

SAFE ENERGY E-JOURNAL No.80

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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/wp/wp-content/uploads/2018/10/NuClearNewsNo112.pdf>

1. Scottish Energy Policy

On 15th October the Scottish Government wrote a joint letter with the Welsh and UK governments to the Committee on Climate Change to seek updated advice on meeting the 1.5°C target following the IPCC's landmark report. (1) The Scottish government's current planned target is to cut emissions by 90% by 2050, up from a previous target of 80%. But green groups have argued the targets are not ambitious enough for a country trumpeting its climate leadership internationally, and are urging the government to go further and set a net zero goal. (2)

The letter said carbon budgets already covering the period 2018-2032 were out of scope of this request.

A group of over 150 MPs from across the political spectrum have written to the Prime Minister urging her to adopt a binding net zero emission target for 2050 at the latest before the end of the current parliament. (3)

Specifically, the governments asked the CCC to report on the date by which they should look to set a net zero target, as well as the range which UK greenhouse gas emissions reductions would need to be within, against 1990 levels, by 2050 as an appropriate contribution to the global goal of limiting global warming to "well below" 2°C above pre-industrial levels. It has also asked for the corresponding emissions range for a 1.5°C target.

The Intergovernmental Panel on Climate Change (IPCC) warned that limiting global warming to 1.5°C by the end of the century would require "*rapid, far-reaching and unprecedented changes in all aspects of society*", and that the world is currently heading for a 3°C rise in temperature. (4)

The Scottish Government has now written separately to the CCC changing its position and saying the previous request "*should not therefore prevent you from advising on all of Scotland's targets.*" (5)

In Westminster Labour's Energy Spokesperson, Alan Whitehead, called on the government to strengthen its review of the UK's long term carbon targets and allow the Committee on Climate Change (CCC) to assess whether existing near-term carbon targets are compatible with keeping temperature increases below 1.5C. CCC chief executive Chris Stark admitted he was surprised the letter explicitly stated that "*carbon budgets already set in legislation (Carbon Budgets 3-5 covering 2018-2032) are out of scope of this request*".

Alan Whitehead has written to Perry to urge her to reconsider the scope of the CCC's review. (6)

IPCC and nuclear

Interestingly, the IPCC said whilst the technical, social, economic and political feasibility of solar energy, wind energy and electricity storage technologies has improved considerably in recent years, nuclear energy and carbon capture and has not. The current timeframe between the date of decision and the commissioning of nuclear power plants is between 10 and 19 years, and current deployment capacity is slowed by public concern about the risk of accidents and problems with nuclear waste. In addition, the IPCC notes, that "*the costs of nuclear energy have increased over time in some developed nations, mainly because of the prevailing conditions, where increased investment risks in high-capital-intensive technologies have become important.*" The theoretical benefits that nuclear energy could bring in the fight against climate change are therefore far too weak, too slow, too expensive and too risky. While the IPCC report requires us to quickly reduce emissions, it is not possible to do this with the slowest and most expensive, dirtiest and riskiest electric generation technology. (7)

"In spite of the industry's overall safety track record, a non-negligible risk for accidents in nuclear power plants and waste treatment facilities remains. The long-term storage of nuclear waste is a politically fraught subject, with no large-scale long-term storage operational worldwide. Negative impacts from upsteam uranium mining and milling are comparable to those of coal, hence replacing fossil fuel combustion by nuclear power would be neutral in that aspect. Increased occurrence of childhood leukaemia in populations living within 5 km of nuclear power plants was identified by some studies, even though a direct causal relation to ionizing radiation could not be established and other studies could not confirm any correlation (low evidence/agreement in this issue)." (8)

- A review carried out by Climate Ready Clyde, a coalition of six councils, transport agencies, universities and government agencies has concluded that transport links and hospitals in the Glasgow area are at significant risk of being damaged or closed by climate change. The study said that by 2050 the area will be hit by far more powerful storms, by regular heatwaves and by heavy winter flooding, affecting up to 1.8 million people. That could see hospitals struggling to cope with abnormal temperatures or flooding, long stretches of motorway closed by floods, the West Highland line at risk of closure from coastal erosion and bridges at greater risk from gale-force winds. Failing to adapt and prepare for climate change could cost the Glasgow region several hundred million pounds a year by the 2050s from storm, flooding and heatwave impacts. (9)

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1. Letter to Lord Deben 15th Oct 2018 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/748489/CC_commission_for_Paris_Advice_-_Scot__UK.pdf
 2. Business Green 9th Oct 2018 <https://www.businessgreen.com/bg/news/3064153/scotland-promises-to-seek-fresh-climate-advice-following-ipcc-report>
 3. Business Green 15th Oct 2018 <https://www.businessgreen.com/bg/news/3064464/government-instructs-committee-on-climate-change-to-explore-15c-target>

4. BBC 8th Oct 2018 <https://www.bbc.co.uk/news/uk-scotland-scotland-politics-45782845>
5. See <https://greens.scot/news/ruskell-welcomes-snp-climb-down-after-ministers-attempted-to-delay-urgent-action-on-climate>
6. Business Green 19th Oct 2018 <https://www.businessgreen.com/bg/news/3064837/net-zero-labour-calls-on-government-to-let-ccc-assess-near-term-carbon-targets>
7. Greenpeace France (accessed) 14th Oct 2018 <https://www.greenpeace.fr/giec-considere-t-nucleaire-solution-climat/>
8. http://report.ipcc.ch/sr15/pdf/sr15_chapter5.pdf page 52
9. Guardian 31st Oct 2018 <https://www.theguardian.com/environment/2018/oct/31/glasgow-major-roads-railways-and-hospitals-at-risk-from-climate-change-study>

1 Committee on Climate Change's (CCC) 2018 Progress Report to the Scottish Parliament

Scotland still outperforms the UK in reducing emissions, according to the Committee on Climate Change (CCC) but transport and agriculture remain significant challenges. (1)

The Committee on Climate Change's (CCC) 2018 Progress Report to the Scottish Parliament (2) shows that Scotland is performing well as total emissions fell by 10% in 2016, compared to 2015. The lion's share of this latest drop in emissions came from electricity generation, but following the closure of Scotland's final coal plant, Longannet, Scotland's strategy must now move on decisively.

The Scottish Government's new Climate Change Bill sets an ambitious target of reducing emissions by 90% by 2050 compared to 1990 levels. The Committee's new report shows that the 2020 interim target of reducing emissions by 56% on 1990 levels is now within reach. The Scottish Government's Climate Change Plan is an ambitious statement of intent and improves on the draft plan presented in 2017. The Committee also commends the new Energy Efficiency Scotland Routemap. Nevertheless, achieving the 2050 target is only possible when effective policy extends to other sectors of the Scottish economy, where emissions are flat or rising.

