier this year the High Court in London decided that the NDA had acted unlawfully in the way it conducted the tendering process for the contract to decommission the UK's closed Magnox nuclear reactors – including Hunterston A and Chapelcross. The contract was wrongly awarded to the Cavendish Fluor Partnership (CFP). The NDA was forced to pay the losing bidders – a consortium of Energy Solutions and Bechtel - £97m in compensation. Adding other costs such as the £8.5m cost of fighting the case in court, the National Audit Office says brought the total cost to the taxpayer of this fiasco to £122m.

The BBC has now revealed that Energy Solutions believe, just like with the Magnox contract, the contract process for the Dounreay bid was "fudged". Energy Solutions didn't go to Court at the time because it didn't want to upset the NDA and ruin its chances of winning the Magnox contract.

Clare Spottiswoode, former head of Ofgas, the gas regulator, between 1993 and 1998, and former Board Member of Energy Solutions and former Chairman of Energy Solutions Europe, told the BBC:

"Purely because we did not want to upset the NDA for the Magnox competition – that was the only reason we did not take them to Court at that point."

She continued:

“We were fairly certain that the scores [to rank companies tendering for the Dounreay contract] had been changed in order to make sure that we did not win. And we did feel that some of those scores had been potentially altered in the process and so we decided we would challenge the NDA to find out more about it, but we got to the point where to challenge them further we would have had to take legal action. But doing that was pretty difficult because making an enemy of those judge and jury of who was going to win the Magnox contract was not necessarily a sensible thing to do for a company, and we decided after some discussion not to proceed with a new Dounreay case purely because the Magnox contract was in contention. Later on we got people who told us we were correct in our assumption. We never got to court to prove it, but there were certainly people around who told us that we were correct that those scores had been changed. We were told they had been changed for the purpose of ensuring that we did not win the contract because we were more expensive at the beginning.”

According to the BBC the inquiry into the Magnox fiasco, being carried out by the former boss of the National Grid, Steve Holliday, has spoken to witnesses about the Dounreay contract tendering process.

As one expert told the BBC with many decommissioning jobs, the longer the delay the more opportunity there is for things to go seriously wrong. It is unclear how far the Dounreay management has gone with its redundancy programme, but it would be a tragedy if skilled workers are made redundant now and move away from the area only to find that the current contractors are given notice after the Magnox inquiry reports and are replaced by a new system which again prioritises reaching a relatively safe interim end state as quickly as possible.

Cllr Dalton suggested to the Cabinet Secretary that she raise this issue again with the UK energy minister, and ask him to order the NDA to halt any further redundancies.

It has now been reported that Dounreay Site Restoration Ltd (DSRL) has received too many applications for redundancy. It had sought 150 volunteers – 15% of the workforce, but it has confirmed that more people volunteered than were able to leave and each applicant was considered using fair and consistent criteria, which included assessing future business need. There are just under 1,200 staff working for DSRL, with up to 800 contractors. It was announced in April that up to 150 employees were being invited to apply for a redundancy package, with a further 50 agency roles being cut. (5)

Dodgy Cost Estimates?

Six years ago, the 2011/12 Annual Report of the Nuclear Decommissioning Authority said:

*“The appointment of a new consortium, the Babcock Dounreay Partnership consisting of Babcock International Group, CH2MHill and URS, and which marks the culmination of a two-year process, will **bring forward decommissioning timeframes and reduce costs by well over £1 billion**. The site is now scheduled to reach its Interim State, when all major decommissioning work is completed, significantly earlier than originally envisaged, potentially achieving this important milestone in 2023. These reduced costs and dates exceed the criteria set for the competition by a significant degree and*

demonstrate the very real value that has been secured from this procurement exercise.” [emphasis added] (6)

The Dounreay Partnership was forced to deny that it had undervalued the cost or timescale it had given to clean up the site, after questions were raised about whether it was possible to achieve the finishing date with such a low budget. Dounreay Site Restoration Ltd managing director at the time, Roger Hardy, claimed the Babcock Dounreay Partnership did not underestimate the cost of the operation by charging the NDA £1.6 billion to achieve its aim within 11 years. According to the John O’ Groat Journal, in 2012, the consortium was chosen as the preferred bidder by the NDA when it agreed to carry out the job for almost £800 million less than its nearest competitor. (7)

Each year since then, the NDA has spent £150-200m a year on the contract - something in the region of £750m over five years. Simple arithmetic would suggest less than £1bn now needs to be spent to finish the job. Not so. The latest NDA annual report and accounts (2016/17), said it will cost £2.3bn more to complete the job, and the estimated end date is now October 2029. (8) The NDA Business Plan 2017-2020 gives 2030-33 as the date for reaching an interim end state. Encapsulation of the waste from the Dounreay Shaft and Silo is not expected to be completed until 2028. (9)

There have been claims that the Cavendish Partnership is slowing the work down – putting things into care and maintenance and backing away from the difficult and expensive work. The problem is they are on a target cost contract – so there is profit in doing things cheaply, and an incentive to steer clear of work where the company needs to make an investment. SEPA wants them to get on with certain things such as the shafts and silo but they have put work into care and maintenance. It’s too difficult to do and there is no profit in it. They have gone for easy and quick hits – demolishing labs. The schedule is slipping because it was not right in first place. What Cavendish said they could do in 11 years was always going to be impossible.

- Meanwhile planning permission is being sought for the demolition of the landmark dome structure at Dounreay – the exterior superstructure, also known as the sphere and the golf ball of the Dounreay Fast Reactor. Work on dismantling the interior is due to begin next year and the sphere will ultimately be removed by 2026. A planning application has been submitted to Highland Council for the dismantling of all the site’s reactors. In total three nuclear reactor buildings are to be razed to the ground over the coming years. Historic Scotland had looked at the potential of listing the building so that it would be conserved. In 2007, Dounreay Site Restoration Limited (DSRL) released the results of public consultation on future uses for the dome. Suggestions included turning it into a hotel, museum and even a nightclub. However, because the structure is contaminated with low levels of radioactivity and due to high maintenance costs, it was decided to demolish it.
- DSRL has also applied for construction of new buildings to store low level radioactive waste which is currently held in the original low level waste pits which are at risk of being exposed due to coastal erosion. DSRL has estimated that this could take place in 800 to 3,000 years’ time, with the radioactive material then being washed out into the North Atlantic. (10)

- The planning application also covers work required to decommission the shaft and silo and the construction of a new “flask” facility. The series of decommissioning projects will run to the site’s ultimate shut down, currently planned for 2030-33.
- The use of drones to carry out building inspections is saving the taxpayer an estimated £100,000 at Dounreay. Dounreay falls within a strictly enforced air exclusion zone and is protected by armed officers from the Civil Nuclear Constabulary. Drone operators have to do a Civil Aviation Authority course to secure an exemption from the no-fly zone. The first £6,000 drone paid for itself on its first outing to inspect two 20-metre high ventilation stacks. Previously, this work would have needed scaffolding and a hired mobile platform, costing thousands of pounds a week. (11)
- The highest radiation dose to members of the public in Scotland was at Dounreay according to the latest Radioactivity in Food and the Environment Report (RIFE 22) (See Submarine Decommissioning below).

