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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/nuclearnews/NuClearNewsNo92.pdf>

If you are keen to keep abreast of developments in energy at a local level in communities and local authorities around the UK, you can sign up to the weekly Micro Power News here:

<http://www.microgenscotland.org.uk/news/>

1 Scottish Climate and Energy Strategy

Climate Plan

The Scottish Government set out draft plans to meet ambitious new targets for cutting greenhouse gas emissions on Thursday 19th January, (the Draft Report on Policies and Proposals – RPP3) but without talking much about energy.

The draft proposals set out to achieve a 66% reduction in greenhouse gas emissions by 2032 against a 1990 baseline, demonstrating what it described as "a new level of ambition" towards tackling climate change. The new target - which goes slightly further than that recommended by the Committee on Climate Change (CCC) last year and would represent one of the most ambitious national decarbonisation programmes anywhere in the world - could lead to wide-ranging changes in transport, logistics, heating, power, agriculture and land management, the devolved administration said. The Draft Climate Change Plan also sets sector-specific targets for 2032, such as a goal to deliver a fully decarbonised electricity sector and a goal to ensure 80% of domestic heating is provided from low carbon sources. In transport, the aim is for at least 40% of new cars and vans registered in Scotland to be ultra-low emission vehicles in 15 years' time. In addition, the Scottish Government said it will aim to restore 250,000 hectares of degraded peatlands by 2032, and create at least 15,000 hectares of woodland each year. (1)

Environmental campaigners welcomed the vision but raised "serious concerns" about how it will be achieved. The Greens said only half of the recommendations for action from the independent UK Committee on Climate Change appear in the plan; ministers are still pinning hopes on unproven carbon capture technology, and there is very limited investment planned in ensuring warm homes; while the draft budget shows a massive rise in spending in motorways to almost £1billion, but funding for walking and cycling remains static at £39million. (2)



Energy Strategy

The long awaited draft energy strategy was published for consultation on Tuesday 24th January - too late for this report. But, again, this would have a hole in it because it is not expected to cover unconventional fossil fuels. A consultation on 'fracking' is expected to be published the following week.

Scottish Ministers committed last year to cut carbon dioxide emissions by 80% by 2050, with a new interim target of 50% by 2020. The previous interim target of 42% was met in 2014 - six years early. But the Committee on Climate Change said the decrease was largely down to a warmer than average winter reducing the demand for heating. Significant progress has been made in decarbonising the energy sector with the closure of Scotland's last coal-fired power station at Longannet. But the climate change committee said "*stronger policies*" would be needed in the new Climate Change Plan and that "*little progress*" has been made in reducing emissions from transport and agriculture. (3)

As far as the energy strategy is concerned the goal of getting the 'equivalent' of 100% of our electricity from renewable sources by 2020 was going fairly well. Scotland has already reached its interim target of 50% by 2015. Unfortunately, as Westminster's Scottish Affairs Committee reported in July, progress on expanding renewable energy capacity could be curtailed by recent cuts costing Scotland up to £3bn in lost investment and putting 5,400 jobs at risk. (4)

The SNP Energy spokesperson in Westminster, Callum McCaig, has highlighted the Government's "shameful" renewable energy policy record risks threatening the UK's economic prosperity and investment opportunities in a "thriving" industry. He says the "appalling" lack of action from Ministers to support the renewables industry means investment in wind, solar, biomass power and waste-to-energy projects could decline by 95% between 2017 and 2020. (5)

It will be interesting to see how the energy strategy proposes to meet the new target for heat, which accounts for more than half of Scotland's energy use - decarbonising it will have to become a priority if climate change targets are to be met. Campaigners and the renewables industry are hopefully that the new strategy will set a tough new target requiring half of all energy (not just electricity) to come from renewables by 2030. (6)

This is likely to mean more district heating systems like the Aberdeen combined heat and power network which is used to heat 2,500 council-owned flats and public buildings while also selling electricity to the grid. And schemes like the one in the town of Drammen in Norway which has a district heating scheme powered by a large heat pump made in Glasgow. Star Renewable Energy, based in Glasgow, installed the heat pump in 2010/11. In simple terms, they work like a refrigerator in reverse, taking river water and cooling it down by about 4 degrees. In Norway, heat pumps rely on water from rivers and fjords which, around the surface, is about 8 degrees Celsius. But Prof Janette Webb, from the University of Edinburgh, says Scotland has a source of much warmer water which could be exploited. She said: "*Right across central Scotland, not only have we got a lot of surface water we've also got underground mines, which are flooded now, which have water, in the deeper mines anyway, at about 30 degrees. We could extract heat from that water and use that to heat our buildings.*" (7)