Transport is now Scotland's biggest sectoral challenge. Emissions from transport have increased each year since 2010, with a further 2% increase overall in 2016. The Scottish Government announced last year an ambition to cut emissions from road transport – phasing out petrol and diesel vehicles by 2032 – but it's unclear how these policies will deliver a more rapid transition than the rest of the UK. Emissions from agriculture, forestry and land use also present substantial challenges; relying on voluntary measures for agriculture as well as uncertain funding for targets for tree planting and peatland restoration.

Overall, Scotland met its annual emissions targets in 2016. Actual emissions in 2016 were 49% below 1990 levels, and the Climate Change Bill's interim target for at a 56% reduction in actual emissions by 2020 is within reach. In 2016, 17.8% of Scotland's total energy came from renewable sources; outperforming the UK overall and ahead of the EU average of 16.7%.

But low-carbon heat, transport, agriculture and forestry sector policies need to improve in order to hit 2032 emissions targets. A clear plan for rolling-out electric vehicle (EV) charging infrastructure is needed to ensure the Scottish Government's 100% take-up target is achieved by 2032; the recent £15m funding for EV charging infrastructure announced by the Scottish Government in September 2018 will help achieve this ambition. In developing effective policies, the Energy Efficient Scotland Route Map should be considered best practice for setting statutory commitments within a regulatory framework.

The Scottish Government's Climate Change Plan – published in February 2018 – now has sensible expectations across each sector to reduce emissions. This includes more realistic deployment of low-carbon heating and an ambition to increase electric vehicles usage. In agriculture ambitions to reduce emissions has been scaled back further from the Committee's assessment of the initial draft plan. Overall, the Committee finds the Plan credible in meeting medium-term targets to 2050 and well-balanced across most sectors. The challenge now will be to deliver on this ambition.

Scotland must now urgently strengthen its plans. The CCC warns that the Scottish Government needs to act decisively across every sector to ensure the country meets its existing commitments and prepares for higher future targets. Achieving a 90 per cent cut in emissions by 2050, as envisaged within the new Climate Change Bill, means greater effort is now required across other areas of Scotland's economy. (3)

Emissions from transport have shot up every year since 2010. Last year alone saw a further 2% rise overall. It is unclear, the CCC adds, how phasing out petrol and diesel vehicles by 2032 will give Scotland a faster transition than the rest of the UK. The committee also queries whether voluntary measures in agriculture are sufficient. Tree-planting targets have also been missed. The message could not be clearer: unless real action is made, the long-term goals may not be reached. Environment Secretary Roseanna Cunningham could not have had a less unambiguous warning. The battle is far from over.

A major part of Scotland's plan to reduce transport emissions is the planned phase-out of new petrol and diesel cars or vans by 2032, eight year earlier than the equivalent UK government target. The government also promises to introduce low-emissions zones in Scotland's four biggest cities, electrify 35% of Scotland's rail network, as well as ensure a third of the ferries owned by the Scottish government are low carbon by 2032. (4)

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1. Committee on Climate Change Press Release 24th Sept 2018 <https://www.theccc.org.uk/2018/09/24/scotland-still-outperforms-the-uk-in-reducing-emissions-but-transport-and-agriculture-remain-significant-challenges/>
 2. Reducing Emissions in Scotland 2018 Progress report Committee on Climate Change <https://www.theccc.org.uk/wp-content/uploads/2018/09/Reducing-emissions-in-Scotland-2018-Progress-Report-to-Parliament.pdf>
 3. Scotsman 24th Sept 2018 <https://www.scotsman.com/news/environment/watchdog-warns-scotland-must-slash-transport-and-agriculture-emissions-1-4804211>

4. Herald 25th Sept 2018 <https://www.heraldscotland.com/opinion/16900610.herald-view-sober-warning-for-scotland-over-greenhouse-gases-target/>

2 Scottish Energy Company

On 8th October 2018, the Scottish Government announce that it is commissioning an Outline Business Case (OBC) to develop a detailed proposal for a Scottish Publicly-Owned Energy Company (POEC). This is expected to be concluded towards the end of 2018. As part of its development the independent consultants will engage with key stakeholders to inform their conclusions. Once Ministers have considered the report a full public consultation will be held setting out the proposed approach; our vision and what the energy company should and should not do. (1)

The Government says to best balance risks and opportunities, and align with the Scottish Government Energy Strategy's local energy principle, a Local Authority led model would be preferable. The Strategic Outline Case (SOC) presented a number of options for delivery, the economic case of the OBC will present developed variations of the 'federal model' described in the SOC and provide a detailed analysis of these options and the Scottish Government support that would be effective in facilitating Local Authorities to deliver them.

A new Scottish publicly owned energy firm could use the "greater trust" it would enjoy as the country's national supplier to sway Scots to switch and ensure its success, MSPs have been told. It could be critical to the core aim of the proposed new national power company to lower energy prices north of the Border, a report by Strathclyde University's International Public Policy Institute indicates. Nicola Sturgeon has pledged to establish a new public owned energy company (POEC) by 2021 and a report for Holyrood's economy committee indicates that persuading enough Scots to switch to the new supplier will determine its ability to lower prices. Rates of fuel poverty remain high in Scotland with 26.5 per cent of households being fuel poor in 2016. Citizens Advice Scotland also warns MSPs that the one of the key challenges facing the new energy company will be persuading poorer Scots – most likely to need its service – to switch. "The POEC will need to consider innovative ways of attracting typically disengaged, fuel poor customers to ensure that they can benefit from lower-cost tariffs and thus fulfil its aim," CAS states in a submission. "Consumer trust in energy suppliers is still low and while some consumers may feel greater trust in a POEC which is not operating for profit, a POEC would arguably be more vulnerable to a loss of trust if it faces difficulties (e.g. inability to maintain competitive tariffs, poor customer service) than other energy companies given its high profile and the likelihood of greater scrutiny," it adds. (2)

APSE Conference 2nd&3rd October in Stirling

Neil Ritchie – the Scottish Government civil servant heading up the team working on setting up a publicly-owned energy company (POEC) – told the conference that a key theme of the Government's Energy strategy is local solutions. Many councils already have Energy Service Companies (ESCOs) in place or ambitions to set up an ESCO. The POEC will be focused on delivery outcomes – building on success, not re-inventing wheels. Stakeholder sessions will be held with one specifically just for local authorities. Consultations will also seek to discover where the POEC shouldn't be involved. (3)

The APSE Energy submission to the Scottish Parliament's Economy Committee argues that the only way energy will prosper in public sector hands is at local authority level. A national government company is unlikely to be the answer, as a "bottom up" approach is required, not a "top down" approach. (4)

APSE believes that the government's role should be facilitative, providing funding, help and assistance to ensure that the intervention in the market that is sought actually happens, without making that intervention directly itself. That way, the politicians succeed in achieving the outcome, without the risk or extensive resources required. The Scottish Government only needs to put in place the building blocks and all the main work should be undertaken at local authority level. The primary governmental role would be to raise awareness and encourage switching to the public sector entity.