-
1. BBC File on 4, The Nuclear Option - Powering the Future and Cleaning Up the Past, 31st October 2017 <http://www.bbc.co.uk/programmes/b09byv6k>
 2. Scottish Government Press Release 6th August 2017 <https://news.gov.scot/news/environmental-and-workforce-concerns-at-dounreay>
 3. NDA Annual Report and Accounts 2016/7 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/630177/NDA_Annual_Report_and_Accounts_2016_to_2017.pdf
 4. Times 6th August 2017 <https://www.thetimes.co.uk/edition/scotland/dounreay-safety-concerns-raised-by-cunningham-sf7nd5d9b>
 5. Energy Voice 17th Nov 2017 <https://www.energyvoice.com/otherenergy/nuclear/156584/many-staff-apply-redundancy-dounreay/>
 6. NDA Annual Report 2011/12 <https://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/6478/4133812255.pdf>
 7. John O Groat Journal 6th July 2012 <http://www.johngroat-journal.co.uk/News/Dounreay-site-chief-defends-clean-up-costs-06072012.htm>
 8. NDA Annual Report 2016/17 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/630177/NDA_Annual_Report_and_Accounts_2016_to_2017.pdf
 9. NDA Business Plan 2017-2020 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/604324/NDA_Business_Plan_2017_to_2020.pdf
 10. BBC 14th Nov 2017 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-41982131> and Energy Voice 14th Nov 2017 <https://www.energyvoice.com/otherenergy/nuclear/156136/skyline-change-forever-dounreays-iconic-golf-ball-set-vanish/>
 11. Construction Index 10th Nov 2017 <http://www.theconstructionindex.co.uk/news/view/dounreay-drones-save-thousands-of-pounds> and BBC 10th Nov 2017 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-41947604>



2. Hunterston and Torness

A seaweed solution is being sought by EDF Energy to prevent cooling water being clogged up with seaweed. Hunterston B has made an application to Marine Scotland to remove seaweed from the seabed next to the cooling water intake jetty to help to reduce the amount of seaweed entering the cooling water system. The consultation period on the application has ended, responses have been received and the station is awaiting a license decision from Marine Scotland. Two years ago, one of the Hunterston B reactors was taken offline due to high levels of seaweed in the waters around the plant. The nuclear reactors rely on water taken from the sea for cooling. (1)

Both reactors at Torness were turned off in May 2013 due to increased seaweed levels, (2) and one reactor was shut again in November 2016. (3) Both Torness reactors had to be shut for a week in June 2011 due to large number of jellyfish (4) EDF Energy lost about £1m each day the plant was not generating. (5)

The combination of climate change and overfishing is causing a population explosion in jellyfish. Since there are fewer fish to eat them, they appear off the British coast in vast swarms. This is a threat to nuclear power stations – because they can block the intake of cooling water. (6)

-
1. Largs and Millport News 20th Oct 2017 http://www.largsandmillportnews.com/news/15607469.Seaweed_solution_sought_for_Hunterston_B/
 2. Energy Live News 28th May 2013 <http://www.energylivenews.com/2013/05/28/seaweed-shuts-down-torness-nuclear-plant/>
 3. Ferret 22nd Nov 2016 <https://dropping.theferret.scot/torness-reactor-shut-seaweed/>
 4. BBC 30th June 2011 <http://www.bbc.co.uk/news/uk-scotland-edinburgh-east-fife-13971005>
 5. Bulletin of Atomic Scientists 19th Feb 2015 <https://thebulletin.org/spineless-attacks-nuclear-power-plants-could-increase8001>
 6. Guardian 7th Nov 2017 <https://www.theguardian.com/environment/2017/nov/07/weatherwatch-climate-change-and-overfishing-bring-explosion-of-jellyfish>

3. Submarines Decommissioning

Dunfermline and West Fife MP Douglas Chapman has called on the MoD to speed up a programme to dismantle seven nuclear submarines in Rosyth. He said work to rid Rosyth of the vessels was “excruciatingly slow”. He said “Rosyth should not be a sanctuary for toxic submarines and this is something I have raised in Parliament as constituents are fed-up with the subs rotting in their own backyard. Yes, they are to be dismantled and removed, but the timescale is excruciatingly slow.” (1 & 2)

The call came after SEPA released its latest Radioactivity in Food and the Environment (RIFE 22) Report which showed that radiation levels around Rosyth dockyard had increased last year, although it said that levels were well within limits.

SEPA is responsible for the radiological monitoring carried out in Scotland and has a duty to ensure no member of the public receives in excess of the statutory dose limit of one millisievert (1 mSv) per year from authorised discharges. (Although the 2002 UK Strategy for Radioactive Discharges suggests that no member of the public should receive more than 0.02mSv per year as a result of authorised discharges from 2020 onwards). According to the SEPA report, the total dose level in the vicinity of Rosyth dockyard went up from 0.006mSv in 2015 to 0.017mSv last year. The increased reading is less than 2% of the recommended dose limit and would only apply to someone spending “a large amount of time over marine sediments”.

The highest dose for a member of the public in Scotland reported in RIFE was 0.058 mSv which is the total estimated dose around Dounreay. (3) SEPA describes this as around one twentieth of the legal limit. (It is, however, almost three times the target level for 2020 suggested in 2002.)

-
1. Dunfermline Press 30th Oct 2017
http://www.dunfermlinepress.com/news/15628126._We_re_fed_up_of_nuclear_submarines_rotting_in_Rosyth__blasts_MP/
 2. Dundee Courier 24th Oct 2017 <https://www.thecourier.co.uk/fp/news/local/fife/530843/calls-made-to-speed-up-excrutiatingly-slow-nuclear-submarine-dismantling-process-at-roseyth/>
 3. RIFE-22 <https://www.sepa.org.uk/media/328601/rife-22.pdf>

4. Dalgety Bay

As reported at the last meeting plans to reduce and control the health and environmental risks of contamination at Dalgety Bay were approved in mid-October by the West Fife Planning Committee. The plans were submitted in April this year to carry out work on the foreshore, which includes installing a geotextile membrane and replacing and reinforcing rock armour to isolate and remove higher activity material. The existing jetty and slipways at Dalgety Bay Sailing Club are also set to be replaced. Work will be carried out over two consecutive six-month summer periods – approximately April to September – due to the risk of impacting wintering birds in the Bay area.

Dunfermline Press 18th Oct 2017

http://www.dunfermlinepress.com/news/15604131.Work_to_tackle_radiation_in_Dalgety_Bay_approved/

5. Trident & Faslane

The MoD is planning 14 major new developments at the Trident nuclear bases on the Clyde. Details released under freedom of information law shows that the MoD is aiming to complete a “nuclear infrastructure” project at Faslane by 2027 and a similarly named project at Coulport by 2030. Faslane on the Gareloch is the home port for the UK’s four Trident nuclear submarines, and Coulport nearby on Loch Long is where the nuclear warheads are stored.