Scotland is also going to need a “revolution” in zero-carbon transport on its roads if it is to meet climate change targets, including a deadline for banning all petrol and diesel engines. WWF Scotland estimates that half of all buses and one third of cars will need to be powered by renewable electricity by 2030. WWF has joined forces with manufacturers in the electric vehicle industry, including the UK’s largest bus maker, to call for a decisive shift on Scotland’s roads. There needs to be a rapid expansion of the electric vehicle charging point network. In Norway electric vehicles already make up a third of all new car sales. (8)

- Investment in windfarms will fall off a "cliff edge" over the next three years and put the UK's greenhouse gas reduction targets at risk - more than £1bn of future investment in renewable energy projects disappeared over the course of 2016 – according to the Green Alliance. The think-tank estimates that investment in wind, solar, biomass power and waste-to-energy projects will decline by 95% between 2017 and 2020. (9)
- Meanwhile, solar and wind is now either the same price or cheaper than new fossil fuel capacity in more than 30 countries, according to the World Economic Forum. *"Renewable energy has reached a tipping point - it now constitutes the best chance to reverse global warming,"* said Michael Drexler, Head of Long Term Investing, Infrastructure and Development at the World Economic Forum. *"Solar and wind have just become very competitive, and costs continue to fall. It is not only a commercially viable option, but an outright compelling investment opportunity with long-term, stable, inflation-protected returns."* (10)
- A full switch to solar and wind is in sight and a complete transition from carbon to solar and wind power looks practical and affordable within a generation, according to a new book by Chris Goodall called *The Switch*. At first it seemed that renewable electricity would always be more expensive and solar power would languish unless it was heavily subsidised. Using alternative energy sources seemed difficult, expensive and inconvenient. That was completely wrong. In fact, optimism about successfully tackling climate change has never been more justified because 2016 was the year in which it finally became obvious that the world had the technology to solve the problem. (11)

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1. Business Green 19th Jan 2017 <http://www.businessgreen.com/bg/news/3002936/scotland-raises-climate-ambition-with-new-plan-to-cut-emissions-two-thirds-by-2032>
 2. Scottish Green Party 19th Jan 2017 <https://greens.scot/news/scotland-s-economy-public-health-at-risk-from-inaction-on-climate-change>
 3. BBC 19th Jan 2017 <http://www.bbc.co.uk/news/uk-scotland-38666232>
 4. Holyrood 13th Dec 2016 <https://www.holyrood.com/articles/inside-politics/renewables-whither-scotland%E2%80%99s-green-revolution>
 5. EDIE 17th Jan 2017 <http://www.edie.net/news/11/SNP-calls-on-the-Government-to-end--shameful--renewables-record/>
 6. Scotsman 17th Jan 2017 <http://www.scotsman.com/news/environment/calls-for-scotland-to-set-tougher-green-energy-targets-1-4341618>



7. BBC 18th Jan 2017 <http://www.bbc.co.uk/news/uk-scotland-38654583>
8. Scotsman 5th Dec 2016 <http://www.scotsman.com/news/politics/scottish-government-should-set-a-date-to-scrap-petrol-cars-1-4308738>
9. Guardian 4th Jan 2017 <https://www.theguardian.com/environment/2017/jan/04/renewables-investment-uk-fall-95-percent-three-years-study-subsidy-cuts-emissions-targets>
10. Independent 4th Jan 2017 <http://www.independent.co.uk/environment/solar-and-wind-power-cheaper-than-fossil-fuels-for-the-first-time-a7509251.html> and Bloomberg 3rd Jan 2017 <https://www.bloomberg.com/news/articles/2017-01-03/for-cheapest-power-on-earth-look-skyward-as-coal-falls-to-solar>
11. Guardian 19th Jan 2017 <https://www.theguardian.com/environment/2017/jan/19/reasons-to-be-cheerful-full-switch-low-carbon-energy-in-sight>

2 Torness and Hunterston B Life Extensions

The Office for Nuclear Regulation is expected to issue a decision letter before 31st January 2017 which will say whether or not it accepts the submission made by EDF Energy in January 2016 on the third Periodic Safety Review (PSR3) for Hunterston B and Hinkley Point B. Once the Office for Nuclear Regulation (ONR) has made its decision and conveyed that to EDF Energy it will publish the associated Project Assessment Report.

EDF Energy has just informed members of the Site Stakeholder Group that one of the reactors at Hunterston B was taken offline for its planned interim outage on Friday 13 January to allow some planned maintenance and inspection work to be carried out. Part of the programme of work will be carrying out inspections of the graphite core.

The graphite blocks in the core are losing weight and cracking. A recent BBC Radio Programme revealed that the ONR is considering doubling the limit it has set on the percentage of cracked bricks it is willing to accept from 10% to 20%. It might be difficult for people living near these reactors to understand why the definition of “safe” seems to be changing.