A POEC is a different venture to a private energy supply company, with different goals and a more compelling unique selling point (USP). As such, whilst it cannot offer prices higher than everyone else (or it will not attract customers easily), it does not need to be the cheapest in the market. Such thinking promotes a "race to the bottom" on prices which risks public money. Publicly owned companies have to distinguish themselves from private companies and play to their strengths. They can do this by focusing on their market: the under privileged, the poor, the fuel poor, the vulnerable, those in receipt of welfare benefits, etc. Local government has far better access to these groups. Once the ESCO secures them as customers they are unlikely to ever switch away as they want a service provider which they can trust. The offer is a constantly discounted price (though not necessarily the cheapest) along with good customer service. There are no profits paid to 'fat cats' in the private sector and all surpluses are fed back into public services. Finding the customers is key to the long-term success of the ESCO but it's not the regular switchers that a POEC wants - it is members of vulnerable groups.

With a wider role than just energy supply – energy services companies have a much more important role around encouraging the use of less energy and improving energy efficiency, for the wider benefit of the community. This is a powerful model but one that will not work for Central Government. This is because it does not have the same community links as exist at local level.

A properly planned and created fully licensed local ESCO has many advantages, both financial and non-financial:

- the effective addressing of the hugely difficult (and worsening) problem of fuel poverty;
- assisting people to understand energy better and to help them to help themselves to control and manage their bills;
- engagement with the community;
- creation of jobs and growth in the local economy;
- promotion of more renewable energy generation at local level;
- assisting with the demands on the electricity grid by smart controls and better usage.

Financial benefits include surpluses that can be used to pay off the costs of establishing the ESCO and thereafter for investment in wider services, particularly those that cannot be funded in any other way such as energy awareness.

The Scottish Government's scoping note confirms that the rationale of a POEC is to address fuel poverty, provide greater choice for consumers, contribute to economic development and help to deliver wider Government ambitions on energy. APSE's main argument is that the Government does not need to establish its own ESCO to achieve these objectives.

Speaking to the Parliamentary Committee on 23rd October, Alister Steele, chairman of Our Power Energy Supply, which is owned by housing associations in Scotland, said a Scottish POEC would struggle to persuade people to switch providers and differentiate itself from existing operators. He warned that the supply market is extremely competitive: "I would question whether this is the right thing for government to be doing. There are a lot of risks involved in entering the market." Mr Steele said he had yet to see the evidence that a new provider would be able to get more people to change supplier and help to reduce fuel poverty. He said: "It is very difficult to get people who are not engaged with the energy sector to switch."

There is also concern over whether the new company will be able to invest in community renewable energy schemes. Nicholas Gubbins, chief executive of Community Energy Scotland, said: "I struggle to see how a publicly owned supply company would add value." He said he could not see how a publicly owned body "would make much difference" in that area.

However, Peter Speirs, public affairs manager at Scottish Renewables, said: "I think the difference a publicly owned company could [make] is the political will to do it. "The financials may be difficult from the perspective of the private sector but the political will could exist to support community level generation." Gail Scholes, chief executive of Robin Hood Energy, the supplier owned by Nottingham city council, said her organisation hoped to invest in its own generation schemes in future but only when its profit improved. There was support for the company to act more like a government agency covering matters such as encouraging greater awareness of energy sector changes and use its position to join up initiatives used at a local authority level. Mr Speirs said: "That would represent an opportunity to behave a bit more like other countries, perhaps Denmark and Sweden, and have an organisation embedded within government that is committed to maximum renewable generation." (5)

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1. See <https://www.gov.scot/Topics/Business-Industry/Energy/POEC> and <https://www.gov.scot/Resource/0054/00541601.pdf>
 2. Scotsman 2nd Oct 2018 <https://www.scotsman.com/news/politics/new-energy-firm-must-tap-into-tartan-trust-effect-1-4808248>
 3. See http://www.apse.org.uk/apse/assets/File/Day%201%20-%20Session%201_1%20-%20Neil%20Ritchie.pdf
 4. See http://www.parliament.scot/S5_EconomyJobsFairWork/Inquiries/EEFW-S5-18-POEC-33-APSE-Energy.pdf

5. Times 24th Oct 2018 <https://www.thetimes.co.uk/article/49cb07d2-d6ff-11e8-926d-96790161a92a>

3 Hunterston

EDF Energy has extended the outage at its Hunterston B reactor 3 until December 18th. The reactor has been offline since March when cracks were found in its core during a routine inspection. It was initially scheduled to return to service on November 17th, but EDF Energy said it has extended the outage to allow the company more time to demonstrate a safety case, needed before Britain's nuclear regulator will allow the unit to resume service.

"The safety case demonstrating safe operation for the next period of operation is now being assessed internally including with our independent experts," according to EDF Energy. Once this process is completed, the safety case will be submitted to the nuclear regulator for their assessment. (1)

At the time of writing Reactor 4 was off as well for a graphite inspection outage until at least 30th November.

The managing director of Hunterston 'B' Power Station, Colin Weir, says tests have been carried out on the cracks in Reactor 3 showing it could withstand an earthquake. Academic tests and modelling analysis has helped show how the reactor and its cracked bricks could cope with a major seismic event. Weir says tests will continue but he is content the reactor will go back online. Measurements have shown that over 70 bricks have cracks. Mr Weir said: "We examined around a quarter of the core during the last inspection, more than 700 bricks, looking for evidence of a number of things. As well as identifying new keyway root cracks in the channels that hold the fuel, we wanted to see if there was evidence of distortion in the core and check the size of the previously identified cracks. As expected, we did identify new cracks. We found around 70 in this most recent campaign, which is where we expected to be in relation to the current safety case. We also found that previously identified cracks had opened less than we had conservatively modelled and there was no significant distortion. Importantly, there were no cracks or defects found in the 11 control rod channels we examined. These results support the work we are doing on the long-term safety case and underline our confidence that the operation of our primary control and shut-down systems is unaffected." (2)

Aarhus Convention

In 2014 Greenpeace Netherlands (the communicant) complained to the Compliance Committee of the Aarhus Convention about the failure by the Netherlands to comply with its obligations under article 6 of the Convention in relation to the design lifetime extension of the Borssele Nuclear Power Plant (Borssele NPP). (3) Specifically Greenpeace alleged that the Dutch Government had failed to provide for public participation to the extent required prior to its decision to extend the period of operation of the Borssele NPP until 31 December 2033.