The SNP has attacked the nuclear projects as massively wasteful and expensive. It pointed out that over 120 countries had recently backed a new United Nations’ treaty banning nuclear weapons. “Not only is Westminster intent on ignoring the recently passed UN treaty, it is continuing to ignore its own commitment under the Nuclear Non-proliferation Treaty to reduce and then eliminate its nuclear arsenal,” said SNP MSP and leading nuclear disarmament campaigner, Bill Kidd. “Britain and the other four members of the original nuclear club on the UN security council, have no intention of ever giving up Trident. It’s this outrageous arrogance that has let the nuclear genie out of the bottle in North Korea.” (1)

The UK Government’s plans for the next generation of Trident submarine reactors are under threat from staff shortages and spending cuts, according to an expert report for the MoD. The report criticises the MoD’s nuclear submarine programme as “introspective”, “somewhat incestuous” and warns it’s facing a “perfect storm” of problems. It also urges the MoD to work more closely with the civil nuclear power industry. Critics warn that the MoD is putting public safety at risk by cutting corners, and that nuclear defence could be “cross-subsidised” by the civil industry. (2)

The submarine report was commissioned by the MoD in 2014 after a radiation leak at the Vulcan reactor testing facility near Dounreay in Caithness. The leak forced a £270 million rejig of the refuelling programme for existing Trident submarines, based on the Clyde. But the report has been kept secret since then, until a heavily censored version was released by the MoD earlier this month under freedom of information law.

It was written by three academics close to the nuclear industry: Professor Robin Grimes from Imperial College in London, Professor Dame Sue Ion who used to be a director of British Nuclear Fuels Limited, and Professor Andrew Sherry from the University of Manchester. They were asked to review plans for a new reactor to power the Dreadnought submarines due to replace the four existing Trident-armed Vanguard submarines in the 2030s. The availability of specialist nuclear staff “appears to be at the bare minimum necessary to deliver the programme”, their report concluded. “We believe the naval nuclear propulsion programme could soon be facing a perfect storm with an ageing expert community facing competition from a resurgent civil nuclear industry.”

Dr Phil Johnstone, a nuclear researcher at the University of Sussex, said: “*This report reveals that the difficulties experienced by the UK submarine programme are even more serious than was known before.*” There was great pressure “*to engineer a cross-subsidy from electricity consumers to cover the huge costs of maintaining the military nuclear industry,*” he argued. His colleague at Sussex University, Professor Andy Stirling, added: “*Military pressures for secretive support to an uneconomic*

civil nuclear power industry, are not just placing a burden on UK electricity consumers, but are threatening the rigour of public accounting and the accountability of UK democracy.” (3)

1. Herald 12th Nov 2017
http://www.heraldscotland.com/news/environment/15656030.MoD_under_fire_over_plans_for_huge_expansion_of_Scottish_nuke_bases/
2. Herald 19th Nov 2017
http://www.heraldscotland.com/news/15670162.Trident_submarine_plans_facing_a_perfect_storm_of_problems_says_MoD_report/
3. The Ferret 20th November 2017 <https://thoferret.scot/trident-submarine-perfect-storm-mod/>

6. Scottish Energy Strategy

A consultation document on the Scottish Government’s (SG’s) draft Energy Strategy was published in January 2017. (1) It set out a vision for the future energy system in Scotland to 2050. It is a vision of a modern, integrated, clean energy system, delivering reliable energy supplies at an affordable price in a market that treats all consumers fairly.

SG has now published an independent analysis of the 252 responses received from 200 organisations and 52 individuals. (2)

There was broad overall support for the five priorities set out in the Strategy, particularly the whole systems approach but with a number of caveats. For instance some felt there is too much emphasis on the oil and gas sector given the draft Energy Strategy’s focus on decarbonisation.

The five priorities were:

- continuing to support the recovery of North Sea oil and gas as a highly regulated source of hydrocarbon fuels;
- supporting the demonstration and commercialisation of Carbon Capture and Storage and CO2 Utilisation;
- exploring the role of new energy sources in Scotland’s energy system;
- increasing renewable energy generation; and
- increasing the flexibility, efficiency, and resilience of the energy system as a whole.

There was overall support for the proposed target to supply the equivalent of 50% of all Scotland’s energy consumption (not just electricity but heat and transport as well) from renewable sources by 2030. Some respondents outlined a number of key elements needed to create the commercial development of the onshore wind industry without subsidy. Several respondents quoted research undertaken by Ricardo AEA which supports this target:

“The 50% target is consistent with independent research for WWF Scotland, Friends of the Earth Scotland and RSPB Scotland by Ricardo AEA – The Energy of Scotland report – which found that a

50% renewable energy target for 2030 was a cost optimal pathway for delivering on the Scottish Climate Change Act based on MARKAL modelling. This echoes further analysis for Scottish Renewables showing a strong case for setting a 50% target.”

There was support for the Scottish Government’s ambition to achieve a subsidy-free onshore wind sector in Scotland. Some noted that costs are falling across the sector and that onshore wind is now among the lowest cost forms of new power generation.

There was overall support for developing the role of hydrogen in Scotland’s energy mix; and a key benefit is the capacity to use the existing gas distribution network. There were suggestions that hydrogen capacity can be set up on sites adjacent to large scale wind energy sources to enable use of surplus energy. There were calls for the further development of the UK Hydrogen and Fuel Cell Roadmap, with a number of suggestions for a similar Scottish-based roadmap. Many respondents, said hydrogen should be produced from low carbon sources such as electrolysis using renewable energy. Some of these respondents noted they did not want hydrogen produced from fossil fuels, with the reason being that it will not contribute to the renewable energy target of 50% if fossil fuels are used. One felt the draft Energy Strategy did not focus enough on the benefits of green hydrogen over brown, with another suggesting consideration of Power to Gas (P2G) which generates hydrogen from surplus renewable energy and then combines it with carbon dioxide to make methane.

There was overall support for an energy efficiency target, although several respondents felt this needs to be more ambitious and many noted the need to align this with the EU ambition to implement an effective energy efficiency target of 30% by 2032. (In fact there is cross-party support in the European Parliament for an ambitious 40% target. (3)) There was much support for smart, local energy systems.

Scottish Energy Company

Many respondents identified a need for some form of public agency to support an energy transition. There were some suggestions for a centralised energy agency along the lines of the Danish Energy Agency. Other suggestions included: Energy Service Companies (ESCOs), Government and Community-Owned Energy Companies (GOECs) and Municipal Energy Companies (MECs). A number of roles were identified for a GOEC; these included the provision of finance to support community-ownership, shared ownership or the development of energy systems projects; as a supplier of last resort; or information provider. Some felt that a GOEC would allow for innovative energy systems and projects, and could act as a catalyst for new developments and accelerate the development of renewable heat technologies. It was suggested that a GOEC could support renewable energy by sourcing power from local energy providers.

“Establishing an arm’s length GOEC with roles in supporting existing and new energy schemes and initiatives, and delivering energy infrastructure including district heating, could remove some of the barriers from establishing district heating that have been identified by the development industry. These barriers include the financial burden and long term involvement associated with installing, managing, maintaining and operating a district heating network.”

There was some opposition from several respondents to the creation of a GOEC. A key reason for this was that it would detract from the existing range of initiatives and activities undertaken by other organisations, with some of these noting their support for initiatives already in place such as CARES, LCIPT or the Innovation Fund. As such, there was some commentary that a GOEC should meet gaps in the market rather than replicate existing resources. Some felt that it would be better for the Scottish Government to support the growth of community not-for-profit energy supply companies and thus the growth of developments in the district heating or CHP markets. The most frequently cited alternative model – often by respondents from Local Government – was ESCos (Energy Service Companies). The advantage of an ESCo is that it might be easier to roll out locally and will have an understanding of local community needs. Also, an ESCo can help to provide energy and tariffs to customers at a lower cost while at the same time providing a source of income for local authorities, which in turn may reduce the burden on the Scottish Government financing of local authorities.