EDF has said the Hunterston reactor closed for maintenance has three more serious keyway root cracks. The keyway is a slot that holds each brick to the adjacent brick, the bricks underneath and the bricks on top. These keyways are acknowledged to be the limiting factor in the life of these reactors. (1)

It is worth noting that the previous Periodic Safety Review (PSR2) was not formally closed out until October 2012. British Energy Generation Limited (BEG) completed PSR2 for the Hinkley Point B and Hunterston B Nuclear Power Stations in 2006. The precursor body to ONR – the NII - reported on its assessment of the PSR2 documentation in June 2007 and the Project Overview Report is published at: <http://www.hse.gov.uk/nuclear/periodic-safety-review/hinkley-huntb.pdf>

The main conclusion was that the PSR2 documentation had a number of significant shortfalls both in the quality and the scope of information required by the UK regulatory system. Nevertheless, the issues arising were not of immediate concern for nuclear safety and HM NII’s decision was that



operations should be allowed to continue whilst a remedial programme of work was progressed for each station.

The Scottish Green MSPs have published a report by the NFLA Scottish Policy advisor which concludes that:

"The Espoo Convention, to which the UK is a signatory, says that all ageing nuclear power stations in Europe should have an environmental impact assessment (EIA) carried out before a licence renewal or the approval of a 10-year-periodic safety review. Such an assessment should compare the potential impact of extending the life of an old reactor with supplying energy from alternative sources such as renewable energy, and involve the public in the decision-making process.

Given the significant problems with cracking in the graphite bricks in the core of Scotland's ageing reactors, the fact that the UK has yet to find a solution to the problem of what to do with nuclear waste, and the progress made with the development of renewable energy in Scotland, it is quite likely that an EIA would conclude that Scotland's reactors should close much sooner rather than is currently anticipated by EDF Energy and the Scottish Government."

Pete Roche told the Sunday Herald:

"At the end of 2012 EDF Energy announced that it would like to extend the life of Hunterston B by seven years to 2023, and last year it said it wanted to extend the life of Torness to 2030. The Office for Nuclear Regulation has been examining EDF Energy's Periodic Safety Review on Hunterston B for the past year and is thought to be about to announce its conclusions. Despite the fact cracks are beginning in the graphite core of these reactors, increasing the risk for us all, the public has still not been asked for its opinion once".

"The Scottish Government should ask itself if it really wants ageing reactors to continue operating and producing nuclear waste for up to another thirteen years - gambling with public safety - when we know that, with the cost of renewables falling rapidly, there are plenty of ways to provide alternative sources of energy."

John Large, of the Consulting Engineers LargeAssociates, told the Sunday Herald:

"... the factors that lead to cracking of the graphite blocks are not at all fully understood and the cracking phenomenon has not been, to date, predictable meaning that EdF cannot tell where and how many individual bricks are cleaved with a resulting reduction in residual strength of the core - it's a nuclear safety issue that is unresolved and because of this continuing to operate these ageing AGR nuclear reactors is to a large extent experimental"

...the two advanced gas cooled reactors at Hunterston are now over 40 years old, that is well past the generally acknowledged originally intended design life of 30 years - ageing problems like this serious cracking of the graphite bricks at the heart of each reactor are deeply worrying, so much so that these nuclear plants should now be permanently shut down"

...sometimes the nuclear industry, including the nuclear safety regulator the Office for Nuclear Regulation (ONR), can somehow convince itself that it fully understands a nuclear safety issue - this false confidence is being applied to the graphite brick cracking at Hunterston - it should not be and

these plants, particularly the Hunterston B nuclear reactors now in their forty-first year of operation, should be immediately shut down."

Meanwhile one of the two at Torness was shut for a few days in November because of seaweed blocking its cooling system. The reactor was automatically tripped "*due to an increase in seaweed levels as a result of the weather conditions in the area.*" Station director Paul Winkle insisted it did not impact safety. "Cooling to the reactor was maintained at all times and there were no health or environmental impacts," he said. Torness reactors were previously closed by seaweed twice in 2013. They were forced to shut down in 2011 by a swarm of jellyfish. In June 2015, a reactor at EDF's nuclear plant at Hunterston in North Ayrshire was also closed by seaweed. (2)

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1. Costing the Earth. Radio 4 BBC 2nd Nov 2016 <http://www.bbc.co.uk/programmes/b080t880>
 2. The Ferret 22nd Nov 2016 <https://dropping.theferret.scot/torness-reactor-shut-seaweed/>

3 Scotland and Hinkley

A report, called Scotland's Wind (1), by Dr David Toke - Reader in Energy Politics at Aberdeen University and published by the Scottish Greens shows that UK, electricity consumers are set to pay around £16 a year for 35 years for to subsidise Hinkley Point C. If Scottish consumers could go it alone their £16 levy could fund almost twice as much power from onshore and offshore wind farms.

The report says:

"If Scottish consumer s money was spent on supporting renewable energy rather than paying for their share of Hinkley Point C ... then, even on conservative calculations, nearly double the amount of electricity would be generated from wind power as from Hinkley C".