In March 2013 Greenpeace appealed to the Council of State, the highest administrative court in the Netherlands, but in February 2014, the court rejected the claim. Thus the available legal procedures were exhausted.

Greenpeace said that the Ministry of Economic Affairs justified the lack of an environmental impact assessment with the argument that no material changes took place in the NPP before the life-time extension was granted. Greenpeace submitted that the Aarhus Convention makes clear that an extension of activities should be submitted to public participation concerning potential significant effects on the environment and a reference to material changes is, in that framework, irrelevant. Greenpeace alleges that allowing a further 20 years of operation of the Borssele NPP after its design life-time of 40 years significantly increases the risk that possible incidents and accidents with severe environmental effects may occur.

The Compliance Committee concluded that it was “appropriate”, and thus required, to apply the provisions of article 6, paragraphs 2-9, to the 2013 decision amending the licence for the Borssele NPP to extend its design lifetime until 2033 which mean that a public participation procedure should have been carried out on the 2013 licence amendment extending the design lifetime of the Borssele NPP until 2033. The Committee found that, by not having at any stage provided for public participation, meeting the requirements of article 6, where all options were open, in regard to setting the end date of 31 December 2033 for the operation of the Borssele NPP, the Party concerned failed to comply with the Convention.

The Committee recommended that the Dutch Government take the necessary legislative, regulatory and administrative measures to ensure that, when a public authority reconsiders or updates the duration of any nuclear-related activity within the scope of article 6 of the Convention, the provisions of paragraph 2 to 9 of article 6 will be applied. See

<https://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf>

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1. Reuters 8th Oct 2018 <https://uk.reuters.com/article/uk-britain-nuclear/edf-energy-extends-hunterston-b-7-uk-nuclear-outage-until-dec-18-idUKKCN1MI19D>
 2. Largs & Millport Weekly News 3rd Oct 2018 <https://www.largsandmillportnews.com/news/16899505.hunterston-could-cope-with-worlds-worst-weather-says-station-boss/>
 3. See https://www.unece.org/fileadmin/DAM/env/pp/compliance/C2014-104/C104_Netherlands_Findings_advance_unedited.pdf

4 Hunterston A

A project to drain around a million gallons of water and remove over 10 tonnes of redundant equipment from the largest used fuel storage pond in the Magnox fleet has been completed. Finishing the complex work to empty and decontaminate the former used nuclear fuel storage pond at Magnox’s Hunterston A Site, which is owned by the Nuclear Decommissioning Authority, has seen one of the site’s highest hazards removed. The project has overcome several unique decommissioning challenges including the removal of radioactive sludge and fixed equipment on the pond floor under around nine meters of water. The team at Hunterston A pioneered several

innovative decommissioning approaches such as decontamination of the pond walls using ultra-high pressure water jetting and ‘concrete shaving’ on some of the surfaces.

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1. Magnox Sites 26th Sept 2018 <https://magnoxsites.com/2018/09/clean-up-milestone-at-hunterston-a> and World Nuclear News 2nd Oct 2018 <http://www.world-nuclear-news.org/Articles/Hunterston-A-storage-pond-clearance-completed>

5 Torness

The IAEA Operational Safety Review Team (OSART), an independent team of industry experts, led a mission to review the operational safety at Torness nuclear power station from 22 January to 8 February 2018. This OSART report includes operational safety recommendations and highlights good practices found at Torness, for consideration by the relevant UK authorities and EDF Energy. The government has published a response to the report. (1)

OSART missions aim to improve operational safety by objectively assessing safety performance using the IAEA’s Safety Standards and proposing recommendations for improvement where appropriate. Follow-up missions are standard components of the OSART programme and are typically conducted within two years of the initial mission. The mission to Torness was the IAEA’s 199th OSART mission since the reviews started in 1982.

The OSART mission to Torness reviewed 12 areas: leadership and management for safety; training and qualification; operations; maintenance; technical support; operating experience feedback; radiation protection; chemistry; emergency preparedness and response; accident management; human, technology and organisational interaction; and, long-term operation. In its report – which has now been made publicly available – the team said: *“Throughout the review, the exchange of information between the OSART experts and plant personnel was very open, professional and productive. Emphasis was placed on assessing the effectiveness of operational safety rather than simply the content of programmes.”* (2)

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1. BEIS 4th Oct 2018 <https://www.gov.uk/government/publications/operational-safety-review-torness-nuclear-power-station-2018-independent-report-and-government-response>
 2. World Nuclear News 4th Oct 2018 <http://www.world-nuclear-news.org/Articles/IAEA-assesses-operational-safety-of-Torness-plant>

6 Dounreay

Around 1,100 Dounreay Site Restoration Limited (DSRL) staff taking apart the former research site have been told about a series of future commitments including the offer of a job with one of the

companies behind the site's parent body organisation Cavendish Dounreay Partnership. Cavendish Dounreay Partnership is a consortium made up of Cavendish Nuclear, Jacobs and AECOM. Together they employ more than 220,000 with locations around the world including Caithness. An interim end state, when the decommissioning work has been completed, is expected to be reached between 2030 and 2033.