A centralised Energy Agency, like the Danish Energy Agency, could focus on delivery, measurement and verification of projects and offer the services of a ‘one-stop-shop’, acting as a centralised planning authority, offering procurement services, expertise and managing relationships with other national bodies. There were also some comments on the range of funds and initiatives that are available within this sector and the need for an organisation to simplify and offer advice on what support is available and how this can be accessed. It was also suggested that this Agency could have responsibility for the delivery of SEEP and that LHEES could learn lessons from the Danish model. There were also a small number of mentions of other countries operating central agencies along similar lines and these included the Sustainable Energy Authority of Ireland and Sweden.

Many respondents expressed support for a Scottish Renewable Energy Bond, although several noted that the Bond should focus on a wider range of energy sectors and not just renewables. Several respondents noted that finance is likely to be a key challenge for complex local energy schemes and a Bond could be an important mechanism to deliver such schemes. Several others noted that it will allow savers and investors to have a stake in the renewable energy sector and open up ownership to a broader range of audiences.

The need for nuclear to form part of the energy mix, was described as a ‘recurring sub-theme’ in responses along with suggestions that the Scottish Government should review its stance regarding nuclear. The use of Small Modular Reactors on former thermal generation sites was raised.

Onshore Wind Policy

The SG consultation on a draft Onshore Wind Policy Statement was one of a number of consultations published alongside the draft Energy Strategy. The draft Onshore Wind Policy Statement reaffirmed SG’s existing onshore wind policy and the consultation asked for views on a number of issues relating to supporting the sector. Several respondents, notably from the onshore wind industry group, cited the importance of SG continuing its lobbying efforts with the UK government to secure long term Contracts for Difference (CfD) for onshore wind. (4)



Energy Efficiency

A third report looked at responses to the Scottish Government's public consultation on energy efficiency and condition standards in private rented housing. (5). A key theme to emerge was around the practicality and cost implications of extending some of the proposed required improvements to older, rural properties and agricultural tenancies. Views were mixed on the proposed timescales for introducing a minimum standard of Energy Performance Certificate (EPC) band E, first at change of tenancy and then at a backstop date. Those who disagreed with the proposed timescales tended to think they were too soon.

Respondents were asked whether they thought that the minimum energy efficiency standard should first of all apply only to those properties where there is a change in tenancy, and after that to all private rented properties. A majority of respondents (63% of those answering the question) agreed. A small majority of respondents (53% of those answering the question) disagreed that 1 April 2019 is the right date to start applying the minimum standard of EPC band E when there is a change in tenancy. There was no clear balance of opinion as to whether 31 March 2022 is the right backstop date, by which all privately rented properties would need to meet the minimum standard of E (44% agreed and 45% disagreed).

Scotland's Energy Efficiency Programme (SEEP)

A fourth report analysed responses received to the consultation on Scotland's Energy Efficiency Programme (SEEP) published in January 2017. The consultation document on SEEP set out the long-term vision for Scotland's building stock and looked at different options for programme and policy design to deliver the vision. (6)

Respondents commented on the importance of local authority involvement, delivery and partnership working. The approach taken in the Home Energy Efficiency Programme: Area-Based Schemes (HEEPS: ABS) was supported by many respondents. Funding was a key theme with respondents welcoming schemes providing interest-free loans and grants. Respondents also highlighted potential issues around capacity, especially at local authority level, to deliver SEEP, and the need for quality assurance. This included a need for clear quality guidelines and independent quality assurance to ensure quality is not compromised as the number of installations increase.

Funding for the installation of energy efficiency improvements and lower carbon heat supply attracted comments on the need to ensure that those facing fuel poverty took precedence in receiving grants. Views on how the able-to-pay sector should be supported were mixed, although many respondents suggested they should have access to low cost loans. The need to incentivise the able-to-pay sector was also highlighted, particularly given low-levels of engagement in recent years.

The need for local authority-led schemes emerged in responses to the question of how SEEP can be designed and promoted to build consumer confidence; respondents said that this should be coupled with national leadership.

Heat and Energy Efficiency Strategies

The SG consultation paper on Local Heat & Energy Efficiency Strategies (LHEES) and Regulation of District Heating was a policy scoping consultation, designed to gather views to help inform further development of the proposals prior to more detailed consultations. (7)

Most of those who replied agreed that local authorities should have a duty to produce and implement a Local Heat & Energy Efficiency Strategy (LHEES). Key themes included that this will be vital in taking the strategy forward, or to raise the profile of heat and energy efficiency in each area. A key concern was availability of funding, support or other resources to enable local authorities, and others involved, to produce or implement the LHEES. In relation to local authorities having the power through LHEES to zone areas for district heating, this was supported by many respondents, although fewer than half of all respondents gave a definitive answer to this question. The main theme to emerge was that zoning areas for district heating could be aligned to local and area plans for development.

Finally, SG has now launched a Second Consultation on Local Heat and Energy Efficiency Strategies, and Regulation of District and Communal Heating. Based on the evidence and views gathered from stakeholders through the first consultation and other engagement, this consultation document sets out more specific policy proposals for LHEES, and regulation of district and communal heating. (8)

After the initial consultation a Short Life Working Group on Heat Regulation further supported and encouraged the Scottish Government to develop policy proposals using the full extent of its powers.

To support appropriately-sited, low carbon, affordable district heating, the SG is consulting further on the development of a policy and regulatory system which will see district heating develop in a strategic manner, and provide appropriate conditions on the ground to accelerate delivery of district heating and to grow this market. In order to achieve this we are consulting further on a proposed regulatory framework in which:

- district heating and communal heating providers will serve their customers well;
- district heating and communal heating providers will deliver affordable and low carbon heat;
- there is increased confidence in the investment in new and expanded district heating; and
- wherever possible, Scotland secures the economic opportunity presented by both reducing costs to customers and, infrastructure investment opportunities for the Scottish supply chain.

SG is now consulting further on a proposed approach to district (and communal) heating regulation, and to the development of Local Heat & Energy Efficiency Strategies (LHEES).

Local authorities would have a statutory duty to develop a Local Heat & Energy Efficiency Strategy (LHEES) to cover a 15-20 year period, setting out the overall energy efficiency and heat decarbonisation strategy for SEEP, authority-wide. Prior to commencement of this duty, local authorities would be offered capacity and support to develop LHEES.

Developers would need to obtain a district heating consent to develop district heating. The consent would have conditions associated with it, including the requirement to have a licence and meet licensing conditions. SG is also exploring options for ensuring that district heating operators have similar or the same rights as other statutory undertakers for permitted development and wayleaves. Developers would need to obtain a licence to develop and/or operate in addition to holding a district heating consent. The licence would ensure technical and operational quality standards, network compatibility, and would codify existing UK-wide consumer protection frameworks.