The costs of onshore windfarms and also offshore windfarms even on current prices need much less support from consumer surcharges to generate an equivalent amount of electricity compared to HPC. Wind power costs are falling rapidly, with some especially low prices being reported in Denmark and The Netherlands. Under such a programme organised by the Scottish Government the cheapest onshore windfarms could start generating in 2020 and offshore windfarms organised under a new, Danish-style framework, could be online in 2026.

The Scottish Government s own preference for renewable energy over nuclear power lends support to the suggestion that the Scottish Government should be able to use Scottish consumers money to pay for new renewable energy rather than new nuclear power. Moreover the best value for money for Scottish consumers in terms of generating non-fossil fuels is likely to come from the Scottish Government having powers to fund its own renewable energy programme from Scottish consumer bills. This is because the Scottish Government will be able to decide on what contract length to offer wind developers, for example offering to pay guaranteed prices for 20 years rather than 15 years as done by the Westminster Government now with renewable energy. Also, the Scottish Government will be able to organise a much more effective offshore windfarm programme than is being done by the Westminster Government. The Westminster Government's methods are increasing the costs of offshore wind by leaving too much uncertainty to be dealt with by developers. The Scottish

Government could organise a much cheaper offshore wind programme on the lines done by the Danish Energy Agency. This is likely to lead to lower costs and less confrontation in the courts over planning issues than is the case with the current offshore windfarm programme. (2)

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1. Scotland's Wind by Dr Dave Toke 9th Jan 2017 <https://greens.scot/sites/default/files/Scotland%2527s%20Wind.pdf>
 2. Dave Toke's Blog 9th Jan 2017 <http://realfeed-intariffs.blogspot.co.uk/2017/01/how-scotland-could-double-amount-of-low.html>

4 Scottish Higher Activity Waste Policy

The Scottish Government has published its strategy on the long-term management of higher activity radioactive waste in Scotland. (1)

There is a summary of the policy from the NFLA perspective available here:

http://www.nuclearpolicy.info/wp/wp-content/uploads/2017/01/Rad_Waste_Brfg_67_Scottish_Government_radwaste_policy.pdf

The Strategy has been developed to support Scotland's Higher Activity Radioactive Waste Policy published in 2011 ("The 2011 Policy") which is that long-term management of higher activity radioactive waste should be in near-surface facilities. Facilities should be located as near to the site where the waste is produced as possible. Developers will need to demonstrate how the facilities will be monitored and how waste packages, or waste could be retrieved. Unlike the rest of the United Kingdom the Scottish Government does not support deep geological disposal of Higher Activity Waste.

The policy does not set out to identify new sites, with long-term management of higher activity radioactive waste continuing to take place in near-surface facilities. A process for developing a full siting strategy is expected to begin after 2030, with construction expected to begin on disposal facilities post-2070. Publication follows an extensive public consultation and work with the Nuclear Decommissioning Authority (NDA), site stakeholder groups, the Scottish Councils Committee on Radioactive Substances (SCCORS) and the NFLA.

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1. Scottish Government 15th Dec 2016 <http://news.gov.scot/news/haw-implementation-strategy-published>

5 GRR Consultation

In May 2016 the NFLA responded to a consultation by the environment agencies on a proposed new guidance on "*Requirements for Release of Nuclear Sites from Radioactive Substances Regulation*". The consultation was managed by SEPA on behalf of all three environment agencies.



The NFLA response is available here: http://www.nuclearpolicy.info/wp/wp-content/uploads/2016/05/Rad_Waste_Brfg_63_Delicensing_nuclear_reactors.pdf

The consultation was seeking views on the requirements for releasing sites from radioactive substances regulation (RSR). A site which is regulated shouldn't be giving a radiation dose to members of the public above the internationally recognised maximum recommended limit of 1 millisievert (mSv), and in fact should be kept below 0.3 mSv from each source in a specific area, and 0.5mSv from a single site with multiple sources.

The NFLA raised three main concerns with what was being proposed.

Firstly the way of assessing the radiological hazard of a site which has been released from radioactive substances regulation appears to be too flexible. Once a site is removed from regulation rather than giving a strict dose limit the proposal is to consider the probability of receiving a particular dose.

Secondly, it was not clear who is expected to regulate a site which is being made available for restricted use. Local authorities are unlikely to have the resources to regulate such a site.

Thirdly, the proposals appear to allow for the unrestricted use of sites which may have nuclear waste buried and which could be capable of administering doses of up to 20mSv/yr if human intrusion occurs. It is the NFLA view that such sites should remain subject to radioactive substances regulation.

The environment agencies have now published their response to comments received here: https://consultation.sepa.org.uk/operations-portfolio/grr/results/2016_12_14-grr-consultation-agencies-response.pdf

On the first point the Agencies did not agree with the analysis and referred to the HSE Criterion for Delicensing Nuclear sites (2005) which advocates the use of a risk based assessment criteria for no danger. Risk based approaches are used extensively for the protection of people and the environment and enable the regulation of a diverse range of different risks that need to be balanced against each other. Risk based approaches provide flexibility to respond to site specific issues.