Jamie Stone, Member of Parliament for Caithness, Sutherland and Easter Ross, said:

"The Dounreay workforce has developed skills that are second to none and we should be proud of the work that they are doing to decommission the site. It is difficult to know that you are ultimately working your way out of a job and so I welcome early consideration of how these skills can be put to the best possible use in the future. The commitment from Cavendish Dounreay Partnership to offer jobs is good news for the workforce and I will be working with them to ensure as many of those roles as possible are based within this community." (1)

The new jobs would be with one of Cavendish Dounreay Partnership's firms. Alternatively, employees have been offered training to place them in the "*strongest possible position*" to take up a role with a local company. Cavendish Dounreay Partnership said there were potential job opportunities locally in the renewable energy sector, and also the planned new spaceport in Sutherland. (2)

USA-based Jacobs Engineering Group has been awarded two four-year framework agreements by Dounreay Site Restoration Limited (DSRL) to provide design and engineering services, and safety case production and peer review services. The scope of work under the £12-15 million design and engineering services agreement includes: design, construction management, specialist engineering services, environmental restoration, software modelling, commissioning support services and the development of waste strategy documents for DSRL. The safety case and peer review framework will see between £8-10 million of work delivered through the agreement and will include various levels of detailed safety reporting, radiation and fire assessments, as well as in-depth reviews of site safety and compliance. (3)

Northern Irish civil engineering company Graham Group has been awarded a £22 million contract to build an extension to a radioactive waste store at Dounreay. The work, which will see Dounreay's existing above-ground intermediate-level waste store extended, is expected to start this month and take three years to complete. The store holds waste processed and packaged as part of the multi-million pound decommissioning and clean-up of the site. Dounreay construction director, David Hubbard said: "*This is just one of several contracts being awarded to ensure we continue to reduce hazards and make progress towards the site's interim end state. The next few years will see us construct several new facilities to support the programme as well as starting to demolish a number of redundant structures.*" (4)

Decommissioning is a growing industry in the UK – a recent report by the Nuclear Decommissioning Authority estimated it will take 120 years and £121bn to "clean up" 17 of the earliest nuclear sites. Balancing ageing and poorly-maintained equipment with financial constraints, environmental conditions and challenging timescales is "very difficult". "It is not impossible, but a level of ingenuity is required, which only comes from a mixture of qualifications, experience and technical

understanding. Getting the right mix can take time.” says Jennifer Gilmour, senior mechanical engineer at Dounreay Site Restoration.

Engineers also have to stay abreast of change in the sector. “The industry is constantly evolving and technology is advancing at a phenomenal rate – software which has recently been installed can be out of date within months, if not days, trying to get hold of spare parts for older equipment is becoming increasingly difficult, and ensuring knowledge retention is captured are some of the daily challenges,” she says. Despite the breakneck speed of progress, Gilmour says she looks forward to more advanced technology being adopted. Virtual technology for design, drones for maintenance and inspection and new materials are all possibilities, she says. (5)

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1. Dounreay 16th Oct 2018 <https://www.gov.uk/government/news/dounreay-management-makes-long-term-employment-commitment-to-workforce>
 2. BBC 22nd Oct 2018 <https://www.bbc.co.uk/news/uk-scotland-highlands-islands-45939260>
 3. World Nuclear News 3rd Oct 2018 <http://www.world-nuclear-news.org/Articles/Jacobs-secures-Dounreay-decommissioning-work>
 4. Press & Journal 12th Oct 2018 <https://www.pressandjournal.co.uk/fp/business/north-of-scotland/1584077/hazard-management-project-given-22-million-for-extension-at-dounreay/>
 5. Professional Engineering 2nd Oct 2018 <http://www.imeche.org/news/news-article/'ingenuity-is-required'-managing-setbacks-at-europe's-most-complex-nuclear-clean-up>

7 Submarines

The government has delayed scrapping potentially unsafe nuclear submarines because of concerns over costs, a new report from the Defence Select Committee suggests. 20 disused submarines are currently awaiting disposal, according to the Ministry of Defence (MoD), including nine that still contain nuclear fuel. But despite admitting to potential safety risks, the government will only begin dismantling the next vessel in the mid-2020s, while the total work needed to scrap the entire 20 submarines will not be completed until at least 2045. (1)

The delays were exposed in a report by the House of Commons Public Accounts Committee, which demanded that ministers stop delaying the disposal of disused submarines. The committee said continued delays and a lack of investment in the UK's nuclear deterrent had created a “ticking time bomb” and that current nuclear facilities were “not fit for purpose”.

In December 2016 it was reported that the first submarine to be dismantled to demonstrate the decommissioning process would be HMS Swiftsure at Rosyth. Removal of the Low-level waste began in– but nothing would happen to the RPV until planning permission and regulatory authorisations had been received for an interim store to be built at Capenhurst in Cheshire where RPVs will be stored until a deep geological disposal facility is ready to receive them. So Swiftsure will be returned to storage afloat for a time after up to 2 years has been spent removing LLW. (2)

Swiftsure will be in dock until around August 2018. (3) Afterwards Resolution will go through the same process. After Resolution, Swiftsure will go back into the dock for Reactor Pressure Vessel (RPV) removal.

The House of Commons Public Accounts Committee also reports that there is not enough berthing space at HM Naval Base Devonport to maintain and defuel submarines. Of the 20 submarines awaiting disposal, nine still contain fuel. The Defence Department stated that, although they had deferred dismantling on affordability grounds in the past, this was no longer acceptable on safety and reputation grounds. The Department has started work dismantling its first submarine, which it expects to complete in the mid-2020s

Although the Department said it did not anticipate running out of storage space, it agreed that its plans for Devonport needed to reflect how it would complete the work needed to operate a defueling facility. It estimates it will begin defueling the next submarine in the mid-2020s, after which a programme of disposals would take 'at least a couple of decades'.

The Nuclear Free Local Authorities (NFLA) raised its ongoing and real concerns with safety at the UK's military nuclear sites, including Devonport Dockyard, where Trident submarines undergo refit, and the Atomic Weapons Establishment, where the UK's nuclear weapons are made. The Parliamentary Public Accounts Committee and the National Audit Office have recently highlighted serious safety issues in the defence nuclear sector. As such, NFLA therefore calls on the Office for Nuclear Regulation (ONR) to work with the Defence Nuclear Safety Regulator to push for significant improvements in the sector.

In its alarming report, the Public Accounts Committee (PAC) concluded that the infrastructure supporting the Royal Navy's nuclear submarine fleet, which hosts the Trident nuclear weapons programme, is 'not fit for purpose'. It goes on to say significant delays to maintenance at 13 Ministry of Defence (MoD) nuclear sites has created a 'ticking time bomb' putting nuclear safety and the wider defence nuclear programme under threat. The Committee has previously warned about a £2.9billion 'affordability gap' for Ministry of Defence nuclear programmes, and particularly that of replacing the Trident weapons programme.