-
1. Scottish Energy Strategy: The Future of Energy in Scotland, Scottish Government, January 2017 <http://www.gov.scot/Resource/0051/00513324.pdf>
 2. Scottish Government 14th Nov 2017 <http://www.gov.scot/Publications/2017/11/9688>
 3. Energy Post 15th Nov 2017 <http://energypost.eu/how-meps-misuse-energy-poverty-to-water-down-efficiency-legislation/>
 4. Consultation on a Draft Onshore Wind Policy Statement: Analysis of Responses, Scottish Government, November 2017 <http://www.gov.scot/Resource/0052/00527479.pdf>
 5. Energy efficiency and condition standards in private rented housing: Analysis of responses to the public consultation exercise, Scottish Government 14th Nov 2017 <http://www.gov.scot/Resource/0052/00527330.pdf>
 6. Consultation on Scotland's Energy Efficiency Programme: Analysis of Responses, Scottish Government 14th Nov 2017 <http://www.gov.scot/Resource/0052/00527527.pdf>
 7. Consultation on Heat and Energy Efficiency Strategies, and Regulation of District Heating: Analysis of Responses, Scottish Government, November 2017 <http://www.gov.scot/Resource/0052/00527547.pdf>
 8. Scotland's Energy Efficiency Programme: second consultation on local heat & energy efficiency strategies, and regulation of district and communal heating, Scottish Government, November 2017. <http://www.gov.scot/Resource/0052/00527606.pdf>

7. Scottish Energy Company

In October, Nicola Sturgeon pledged at the SNP national conference to set up a publicly owned, not-for-profit energy company “By the end of this parliament.” Kenny Farquharson, writing in The Times, predicted that the new Company could become “the Uber of electricity”. After all, the first minister promised a simple but disruptive intervention in the market. As she described it to her party: “Energy would be bought wholesale or generated here in Scotland – renewable, of course – and sold to customers as close to cost price as possible. No shareholders to worry about. No corporate bonuses to consider.”

Alf Young, also writing in The Times asks if a bold national champion of energy supply, whose only job is “to secure the lowest price for consumers”, is really what the Scottish government has in mind? The 2016 SNP manifesto called for a government-owned energy company which would help the growth of local and community energy projects. There are a growing number of such projects

already across the UK. Back in 2002 Aberdeen city council launched Aberdeen Heat and Power to develop and operate district heating and combined heat and power schemes that now cover 33 multi-storey blocks and 15 public buildings in the city. The Edinburgh-based Our Power supplies electricity and gas on a not-for-profit basis to homes across Scotland. It is owned by social housing providers, community organisations and local authorities. By contrast People's Energy, the brainchild of Gullane couple David Pike and Karin Sode, which was launched this year, was crowd-funded and intends to return three quarters of its profits to customers.

Would the new Scottish Government Company ensure that many more such alternative enterprises enter the domestic energy market, as the 2016 manifesto indicated or would it be a direct competitor, determined to do to the Big Six commercial suppliers what Uber did to the established taxi trade? If it does, what future is there for enterprises such as Our Power and People's Energy? The wires that deliver electricity in Scotland, from generators north of the border or as imports, will still be controlled by Scottish Power and SSE.

The Scottish Government's draft energy strategy offers few clues. Until the final strategy is launched, we simply don't know what kind of Energy Company is planned. If it wants to be a big supply player in its own right, it faces multiple challenges. The first will be start-up costs. The bigger they are, the harder it will be to offer consumers the lowest price. Does the Company intend to trade in gas as well as electricity? If so where is the gas coming from? (1)

Jack Ponton, professor of engineering at the University of Edinburgh, points out two thirds of domestic energy consumption is gas. There is no way in which the quantity of gas consumed in Scotland could be produced by the only renewable process, anaerobic digestion. If crops are specially grown for feedstock, there is only enough arable land in Scotland to provide enough of this to supply gas for 130,000 of our 2.4 million households, and most of this land is required to grow food. It is also probably the most expensive source of fuel gas. Currently consented wind developments are certainly now sufficient to provide all Scotland's electricity renewably, but only when the wind is blowing. When it isn't we now have to import electricity from England. It is also unclear how this "green" company could avoid selling nuclear-generated electricity from Torness and Hunterston, or indeed from England or France. Electricity on the grid is not labelled by its source. The wholesale cost of electricity is less than half of what consumers pay. Contrary to popular belief, no one is making much money right now selling electricity. It may surprise those whose electricity bills have just increased to hear that wholesale prices are at a near record low. (2)

As reported at the October meeting, Alastair Martin chief strategy officer of Edinburgh-based demand management company – Flexitricity - has offered one of the most inspirational visions for a future Scottish Energy Company. He says community energy changes the game. Aberdeen, Gateshead and Nottingham all have publicly-owned community energy schemes based around heat networks. Community schemes can find synergy between different energy uses and generation capabilities. One site's cooling problem is another's heating opportunity. A solar farm might be held back by network constraints just when it's sunniest, but not if there's a local vehicle charging station ready to soak up the excess.

Community energy doesn't just diversify the energy mix; it can actually make money for the consumer. Better yet, community energy means community engagement. Creating a challenger

supplier is a lot cheaper than nationalisation, and it's more likely to have the desired effect of forcing established suppliers to improve their game. But by supporting community energy, the new Company could transform the dynamics of the Scottish energy system. The new business should support a decentralised network of community energy assets of all types, underpinned by full use of smart grid technology to ensure these assets are used to maximum efficiency. It'd be big, bold and unprecedented – but the time for timidity is over. Energy is transforming anyway. By getting into the heart of that change and directing it towards communities, the First Minister can achieve her goal of protecting vulnerable people, and at the same time make energy work for everyone. (3)

-
1. Times 1st Nov 2017 <https://www.thetimes.co.uk/edition/scotland/sturgeon-power-got-the-stamp-of-approval-but-for-what-exactly-m3sjj3h53>
 2. Times 19th October 2017 <https://www.thetimes.co.uk/edition/scotland/low-cost-energy-initiative-would-have-a-high-price-fsbnb2mnz> and Times 25th October 2017 <https://www.thetimes.co.uk/edition/scotland/kenny-farquharson-comment-national-energy-company-can-generate-change-66lz7ts92>
 3. Energy Voice 16th Oct 2017 <https://www.energyvoice.com/opinion/153251/opinion-unleashing-sturgeonpower-transform-scotlands-energy-landscape/>

8. Scottish Investment Bank

Nicola Sturgeon has opened a public consultation on the Scottish National Investment Bank (SNIB), pledging that the Scottish Government will 'seize the economic opportunities of tackling climate change'. Mariana. Mazzucato, Professor of the Economics of Innovation and Public Value at University College London and a member of Scotland's Council of Economic Advisors, commented:

"I welcome strongly the decision to establish the Scottish National Investment Bank. It shows that the Scottish Government is looking seriously at ways to increase flows of investment and to direct them to support key public policies like reducing greenhouse gas emissions, increasing productivity and building an inclusive economy. There is a lot of experience from other countries of what works and what doesn't and if we draw from that, the bank can make a real difference to Scotland's economy." (1)

Friends of The Earth Scotland, the Scottish Trade Union Congress (STUC) and economists have united to urge the Scottish Government to use the opportunity to invest heavily in a low-carbon economy. The plans could transform Scotland's economy and create thousands of green jobs.

Dr Richard Dixon, director of Friends of The Earth Scotland, said the development of the bank should be closely aligned with plans for a state-owned energy company in Scotland and the establishment of the government's new Just Transition Commission. He said the bank could work to help fund the investment that moves us to a low carbon economy.

“If the bank develops the right remit, it could create thousands of green jobs by transforming our transport, heating, housing and electricity. By working closely with the recently unveiled Just Transition Commission and government-owned energy company they can deliver a joined up economic strategy that puts tackling climate change at its heart.”