On the second point the Agencies say they cannot and will not pass on any of our regulatory duties to another body.

On the third point they say that the use of the risk based approach means that it is possible that in the future doses that might be received by future occupiers of a site will be above 0.02 mSv/yr. Human intrusion is a low probability event, but even if it does happen operators will be constrained to ensure that doses are less than 20 mSv/yr.

In fact ONR's submission to the consultation suggests that even mentioning 20mSv/yr in the Guidance for what is a very low probability event – human intrusion into a near surface disposal site could be a mistake.



6 Integrated Environmental Authorisation Framework

The Scottish Government and SEPA have begun a joint consultation on proposals for a new integrated environmental authorisation framework. This new framework plans to bring together the authorisation, procedural and enforcement arrangements for existing regimes relating to water, waste, radioactive substances and pollution prevention and control. The consultation also has some proposals for changes to the existing regulatory regime for radioactive substances in Scotland.

The integration will allow for the incorporation of the European Basic Safety Standards Directive (BSSD) laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation. This directive replaces the existing Basic Safety Standards Directive.

It will also be an opportunity to update the Radioactive Substances Act so that the management of radioactive waste can become a regulated activity (not just disposal) to avoid double regulation between SEPA and ONR.

The consultation document is available here, <https://consult.scotland.gov.uk/sepa/integrated-authorisation-framework/>

The section on Radioactive Substances is here: <http://www.gov.scot/Resource/0051/00512902.pdf>

SEPA will be conducting engagement sessions with stakeholders during the consultation period which runs to 12th April.

7 Nuclear Transports

In the November report we learnt that 700kg of highly enriched (bomb-grade) uranium is to be transported from Dounreay in up to nine flights to the USA over the next 18 months and that the first flight had left in September 2016. (1)

According to Paul Monaghan, SNP MP for Caithness, Sutherland & Easter Ross, the Wick John O'Groats airport runway is 1,600ft too short despite the recent upgrade for the aeroplanes used for these transports. A US air force C17 Globemaster aircraft requires a runway length of 7,600ft to take off safely but the one at Wick is only 6,000ft long. As a result planes are routed through RAF Lossiemouth in Moray to be drained of fuel before heading to Wick. They refuel at Lossiemouth on the return leg. (2)

Now a 46-page internal report commissioned by the airport operator Highlands and Islands Airports Limited (HIAL) from US engineering firm AECOM to examine the structural suitability of Wick's runway for C-17s, suggests the C-17 planes are too heavy and are expected to crack the asphalt surface. The report released under freedom of information law has prompted angry accusations from politicians and environmental groups that safety is being compromised to allow the flights to take place. This is denied by the Scottish Government company that runs the airport. The AECOM

report led to a publicly financed £9 million programme to resurface some of the runway between April and August 2016. But although edges and ends were upgraded, most of the runway was not.

Highlands Scottish Greens MSP, John Finnie, has raised concerns about the suitability of Wick John O'Groats Airport in a series of questions to the Scottish government. He has called for the flights to be suspended pending a safety review. *"The public will rightly be alarmed by this disclosure,"* he said. *"It clearly suggests that no legitimate risk assessment has been undertaken and a lower standard is being applied simply because of what the cargo is. I intend raising this matter in the Scottish Parliament."* (3)

The Scottish government said it has *"on-going regular dialogue"* with the UK government on the transfer of nuclear material from Scotland to the US. The MSP does not believe the airport to be safe for the large aircraft involved. In answer to one of his questions, Environment Secretary Roseanna Cunningham said: *"There will be on-going regular dialogue between the Scottish government and the UK government on the programme of movements of nuclear materials from Dounreay. The Scottish government will continue to seek assurances on the safety and security of any movements."* (4)

Highlands Against Nuclear Transport (HANT) believes moving highly dangerous nuclear materials unnecessarily increases the risk of accident, terrorist attacks and radiation leaks. HANT has called on the Scottish Government to demand that the UK Government and its decommissioning agency NDA halt these flights immediately to prevent further risk to the local population of Caithness and other areas overflowed by these transports – an accident could have a devastating effect on the environment, local populations and the economy. The NDA has confirmed that high-level waste could be stored at Dounreay under full security and monitoring and given that a suitable site for a deep geological depository may never be found in the UK, the safest way to store these materials is on the sites where it is produced. (5)

Environment Secretary Roseanna Cunningham told John Finnie that the bomb-grade uranium must be put to "peaceful uses". She said: *"The UK government owns the nuclear materials currently stored at Dounreay and is responsible for any movements of that material. Any transfers to the United States are covered by an agreement for cooperation in the peaceful uses of nuclear energy between the European Atomic Energy Community and the United States of America. This agreement rules out the military use of any material transferred under its terms."* (6)