New contingency plans have been drawn up to evacuate a Highland community if a nuclear submarine accident caused a radioactive cloud to be released. The procedures for Loch Ewe in Wester Ross now feature an enlarged "emergency planning zone" that is designed to protect local residents from a radiation leak. Planning is carried out for a "nuclear emergency" at Loch Ewe because the Royal Navy's nuclear submarine fleet is officially allowed to use it as a "Z-berth" for operational visits. However, the special designation has proved controversial, and a local MSP warned last night that "coastal communities are being put at risk" by such warships. Concerns have also previously been raised about the preparations for an incident and it is understood that nuclear warships stayed clear of the loch between 2008 and 2015 after secret exercises raised a series of issues relating to the proposed emergency response. Last year, the Office for Nuclear Regulation (ONR) ordered Highland Council to revise its contingency procedures following a review carried out in the wake of the Fukushima nuclear disaster that followed a 2011 earthquake and tsunami in Japan. (5) Highland Council has now set out its planned. (6)



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1. Independent 21st Sept 2018 <https://www.independent.co.uk/news/uk/politics/trident-uk-nuclear-submarines-government-cuts-pac-ministry-defence-a8547856.html>
 2. House of Commons Committee of Public Accounts Ministry of Defence nuclear programme Sixty-First Report of Session 2017–19
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 6. BBC 29th Oct 2018 <https://www.bbc.co.uk/news/uk-scotland-highlands-islands-46017913>

8 SME's & Energy Efficiency

The Scottish Government has partnered with Zero Waste Scotland to launch a “cashback” scheme which offers interest-free loans to small businesses that install energy efficiency measures. Launched on 26th October, the scheme enables small and medium-sized businesses (SMEs) to apply for an unsecured, interest-free loan of up to £100,000 in order to install technology such as LED lighting, low-flow taps and insulation. Businesses which are successful in applying for one of the loans will also receive 15% cashback on the value, further incentivising them to implement measures to reduce their energy use and carbon emissions.

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1. Edie 29th Oct 2018 <https://www.edie.net/news/6/Scottish-Government-launches--cashback--scheme-to-help-businesses-bolster-energy-efficiency--/> See <https://www.resourceefficientscotland.com/SMELoan>

9 Local Authorities and Energy Efficiency

The Scottish Government’s Energy Efficient Scotland Route Map is a 20-year plan to 2040 that sets a common framework for mandatory energy performance upgrades in all existing domestic and non-domestic buildings and standards for new buildings. It is a key part of the 2017 Scottish Energy Strategy and 2018 Climate Change Plan. Local authorities are expected to work in partnership with government to ensure success, and selected local authorities are piloting integrated projects and costed delivery strategies.

Local Heat and Energy Efficiency Strategy (LHEES)

Between November 2017 and February 2018 the Scottish Government consulted on the introduction of a statutory duty on local authorities to develop LHEES which would link the long-term targets and national policies to the delivery of energy efficiency and heat decarbonisation on the ground. They would allow local authorities to prioritise and target work, whether that is supporting owner occupiers and businesses to install energy efficiency measures, or encouraging the development of district heating and other low-carbon heat solutions.

The Scottish Government has given funding to 15 councils to fund pilot projects that will support homeowners and businesses installing energy efficiency measures and help local authorities develop LHEES. Of these 15 councils, most were given funding for a project in a small part of their area. Falkirk, on the other hand, was given funding to develop a pilot for the whole council area. (1)

An Interim report on the projects set up to pilot the development of a Local Heat and Energy Efficiency Strategy (LHEES) was published in February 2018. (2)

Overall, the proposal for potentially placing a statutory duty on local authorities to develop LHEES was cited as a critical driver for local authorities taking part in the pilots - an opportunity to get a head start on learning what is involved and preparing to take on this potential duty and to influence national level discussions about LHEES, including contributing to the guidance details from Scottish Government.

Falkirk is focusing on transport; buildings - domestic and non-domestic and industrial links with energy and emission reductions. Falkirk stadium will be a low carbon hub with charging spaces for 26 electric vehicles and a solar canopy of around 2000m² to provide 300,000kWh of electricity. The electricity will provide power for the chargers and lighting with any surplus exported via private wire to the stadium. An investment of around £900k includes an electric bike hire scheme. (3)

On non-domestic buildings the council is working on a pilot with LED Lighting, solar PV and CHP. There has been positive feedback from schools and care homes that have been completed for LED lighting. This is on course to save £120k per year from a £850k spend. The LHEES funding also allows for an overall appraisal of what would be required in public buildings to bring them up to the required energy performance. On domestic buildings the council is extending its district heating network to three further high rise blocks and installing air source heat pumps in a further three tower blocks.

Home Energy Efficiency – Area Based Schemes (HEEPS – ABS)

Funding from the Scottish Government (SG) for the Home Energy Efficiency Programme – Area Based Schemes (HEEPS – ABS) goes direct to the local authority. Previously with the Cavity Wall Scheme funding went via the Energy Saving Trust. 90-92% of cavities are now filled. SG now wants to do solid wall insulation – targeted at low income areas.

Area Based Schemes can fund External Wall Insulation (EWI) for mixed tenure streets – previously private houses often got missed out. The Cost of EWI can be between £6k - £15k per property – but fuel bills can be reduced by £200 per year.

Given the cost of the scaffolding various other works can be carried out at the same time (gutters; single-glazed windows; roof replacement) One project for example – Whitletts in Ayr – involved a total renovation with works completed at a cost of £2k to private owners. If the owners don't pay, a charge can be put on the property so the council can recover the money when it is sold.

Mechanical ventilation with heat recovery is installed if required.

Surveys suggest improved respiratory health, pain reduction, improved mental health and a drop in hospital admissions. (4)

Meanwhile a new report from the Institution of Engineering and Technology (IET) and Nottingham Trent University says a nationwide programme to upgrade the UK's housing stock will be essential to meeting the country's 2050 climate commitments. 26m retrofits will be needed between now and 2050 – effectively every home in the country, at a rate of around 1.5 homes every minute. This means a one-off “deep retrofitting” approach will be needed, whereby the energy efficiency of a home is significantly improved all at once rather than incrementally. Four out of every five homes that British people will be living in in 2050 have already been built, the report says. Retrofits of current houses will, therefore, play a pivotal role in meeting the UK's climate targets. Home energy demand currently accounts for around 20% of the UK's greenhouse gas (GHG) emissions and more than three-quarters of this demand comes from space and water heating. Because overall energy demand peaks in winter at around six times its summer levels it will be hard to switch solely to electric heating, so the best way to cut housing emissions is to reduce heating demand. (5)

The report highlights several programmes and pilots exploring mechanisms for quickly ramping up energy efficiency. One of these programmes is the “Energiesprong” model – Dutch for “energy leap”. This approach to deep retrofitting involves a major, whole-house retrofit to achieve a near net-zero energy home, typically including the fitting of an external “wall envelope” for insulation, as well as rooftop solar panels. Nottingham has recently finished a pilot with 10 retrofits – the first Energiesprong project outside the Netherlands – and is considering doing another 200.