STUC general secretary Grahame Smith said:

“It is also imperative that every investment made by the bank honours the principles of fair work and that the jobs developed are high quality, providing security, respect, and an effective voice for every worker. We look forward to working with the Scottish Government to ensure that the new bank functions effectively and to that end its governance should include representatives of trade unions and the environmental sector in order to ensure a just transition.” (2)

The Scottish National Investment Bank Consultation closed on 20th November 2017

<https://consult.gov.scot/economic-policy-unit/scottish-national-investment-bank/>

-
1. Scottish Energy News 6th Nov 2017 <http://www.scottishenergynews.com/london-economists-welcome-green-energy-opportunities-in-new-scottish-investment-bank/>
 2. STV 23rd Oct 2017 <https://stv.tv/news/scotland/1400492-national-investment-bank-could-create-thousands-of-jobs/>

9. Fuel Poverty

The Scottish Government has launched a consultation on a new long-term strategy to tackle fuel poverty. The consultation will run until 1 February 2018 and will seek opinions on, among other things, ambitious targets for fuel poverty reduction - with a revised definition recommended by an independent, expert review - and the timescales for meeting them.

Responses to the consultation will inform the new strategy and the development of a Warm Homes Bill, due to be introduced in 2018, which will enshrine the proposed new fuel poverty target in legislation.

Housing Minister Kevin Stewart announced the consultation at the annual Energy Action Scotland conference in Crieff. He said the “...fuel poverty strategy and Warm Homes Bill will take a bolder and more focused approach to reducing fuel poverty.”

He said the Government is delivering on the Programme for Government 2016 commitment to make half a billion pounds available over the next four years. By the end of 2021 we will have allocated over £1 billion since 2009 on tackling fuel poverty and improving energy efficiency. An independent panel of four academic experts was established earlier this year to consider changes to how fuel poverty is defined, and recently published a paper presenting their findings. This followed the Fuel Poverty Strategic Working Group’s conclusion that the current definition may be impeding efforts to target those most in need.

The consultation document is available here: <https://consult.gov.scot/better-homes-division/fuel-poverty/>

The Government missed its target to eradicate fuel poverty by 2016 and is looking to set new goals to reduce it. Almost a third of homes are still suffering from fuel poverty, campaigners say.

The new strategy wants the overall fuel poverty rate to be less than 20% by 2030 and less than 10% by 2040. Energy efficiency should be removed as a driver for fuel poverty by 2040 by ensuring all homes reach a minimum energy performance rating.

One correspondent to The Herald pointed out that achieving these new goals will be an uphill battle because of the commitment to phase out fossil gas central heating. The average fuel consumer uses 3,500 units of electricity (14p per unit) plus 21,500 units of gas (4p per unit) resulting in an annual bill of £1,350. If gas is replaced with electricity the bill would jump to £3,500. (3)

The official increase in deaths during winter in Scotland fell slightly in 2016-17 compared with the previous year. The number is calculated by comparing the number of fatalities over the four winter months with the average of the four-month periods before and after. This was estimated at 2,720 for 2016-17, a drop of 130 from the previous year, according to the National Records of Scotland (NRS). But this seasonal increase exceeded the level in five of the ten previous winters. Winter deaths reached a 15-year high in 2014-15 when the seasonal difference reached 4,060. Keith Robson, of Age Scotland, said: "Cold weather can have a serious, and indeed deadly, impact on people who have existing health conditions such as heart disease, respiratory problems or dementia. We want an ambitious energy-efficiency programme to transform Scotland's housing and ensure older people can live in warm, comfortable homes. We also need to tackle scandalously high energy bills and the rising number of pensioners living in poverty." (4)

-
1. Scottish Government Press Release 9th November 2017 <https://news.gov.scot/news/tackling-fuel-poverty-1>
 2. Herald 0th November 2017 http://www.heraldscotland.com/news/15650553.Country_taking_a_bolder_and_more_focused_approach_to_tackling_fuel_poverty/
 3. Herald 14th Nov 2017 http://www.heraldscotland.com/opinion/15656903.Letters_The_SNP_s_latest_fuel_poverty_strategy_is_doomed_to_failure/
 4. Times 18th Oct 2017 <https://www.thetimes.co.uk/edition/scotland/winter-death-toll-prompts-call-to-end-scots-fuel-poverty-w7pt5mqw9>

10. Green Heat

The UK energy transition may be progressing on the electricity side, but less progress has been made on green heat. A new Energy Research Partnership (ERP) report on decarbonising heat, 'Transition to

low-carbon heat', looks at the technical, social, financial and governance aspects and highlights the key actions that need to be taken now and in the next few years.

The ERP is a high-level forum bringing together key stakeholders and funders of energy research, development, demonstration and deployment in Government, industry and academia, plus other interested bodies, to identify and work together towards shared goals. ERP's remit covers the whole energy system, including supply (nuclear, fossil fuels, renewables), infrastructure, and the demand side (built environment, energy efficiency, transport).

To replace the use of fossil fuels in our homes ERP says there are three options: (1) the use of decarbonised (or green) gas; (2) replacement of gas central heating with electric heating or (3) the installation of district heating networks. But it is not a simple choice: each option has challenges that could limit deployment. A combination of options is likely to be required with no one option dominating, in the way that natural gas currently does.

The Scottish Government's (SG's) Draft Energy Strategy set a new target to provide the equivalent of 50% of Scotland's heat, transport and electricity consumption from renewable sources by 2030. The SG wants to achieve a significant change in deployment of affordable low carbon district heating as part of the route to a largely decarbonised heat system and wants to establish a regulatory framework to support this vision. But the UK National Comprehensive Assessment of District Heating and Cooling (2015), estimated that only 4TWh p.a. (7%) of Scotland's total heat demand in 2025 could be met by district heating and cooling on a socially cost-effective basis. The UK Committee on Climate Change estimates that by 2050, district heating could supply up to 20% of the UK's total building heat demand.

So, unless we can decarbonise gas, it appears that a large proportion of households with gas central heating could be expected to rip out their boilers and radiators and install a completely new system probably using ground or air-source heat pumps or other forms of electric heating. This would be extremely expensive for each individual consumer and most people probably couldn't afford it without massive subsidies. Electricity distribution networks may find it difficult to cope with the huge fluctuations in demand on a really cold winter's day without extensive upgrading as more and more heating is transferred to electricity. (2)

It would seem sensible to look at the possibility of continuing to use the UK's gas distribution grid, developed over many years and recently upgraded with new pipes, for the distribution of decarbonised gas. Unfortunately regulation of the gas network is a matter reserved to UK Parliament, and decisions on the future decarbonisation of the gas network are not expected to be taken by the UK Government until after 2025. The SG's Climate Change plan therefore prioritises demand reduction measures in the period from now until 2025, after which we expect there to be a clear decision on the future of gas in the UK.

ERP says several low-carbon heating options need to be pursued in parallel now. Early in 2020s, critical actions and decisions will need to be taken, by Government, to avoid closing-off options, undermining their potential, or increasing their costs. For example, it says it will be urgent to determine 'the extent to which hydrogen could be used to decarbonise the gas system'.