Rail Transports

The decision to transport spent fuel from Dounreay to Sellafield has boosted turnover and profits at the company tasked with decommissioning Dounreay. Dounreay Site Restoration (DSR), which is undertaking the £1.6billion decommissioning of the site for the Nuclear Decommissioning Authority (NDA), said it was undertaking *"significant additional work"* repackaging fuel for transportation to Cumbria following the NDA's decision to move so called "exotic" fuels to Sellafield in 2013. DSR, which is owned by a consortium led by industrial engineering and aerospace giant Babcock International, saw turnover rise 10% to £209.5million in the year ended March 2016. Pre-tax profits rose 47% to £15.6million in the year, according to accounts filed at Companies House. The company also delivered a £7.1million dividend to shareholders – up from around £5m in the prior year. (7)

1. Times 1st Oct 2016 <http://www.thetimes.co.uk/edition/news/scottish-airport-not-safe-for-us-uraniumjets-bwd57s3nk>
2. Times 1st Oct 2016 <http://www.thetimes.co.uk/edition/news/scottish-airport-not-safe-for-us-uraniumjets-bwd57s3nk> and Sunday Post 2nd Oct 2016 <https://www.sundaypost.com/news/risky-scots-airportshort-giant-waste-transport-planes-despite-8-million-upgrade/>
3. Ferret 19th Dec 2016 <https://theferret.scot/safety-rules-broken-highland-nuclear-flights/>
4. BBC 17th Jan 2017 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-38649382>
5. Sunday Herald 1st Jan 2017 http://www.heraldsotland.com/opinion/letters/14996581.Letters__Halt_these_nuclear_transport_flight_s/
6. BBC 19th Jan 2017 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-38676717>
7. Energy Voice 3rd Jan 2017 <https://www.energyvoice.com/marketinfo/127949/nukes-transport-boosts-dounreay-bottom-line/>

8 Energy Storage

Paul Wheelhouse , the Scottish Minister for Business, Innovation and Energy, says there are concerns *“over the intermittency of some renewable sources”* so he wants the UK Government to change its *“policy in allowing a route to market for new pumped hydro storage – to provide a responsive, on-demand supply of electricity to deal with intermittency.”* (1)

Pumped storage hydro-electricity stations have the capacity to store large quantities of energy, by using surplus electricity to pump water back up to the reservoir so that it can be used to generate electricity when it is required, providing important flexibility in electricity supply when there is a greater proportion of electricity from renewable energy technologies.

In Scotland, currently, the main opportunity to store electricity is with pumped storage.

Existing pumped-storage hydro energy stations are:

Foyers, 300 MW, 6 GWh.

Cruachan, 440 MW, 10 GWh.

And a further 600MW at Coire Glas (30 GWh) has already received planning consent bringing the total capacity up to 1,340MW

A further three schemes have been proposed:

Balmacaan, 300-600 MW, 30 GWh..

Sloy, 152 MW. Proposal for conversion of existing conventional hydro to pumped storage, by adding 60 MW pump capacity.

Cruachan expansion. Proposal for expansion by a further 600 MW capacity and larger reservoir.



Plans to build a new 400-MW pumped-storage hydro power plant in Dumfries-shire have recently been given the go ahead. The Glenmuckloch hydro project site – which previously operated as a surface coal mine – is being developed by Greenock-based 2020 Renewables. It will employ 15 full time workers when built, and will create more than 300 jobs during the construction phase. (2)

SSE and Scottish Power are also keen to see the UK Government change its pricing regime for "pumped storage" hydro power stations, saying a new approach could unlock hundreds of millions of pounds of investment and support use of renewables. They want to see the adoption of a "cap and floor" pricing regime with a guaranteed minimum price for output but also a maximum price limiting the potential cost to consumers – the payment system used for grid connections. SSE has planning permission for the £800m pumped storage scheme at Coire Glas in the Scottish Highlands, but has not proceeded with it because of concerns about the high upfront costs and uncertain long-term returns. Scottish Power is keen to start work on a £400m plan to expand capacity at its existing plant at Cruachan. (3)

Balancing Green Energy

A Scotsman editorial in December said *"supporters of renewables have yet to give a convincing answer to the question of how to supply Scotland's base load ... the issue of base load or back up capacity is not going to go away any time soon. While the commendable work that has been done to cement Scotland's reputation as a leader in green energy should continue, there is clearly a need to look at the bigger picture."* (4)

In fact, what a renewable system needs is not baseload but flexible back-up which can be turned on and off quickly to provide electricity at peak times when renewables are not producing much.