- The first ‘Passivhaus’ schools in Scotland will be constructed in Edinburgh as councillors pushed forward plans to provide funding for three new buildings. The city council's Finance and Resources Committee approved proposals to fund the rebuild of Currie High, Trinity Academy and Castlebrae High over the next five years. Plans to rebuild Wester Hailes Education Centre, Liberton and Balerno High will be brought forward later this year, subject to funding from the Scottish Government. (6)

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1. See Energy Efficiency Funding 17th June 2018 <https://beta.gov.scot/news/energy-efficiency-funding/>
 2. <https://beta.gov.scot/publications/lhees-pilots-evaluation-interim-report/>
 3. See <http://www.apse.org.uk/apse/assets/File/Day%201%20-%20Workshop%202%20-%20Mari-Claire%20Morgan.pdf>
 4. See <http://www.apse.org.uk/apse/assets/File/Day%202%20-%20Workshop%204%20-%20Andrew%20Filby.pdf>

5. Carbon Brief 11th Oct 2018 <https://www.carbonbrief.org/uk-homes-need-deep-efficiency-retrofit-meet-climate-goals>
6. Edinburgh Evening News 12th Oct 2018 <https://www.edinburghnews.scotsman.com/news/three-edinburgh-schools-to-be-rebuilt-using-passivhaus-principle-1-4813916>

10 Renewable Notes

- A Scottish business is setting up what it believes to be the first British-based recycling plant for wind turbine parts. Renewable Parts already works buying and selling stock for the onshore wind sector. Now it has invested a six-figure sum refurbishing a former ambulance centre in Lochgilphead, Argyll. Many of the first generation of wind farms soon will be coming to the end of their expected 25-year operational lifespan. That is expected to lead to equipment being decommissioned and it is thought that many parts can be repaired and resold rather than being sent for scrap. (1)
- The north-east of Scotland has the best conditions in the UK for floating offshore wind projects, a joint industry report has said. Three ports in the region are currently ‘floating wind ready’ having helped develop the Hywind and Kincardine Offshore Windfarm projects. Nigg Energy Park, Invergordon and the Port of Dundee are the best in the UK, according to a report published by the Carbon Trust and LOC Renewables. The report analysed 96 European ports and found the “very few” were able to accommodate floating offshore wind. (2) In October the developers Kincardine Offshore Windfarm Ltd (KOWL) announced they had produced their first electricity from what is expected to become the world’s largest floating wind farm. (3)
- A new report commissioned by the Crown Estate Scotland has found that not only does floating offshore wind have an important role to play in the UK’s plans to generate 50 gigawatts (GW) from offshore wind by 2050 but that it could support up to 17,000 jobs and provide £33.6 billion in added value. The UK offshore wind industry is, by a significant margin, the most developed and busy in the world, with over 7 GW worth of operational offshore capacity and a further 7 GW under construction or with contracts secured. It gets better, too, when you expand the definition of “pipeline” to include projects in development, bringing the UK’s offshore wind portfolio up to over 35 GW. The UK is, therefore, and unsurprisingly, the world’s floating offshore wind leader as well, home to the only (currently) operational floating offshore wind farm — the 30 MW Hywind Scotland which began operations in late 2017 and which quickly began outperforming expectations. (What is expected to be the world’s second floating offshore wind farm took a further step forward last week in Portugal.) (4)
- The Moray West Offshore Windfarm will create 150 jobs and add £90 million to the local economy, developers have said. It aims to deploy 90 turbines off the coast of the Moray Firth to provide power for more than 900,000 homes. The development manager for the

project stressed the company's commitment to supporting local firms in the Aberdeenshire and Moray region. (5)

- A pioneering green energy project in the far north of Scotland has become the world's first fully operational grid-connected tidal power station. The move comes after tidal turbines in the sea off Shetland were integrated with cutting edge battery storage from international tech firm Tesla to enable a predictable supply of renewable energy to be fed into the network to match demand. The 300-kilowatt scheme, owned by Edinburgh-based Nova Innovation, has produced 30 megawatt-hours of electricity since going online at the beginning of October. (6)
- Simec Atlantis Energy will beef up its MeyGen tidal array in the Pentland Firth with at least two more of its 2 megawatt turbines. The turbines will use a new subsea connection hub and share a single export cable. This will significantly reduce project infrastructure costs by removing the requirement for a dedicated export cable per turbine and should also result in reduced vessel installation costs.(7).
- The Company has also formed a joint venture with the Development Agency for Normandy (AD Normandy) to develop a tidal power project in Raz Blanchard, Normandie. The new JV company Normandie Hydrolienne has been created with the intent to produce up to 2GW of power from the eight-mile strait Alderney Race that runs between Alderney and La Hague in France. It will also focus on more than 1GW resource from adjacent concessions under the control of the States of Alderney. (8) The plans will make Alderney territorial waters part of the largest tidal power scheme in the world – a multi-billion euro development which could transform the island's fortunes. (9)
- The European Marine Energy Centre (Emec) in Orkney is to lead a £2.2 million project to support the development of wave and tidal power in coastal areas of north-west Europe. The new 36-month Blue-Gift (Blue Growth and Innovation Fast Tracked) project would encourage "longer term demonstration and technology de-risking" across coastal areas of Spain, France, Portugal, Ireland and Scotland – the "Atlantic Arc" – boasting the highest ocean energy resource in Europe. (10)
- Sunamp has signed an agreement with Chinese solar giant Trina Solar to develop an integrated solution combining its thermal storage batteries with heat pumps to be manufactured at a new factory in Changzhou. The agreement will see UniQ heat batteries from Sunamp, based in East Lothian, used in combination with Trina's heat pumps to deliver what both have described as 'a game-changing cleantech solution'. According to Sunamp, the combined system will offer between 23 - 35kWh of storage. (11)

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2. Energy Voice 29th Sept 2018 <https://www.energyvoice.com/otherenergy/182678/north-east-has-optimal-conditions-for-floating-offshore-wind/>
3. Energy Voice 31st Oct 2018 <https://www.energyvoice.com/otherenergy/184901/first-power-generated-from-worlds-largest-floating-windfarm/>
4. Clean Technica 30th Oct 2018 <https://cleantechnica.com/2018/10/30/uk-floating-wind-could-support-17000-jobs-generate-33-6-billion-in-value-by-2050/>
5. Energy Voice 25th Sept 2018 <https://www.energyvoice.com/otherenergy/182293/moray-firth-wind-project-to-bring-90m-to-local-economy/>
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7. Energy Voice 30th Oct 2018 <https://www.energyvoice.com/otherenergy/18852/new-turbines-to-raise-meygen-output-by-40-simec-atlantis-says/>
8. Power Technology 30th Oct 2018 <https://www.power-technology.com/news/simec-atlantis-tidal-power-project/>
9. Guernsey Press 31st Oct 2018 <https://guernseypress.com/news/2018/10/31/tidal-power-firm-races-to-site-turbines-off-alderney/>
10. Press & Journal 31st Oct 2018 <https://www.pressandjournal.co.uk/fp/business/north-of-scotland/1598531/energy-centre-to-lead-marine-power-project/>
11. Solar Power Portal 30th Oct 2018 https://www.solarpowerportal.co.uk/news/sunamp_signs_milestone_mou_with_trina_solar_to_combine_thermal_storage_with