Emeritus Professor of Renewable Energy, Dave Elliott, writes that the UK Government's new Clean Growth Strategy includes amongst other things, a £20m R&D/innovation funding for low carbon heat and energy efficiency, but that is dwarfed by the £480m proposed for nuclear R&D, on Small Modular Reactors and the like. Maybe the priorities need debating further. There are arguably more urgent options to explore- Power to Gas (P2G) especially. (3)

Power to Gas

P2G - the conversion of electrical power into gaseous energy carriers - is a quickly improving and potentially disruptive energy conversion technology. It offers many of the same services of other energy storage technologies such as batteries but with the added ability to be stored for long periods in the form of hydrogen. P2G is primed for significant growth in coming years as demand for clean hydrogen grows, electrolyzer capital costs fall, and cheap renewable energy bathes the grid.

Hydrogen energy storage systems can have lower capital costs than lithium-ion batteries for discharge durations of more than about 20 hours. Electrolyzers can also ramp production up or down quickly – ideal for a system with lots of intermittent energy. Electric utilities are gradually beginning to recognize the value P2G can bring to their grid, and gas utilities are beginning to recognize hydrogen as a potentially significant fuel of the low carbon future. The longer-term vision of companies like Engie and others is to generate hydrogen where cheap renewables exist, and export it to demand centres. Generating hydrogen from renewables can be a win-win for energy systems across the globe. (4)

In Germany Uniper (formerly part of Eon) has been testing a P2G plant at Falkenhagen which separates water into hydrogen and oxygen using electrolysis. The plant feeds small amounts of pure hydrogen (so-called "WindGas") directly into the natural gas network. (5) But there are technical limits on how much hydrogen can be added to the natural gas network. Currently this is around 5 to 10%. So a new methanation plant will be added at Flakenhagen that will be able to convert hydrogen into methane using CO₂. This methane is synthetic natural gas, which can be added to the gas network in unlimited amounts and stored in the existing natural gas infrastructure. This enables surplus renewable energy to be used for the domestic gas heating market. It can also be used as backup whenever solar and wind power is not available to generate electricity. The plant is scheduled to be completed in the spring of 2018. (6)

Germany company – Electrochaea – has developed a commercially viable process which converts low-cost and stranded electricity and carbon dioxide into pipeline-grade renewable gas for direct injection into the existing natural gas grid. The core of this power-to-gas system is a selectively evolved microorganism – a methanogenic archaea. The technical advantages of this biocatalyst mean the technology can operate at lower capital and operating costs and with greater flexibility than conventional thermochemical methanation processes. In November a company called Caloric won the tender for engineering and construction of a biomethanation pilot & demonstration plant in Solothurn, Switzerland using the Electrochaea system (7)



Hydrogen-powered vehicles

Sheffield-based ITM Power has been quietly building a global market in hydrogen technology, making electrolyzers that convert electricity to hydrogen. The gas can then be used in fuel cells to power vehicles. It is installing filling stations in the UK with Shell. While carmakers have been slower to produce hydrogen models than electric ones, bus companies and even hauliers, which return to a fixed point, are beginning to embrace it. Compared with electric motors, the range is better and refuelling – around six minutes. Electrolysers reduce the climate impact of making the gas. Creating a ton of hydrogen by traditional methods creates 12-16 tonnes of carbon dioxide. Using renewable electricity cuts that to zero. (8)

Hydrogen Council

The Hydrogen Council – a new coalition of companies which includes 3 oil majors - published a report at the Climate Conference in Bonn on the value of using surplus electricity (through water electrolysis) as a source of hydrogen, and then using it as energy for cars and for making renewable chemicals and fuels. As well as being a key pillar in of the energy transition, the study shows that hydrogen has the potential to develop US \$2.5tn of business, creating more than 30 million jobs by 2050. The study entitled Hydrogen, Scaling up outlines a comprehensive and quantified roadmap to scale deployment and its enabling impact on the energy transition. Deployed at scale, hydrogen could account for almost one-fifth of total final energy consumed by 2050. (9)

Island Energy

A project that might be relevant to Scottish Islands is being run by ENGIE and Schneider Electric on Semekau Island which is located to the south of Singapore. The two companies have installed a microgrid on the island. The network uses a 100 kW turbine, a large PV array, batteries and an electrolyser to produce hydrogen during periods of surplus electricity. The gas will be used both for vehicles and to produce electricity from static fuel cells. (10)

The Orkney isles and Community Energy Scotland (CES) are taking the lead for the whole UK as the European Union explores ways for islands to capitalise upon their energy resources with a new £14 million smart grid project. The SMILE project (SMart ISland Energy systems) will see Orkney collaborate with technical, grid and academic partners across Europe and fellow island communities of Samsø in Denmark and Portuguese Madeira, to investigate how electricity producers, consumers and the grid that links them, should tackle energy storage and other challenges raised by renewables and electric transport. In light of Scottish and UK government proposals for significant moves away from petrol and diesel vehicles, SMILE helps to address how battery-powered vehicles (BPVs) will be re-charged in future to maximise electricity generation from renewable sources and not over-burden the grid. (11)

For independent energy charity CES, SMILE joins a suite of projects across Scotland where they are working with partners to overcome grid constraints so that community owned renewables can create local confidence and value, help people reduce their energy costs, strengthen local services, and promote skills and employment. With over 50MW of installed wind energy capacity generating over 46GWh per year of renewable power, Orkney has been a net exporter of electricity since 2013.

Many of the islands' wind turbines are often 'curtailed' due to local grid capacity restrictions, resulting in loss of significant proportions of their annual output; estimated to be between 30% and 70% of potential production for the worst affected. Smart grids are part of the answer for the need to flexibly, stably and reliably accommodate in the energy system the increasing share of distributed energy generation, increasing demands for energy and changes to the pattern of this demand. Through smart grids, peak generation and demand can be controlled, matched and the electricity system stabilized.

District Heating

Meanwhile, Clydebank is hoping to create a pioneering district heating network. The environmentally friendly scheme will use a water source heat pump to warm new homes, businesses and public buildings being constructed as part of the £250 million Queen's Quay regeneration project in Clydebank, on the site of the renowned John Brown's shipyard. The new district heat network will be the largest and most ambitious ever created in Scotland and will enable thermal energy, often wasted in power generation and industrial processes, to be captured and supplied directly to householders and workplaces. The network will be designed to allow future expansion. This means the nearby Golden Jubilee Hospital as well as the wider Clydebank area could be added later. (12)

West Dunbartonshire Council (WDC) approved the district heating network plan last November and was granted £6 million by the Scottish Government towards the £12m cost. (13)

- The largest hydrogen fuel cell installation in the UK has arrived at the under-construction Aberdeen Exhibition and Conference Centre (AECC). The cells will have a total electrical output of 1.4MW, which is on a par with the largest fuel cell installations in Europe. UK energy engineering specialist Doosan Babcock has supplied three cells which will provide an independent source of dependable, affordable, low-emission heat and power for the 150-acre site. It is claimed the move reinforces Aberdeen's status as Europe's Energy Capital as well as underlining the city's commitment to rebalancing the economy with a focus on energy transition. (14)

-
1. Transition to Low Carbon Heat, Energy Research Programme, October 2017 <http://erpuk.org/project/low-carbon-heat/>
 2. See the Green Gas Book https://alansenergyblog.files.wordpress.com/2016/07/final-the-green-gasbook_96pp_v5.pdf
 3. Environmental Research Web 4th November 2017 <http://blog.environmentalresearchweb.org/2017/11/04/energy-transitions-in-the-uk/>
 4. Renewable Energy World 13th Oct 2017 <http://www.renewableenergyworld.com/articles/2017/10/power-to-gas-for-renewables-integration-is-on-the-rise.html>
 5. See <https://youtu.be/paoZ9VTGSG8>