Michael Liebreich, CEO of Bloomberg New Energy Finance agrees *"...there are plenty of ways of managing intermittency in renewables without resorting to expensive backup power."* (5)

He says renewable energy has clearly achieved the long-awaited goal of grid competitiveness. More than that, in many countries it now undercuts every other source of new generating capacity, sometimes by very considerable margins. *"The old rules were all about locking in cheap base-load power, generally from coal or hydro plants, then supplementing it with more expensive capacity, generally gas, to meet the peaks. The new way of doing things will be about locking in as much locally-available base-cost renewable power as possible, and then supplementing it with more expensive flexible capacity from demand response, storage and gas, and then importing the remaining needs from neighbouring grids."* (6)

There are at least five ways green energy can be balanced:-

1. By using the right mix of renewables intermittency can be reduced;
2. By increasing grid connections to other countries so that electricity can be imported at peak times when indigenous renewable production is low, and so that surpluses can be exported;
3. By storing surplus renewable electricity which can be called upon when wind and solar production is low;
4. Demand management – using various techniques to reduce demand at peak times;

5. By calling on combined heat and power stations working in conjunction with heat storage to generate electricity at peak times.

Another possible solution to the energy storage problem is discussed in a new book by Chris Goodall called *"The Switch"*. A system called Power to Gas (or P2G) which generates hydrogen from surplus renewable energy and then combines it with carbon dioxide to make methane is already operating in Lower Saxony. The plant is operated by Audi. The CO₂ comes from a neighbouring anaerobic digestion plant. The resultant methane can then either be injected into the gas grid to provide green gas, or it can be used to generate electricity when renewables are not producing sufficient electricity.

WWF Scotland's report, *Pathways to Power*, used independent technical analysis by DNV-GL – a leading engineering consultancy – to show that Scotland could very credibly have almost entirely renewable generation, without coal, gas or nuclear (except for 340MW of CCS at Peterhead), as long as it remains part of the GB grid. Security of supply would be assured and Scotland could maintain and build on its position as a net power exporter. Greater emphasis on demand reduction, flexible pumped storage, demand side response and interconnection would all play an important part in achieving this goal. Indeed more emphasis needs to be placed on demand reduction and storage in particular, by both the UK and Scottish governments, to build resilience and reduce the need for new generation capacity. (7)

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1. Holyrood 14th Dec 2016 <http://www.holyrood.com/articles/inside-politics/paul-wheelhouse-talks-fracking-nuclear-and-relations-westminster>
 2. Scottish Energy News 30th Nov 2016 <http://www.scottishenergynews.com/new-400-mw-scottish-hydro-power-project-gets-go-ahead-as-scots-energy-minister-opens-wood-groups-renewable-energy-global-control-centre-in-glasgow/> and BBC 29th Nov 2016 <http://www.bbc.co.uk/news/uk-scotland-south-scotland-38143696>
 3. FT 5th Dec 2016 <https://www.ft.com/content/300a8d66-bae8-11e6-8b45-b8b81dd5d080>
 4. Scotsman 23rd Dec 2016 <http://www.scotsman.com/news/uk/leader-comment-good-renewables-figures-but-still-some-questions-1-4324366>
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 6. Bloomberg New Energy Finance 18th Jan 2017 <https://about.bnef.com/blog/liebreich-shift-base-cost-renewables-10-predictions-2017/>
 7. WWF Scotland report *Pathways to Power: Scotland's route to clean, renewable, secure electricity by 2030*. <http://assets.wwf.org.uk/downloads/pathwaystopower.pdf>

9 Island Energy

Political leaders in the Western Isles have accused the UK government of a "betrayal" over plans to curb subsidies for new wind farms.



Two major schemes, which already have planning consent, were expected to result in a £1bn investment in Lewis. But with the ending of subsidies for onshore wind these schemes may not now be able to go-ahead. Energy firms argue that without the subsidies, it would be too expensive to lay a sub-sea cable to bring the electricity from the islands to consumers on the mainland.

UK Ministers announced a consultation on creating a separate mechanism for island onshore wind, but this has yet to come to fruition. Interested parties have until the end of January to make representations for the islands to be treated as a special case for subsidies. Michael Rieley, senior policy manager at Scottish Renewables, said: "*Scotland's remote islands are home to the best wind resource in the UK and among the best in Europe. Developers and island communities were bitterly disappointed to hear that, despite years of work on the issue and many ministerial pledges to resolve it, we still seem no further forward to unlocking their renewable energy potential.*"

Angus Campbell, leader of Western Isles Council, told BBC Scotland: "*In the past we couldn't get connected because we weren't regarded as onshore wind. We argued for a separate case for the islands. "We are now being told we might be treated as onshore wind and because [subsidies for] that have stopped, we would be the first to suffer,"* he said. "*Morally, I do believe that's wrong.*" (1)

There have been discussions about laying 'interconnectors' to the islands at least since the ultimately unsuccessful plans for the first giant wind farm for Lewis were unveiled in 2001 - over 15 years ago. By 2013 it was difficult to overstate the anger and sheer frustration felt in the islands as the vision of creating an age of prosperity founded on wind, wave and tidal energy appeared to be disappearing over the horizon. Three and a half years later, the anger and frustration have intensified. The Western Isles faces a 13.7% decrease in population by the year 2039, and desperately needs an economic catalyst. But the UK Government's plans to curb subsidies for new onshore wind farms have been yet another hammer blow. At least the new consultation offers a glimmer of hope.