11 Hydrogen Notes

- The north-east is to be used as a testing ground for hydrogen. Scottish Gas Network (SGN) and Pale Blue Dot, the firm behind a clean energy system at the St Fergus gas terminal, have launched an “Aberdeen vision” to deliver up to 100% hydrogen through the city’s regional gas system to power homes, via the plant near Peterhead. The study will also assess whether an unprecedented move could be carried out to blend at least two percent hydrogen with gas through the older national network serving the wider UK. The scheme would see hydrogen processed at scale from North Sea natural gas through Pale Blue Dot’s Acorn carbon capture and storage (CCS) project, which the firm is hoping to expand in coming years. (1)
- The European Marine Energy Centre (EMEC) has received a £400k cash injection for its Orkney hydrogen ferry project. The 12-month HyDIME (Hydrogen Diesel Injection in a Marine Environment) project will provide a stepping stone to de-risk and kick-start future hydrogen marine projects. (2)
- 2G Energy, a leading manufacturer of gas-driven combined heat and power (CHP) systems, has received an order for a hydrogen-driven CHP system from Stadtwerk Hassfurt GmbH.

This will be a ground-breaking project. The hydrogen will be produced by a power-to-gas-system located in the port of Hassfurt. This utilizes surplus electricity generated by the wind park in the adjacent Sailershäuser Forest for the electrolysis of the water. The CHP system then reconverts the hydrogen into electricity and heating in line with demand, achieving efficiencies of > 90%. The electricity from the CHP system will be fed into the city's electricity grid. The heating will be transferred to a neighboring malt factory, a school and a kindergarten via a heating grid that has yet to be constructed. (3)

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1. Energy Voice 10th Oct 2018 <https://www.energyvoice.com/otherenergy/183462/aberdeen-vision-for-pioneering-hydrogen-from-gas-project/>
 2. Energy Voice 9th Oct 2018 <https://www.energyvoice.com/otherenergy/183399/full-steam-ahead-for-orkney-hydrogen-ferry-thanks-to-400k-cash-injection/>
 3. Fuel Cell Works 12th Sept 2018 <https://fuelcellworks.com/news/2g-energy-ag-receives-order-for-hydrogen-driven-chp-system/>

12 Local Authorities and Electric Vehicles

(See Steve Cirell's Blog <https://www.current-news.co.uk/blogs/no-time-like-the-present-for-public-sector-ev-fleets>)

THE Scottish Government has hit out at Westminster's Department for Transport (DfT) after it was revealed that the subsidy for "green" cars is to be reduced from November 9. The DfT announced that it will cut grants for electric vehicles (EVs) by £1000 and will disqualify a host of plug-in hybrid models from the popular Plug-in Car Grant (PICG) scheme. The UK Government was effectively saying that the grant scheme aimed at reducing greenhouse gas emissions from cars has been a victim of its own success. In a statement, the DfT said the grant rate for Category 1 vehicles with zero emissions will move from £4500 to £3500 and Category 2 and 3 vehicles – usually hybrids – will no longer be eligible for the grant. The Scottish Government is committed to phasing out the need for new petrol and diesel cars and vans by 2032 and growth in the registration of new EV and PHEV vehicles is higher in Scotland than in the rest of the UK. This year SG is making available almost £50 million to continue to support the take up of low emission vehicles. (1)

The Green Alliance estimates that the UK Government has a fleet of 25,000 vehicles and local government has 50,000 vehicles. These figures do not include private vehicles used for local or central government business. If these various arms of government were to join together huge savings could be made in the procurement of EVs. Placing targets on the public sector could move the EV market ahead very quickly.

On top of this Vehicle-to-grid chargers could become a new source of income for local government.

There has been a massive investment in battery technology in the last few years. The original Nissan Leaf had a range of only 85 miles. The next generation of EVs will be able to travel 300 miles on one

charge. There will be a full range of vehicles within the next two years. The average car does 20 miles per day and then goes back home. Most will be charged at home overnight. A 300 mile range is equivalent to enough electricity to power a house for 1.5 weeks.

EVs will be coming back to local authority depots probably with a 90% charge which could be sold by the local authority back to the grid during the peak (red zone) period of 4.30 to 7.00. The vehicles can then be charged up again in the small hours in time for the morning.

As the price of solar falls, more buildings will have PV installed with storage, and car parks will have solar canopies. New housing will need to calculate its impact on the grid; buildings will become mini power stations. Solar plus storage plus Vehicle-to-grid technology will change the energy system.

Octopus Energy now offers a tariff with electricity costing 30p/kWh during the evening peak (4.30 to 7pm), but for the rest of the day it costs 5p/kWh. So anyone with a battery or an electric vehicle can probably get all of their electricity at 5p/kWh.

Energy and Clean Growth Minister Claire Perry visited the Bristol HQ of energy firm OVO Energy, which has invested in a smart meter enabled software platform for managing residential energy use called VCharge and early stage vehicle to grid charging technologies designed to allow electric vehicle (EV) owners to sell power back to the grid at peak times. The company is also amongst a handful of energy suppliers to use smart meters to offer customers time-of-use based tariffs that reward them for charging their EVs at off-peak times. Previous government estimates suggest the roll out of smart energy technologies that better manage supply and demand across the grid could save the UK up to £40bn between now and 2050, by curbing the need for new generation capacity, enhancing efficiency across the system, and slashing carbon emissions. Perry said OVO's products were an example of how smart meters would provide the "cornerstone" for a new wave of energy technology innovation. (2)

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1. The National 13th Oct 2018 <http://www.thenational.scot/news/16980605.scottish-ministers-hit-out-at-plan-to-cut-green-cars-grants-by-1000/>
 2. Business Green 16th Aug 2018 <https://www.businessgreen.com/bg/news/3061212/minister-hails-emergence-of-smart-meter-enabled-tariffs>