6. Store and Go 6th July 2017 https://www.storeandgo.info/fileadmin/press_releases/20160705_PM_Grundstein_Falkenhagen_StoreGo_ENG.pdf
7. Electrochaea 6th Nov 2017 http://www.electrochaea.com/wp-content/uploads/2017/11/20171106_PI_Caloric_Electrochaea_EN_FIN.pdf
8. FT 29th October 2017 <https://www.ft.com/content/8e84b6b4-bb32-11e7-9bfb-4a9c83ffa852>
9. Hydrogen Council 13th Nov 2017 <http://hydrogencouncil.com/hydrogen-scaling-up-new-roadmap-launches-at-cop-23/>
10. Enterprise Channel Asia 23rd October 2017 <https://enterprisechannel.asia/story/engie-and-schneider-electric-achieve-huge-milestone-together/>
11. Scottish Energy News 3rd November 2017 <http://www.scottishenergynews.com/orkney-lands-14m-eu-funded-smart-grid-project/>
12. Scotsman 26th October 2017 <http://www.scotsman.com/news/environment/clydebank-to-go-green-with-pioneering-river-powered-heating-1-4597236>
13. Clydebank Post 31st Oct 2017 http://www.clydebankpost.co.uk/news/15631085.Clydebank_power_plant_is_hot_topic_as_heating_network_design_is_unveiled/
14. Energy Voice 14th Nov 2017 <https://www.energyvoice.com/otherenergy/156072/uks-largest-hydrogen-cell-installation-arrives-new-aecc/>

11. Marine Renewables

Wave and tidal energy firms are warning that changes in UK government support may force them to take jobs and investment overseas. They say the UK government's switch to a system known as Contracts for Difference leaves them without access to ring-fenced support. They claim it fails to recognise the extra costs of new technologies.

The Department for Business, Energy & Industrial Strategy (BEIS) said it has to ensure best value for consumers. Under the Contracts for Difference scheme, power generators compete to secure a minimum price guarantee by offering the lowest price they can. But some in the marine renewables sector argue it still requires ring-fenced subsidies, as the technology develops.

James Murray from Scotrenewables told BBC Radio Orkney: "Other countries now are starting to recognise the benefits of supporting the early stages of the industry. Countries such as France and Canada have put in place appropriate levels of revenue support for first array projects. It would be a terrible shame, but it does look like unless the UK government changes its mind that we might have to do our first commercial projects there instead." This happened before, when the UK lost its lead in onshore wind turbines to Denmark. (1)

Scotrenewables tidal turbine, the SR2000, has been tested at the European Marine Energy Centre on Orkney over the past year. The trial has supplied up to 25% of the electricity on the island for short periods. The device has recently been generating more than 20 megawatt hours per day.

Scotrenewables Tidal Power has now hired an investment bank to help explore financing options to take the technology to market and deliver the first group of devices that can be deployed commercially. (2)

Scotland's position as wave power world leader could be lost after Brexit, unless long-term funding is secured to replace EU funding. The Carbon Trust estimates that wave power could deliver enough energy to provide around 20% of the UK's total annual electricity needs. But a paper, by Strathclyde University and Imperial College London, says the technology could sink without EU financial support. It has taken £200 million in research and development funding since 2000 to get the industry to its current position – but despite its lauded potential, it has yet to become commercial.

While the researchers say the UK has become “much better placed” to deliver a commercial wave energy device, they claim this could be derailed by Brexit as innovation funding and international collaboration falls away. The report recommends that Scotland must now develop its own long-term strategy. A strategy must be put in place that presents a credible path towards delivering a commercial wave energy device in Scotland that is resilient to the potential withdrawal of UK Government and/or EU funds. (3)

Recent years saw pioneering Edinburgh-based wave firms Pelamis and Aquamarine wound up because they couldn't make a success of the technology. A poor understanding of the scale of the challenge in mastering wave energy was highlighted in the report, as well as a premature emphasis on commercialisation and a lack of test facilities. Matthew Hannon, Chancellor's Fellow of Technology and Innovation at Strathclyde Business School, said: “The report's findings are aimed primarily at government and industry in a bid to help improve the effectiveness of future wave energy innovation support in the UK and accelerate the technology's journey towards commercialisation.”

Hannah Smith, senior policy manager at Scottish Renewables, called on government to “provide a viable mechanism to ensure the sector's continued development”, adding failure to do so “would risk losing Scotland's lead in this global industry”. The research was carried out by the Strathclyde team in conjunction with Imperial College London and focused on the failure to develop “market-ready” wave energy devices and where government and industry support fell short. Rapidly changing, poorly co-ordinated policies and a lack of knowledge exchange between technology developers was also blamed. (4)

“It's no secret that wave energy has not developed as fast as tidal stream energy technology,” says Emeritus Professor Dave Elliott of the Open University. Many wave devices have been tested and some are still under test, but it has proved harder to extract energy from the often turbulent wave environment than from the relatively calm undersea tidal flows. There have also been funding and programme management issues, as the Strathclyde/Imperial report shows. It claims that there was premature emphasis on commercialization. The requirement for state-supported developers to secure private-sector match funding had brought ‘intense investor pressure to reach commercialisation as quickly as possible’. (5)

“At present, the whole emphasis of UK energy policy is to go for ruthless market competition, so it does not look very promising for wave energy. There may be isolated niche markets where some

types of wave energy systems might prosper, and clever new ideas will no doubt continue to emerge, with, hopefully, costs coming down, as has happened with wind and PV solar. But for the moment, sadly, wave energy looks somewhat becalmed.”

-
1. BBC 1st Nov 2017 <http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-41833306>
 2. Times 7th Nov 2017 <https://www.thetimes.co.uk/edition/scotland/scottish-firm-seeks-funding-to-help-sell-tidal-turbine-2phr83rgp>
 3. The National 2nd Nov 2017
http://www.thenational.scot/news/15634661.Brexit_could_sink_Scots_wave_energy_lead__warns_report/
 4. Scotsman 2nd Nov 2017 <http://www.scotsman.com/news/environment/government-s-200m-wave-energy-plan-undermined-by-failures-1-4602617>
 5. Environmental Research Web 11th Nov 2017
<http://blog.environmentalresearchweb.org/2017/11/11/whatever-happened-to-wave-power/>

12. Renewables and Brexit

There are growing fears over the economic, regulatory and climate-change threats posed by Brexit to the Scottish energy sector. Brexit looms large as an uncertain backdrop to Scotland’s ambitious decarbonisation strategy. A new research report considers the extent to which Brexit poses a risk to renewable electricity investment in the UK – and Scotland in particular. The analysis reveals that, while the risk of a change in overall energy policy direction following Brexit is relatively small, the UK’s future access to EU-based finance, R&D, and skilled labour in the renewable energy sector remains far from assured.

The potential impact of Brexit on Scotland’s renewable electricity ambitions, Peter Zeniewski, University of Edinburgh November 2017

http://www.climatexchange.org.uk/files/4115/1057/0751/Brexit_impact_on_Scotlands_renewable_electricity_ambitions.pdf