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1. BBC 9th Dec 2016 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-38251910>
 2. Herald 14th Dec 2016 http://www.heraldscotland.com/opinion/14964264.David_Ross__Winds_of_change_in_the_Highlands_and_Islands__blowing_in_the_wrong_direction/

10 Tidal Power

A Scottish tidal energy company set up six years ago has secured EU funding to demonstrate a direct drive tidal turbine – a technology that, when commercialised, could revolutionise the future of the tidal energy sector, because it offers lower operating costs, improved reliability and increased energy output. The Edinburgh-based Nova Innovation – which in earlier this year deployed of the world's first fully-operational, 100kW grid-connected offshore tidal array at Bluemull Sound in Shetland – has landed €2.25 million of grant funding of through the EU Commission's Horizon 2020's SME Instrument programme. (1)

Atlantis Resources, the tidal energy giant, has confirmed it is going ahead with the next phase of its MeyGen 'subsea power station' in the Pentland Firth off Caithness. This next phase of the MeyGen

site development – ‘Project Stroma’ – is an important step in demonstrating progress towards a lower cost of energy for tidal stream. (2) The Company has won a £20 million EU grant to design and build the 6-MW turbine array for Project Stroma. Construction will begin in Spring 2017 and first power is expected in 2018. The project will be built adjacent to the existing 6MW MeyGen project, which delivered first power to the grid in November 2016. (3)

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 2. Scottish Energy News 16th Dec 2016 <http://www.scottishenergynews.com/atlantis-confirms-go-ahead-for-next-phase-of-large-scale-meygen-tidal-power-project-off-caithness/>
 3. Scottish Energy News 10th Jan 2017 <http://www.scottishenergynews.com/atlantis-tidal-power-giant-to-build-20m-eu-big-blade-demonstration-turbine-generator-in-pentland-firth-2/>

11 Floating turbines

RSPB Scotland has endorsed the proposal to build a floating offshore wind farm in the Pentland Firth near Dounreay. Developer Dounreay Tri Ltd is proposing to build a floating offshore wind farm consisting of two turbines, located on a single semi-submersible floating platform, with an installed capacity of between 8 to 16 megawatts (MW) approximately four miles off the Caithness coast. (1)

Dounreay Tri has awarded the construction contract for the 10MW twin-turbine prototype to Global Energy Group and entered into an agreement with Scrabster Harbour to service the development. The company, formed by Sweden-based firm Hexicon for the project, say work is likely to start this summer if Marine Scotland and Scottish Ministers process the planning application by March 31. No figure for the fabrication contract has been given, but last night Inverness and Aberdeen-based Global welcomed the award, saying it would deliver “much-needed additional jobs” at a time of job losses. It is thought the contract could involve up to 100 jobs at Global’s Nigg Energy Park facility on the Cromarty Firth, as well as creating seven full-time posts at Scrabster. (2) The prototype would put Scotland at the forefront of developing an innovative technology that can be deployed in deep water. (3)

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1. Scottish Energy News 1st Dec 2016 <http://www.scottishenergynews.com/bird-charity-boost-for-new-dounreay-floating-turbine-wind-power-plan/>
 2. Energy Voice 6th Jan 2017 <https://www.energyvoice.com/otherenergy/128202/highland-jobs-boost-floating-wind-demonstrator-off-dounreay/>
 3. The National 7th Jan 2017 http://www.thenational.scot/news/15008192.Floating_turbines_in_the_Highlands_a_new_frontier_for_Scots_renewables/



12 Kite Power

Plans for one of the world's first kite power stations in south west Scotland have secured £5m of new investment. Kite Power Systems (KPS) has gained backing for its project at West Freugh near Stranraer from E.ON, Schlumberger and Shell Technology Ventures (STV). It is an "endorsement" of KPS's research and development work on the technology. A demonstration system will be put in place in 2017 with further systems planned in years to come. The technology uses two kites tethered to spool drums and as they fly they turn the drums to produce electricity. A full-sized kite could generate two to three megawatts of electricity, which KPS said was comparable to a 100m conventional wind turbine. The company could eventually employ up to 500 people by 2025. (1)

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1. BBC 13th Dec 2016 <http://www.bbc.co.uk/news/uk-scotland-south-scotland-38306154>

13 Solar Scotland

Scotland's largest privately owned solar farm is on track to record just under 1.5 million kilowatt hours in 2016, its first year in operation. Based on a farm near Westerton, Aberdeenshire, the 10-acre facility was built for the family-owned Mackie's ice cream business and has a total installed capacity of 1.8MW. It complements four wind turbines, with a total of 3MW, providing peak power in summer when wind levels tend to drop. The 7000-panel solar farm, installed by Loch Lomond-based Absolute Solar and Wind, is capable of creating enough electricity to power 485 homes. Its 2016 output is 5% above estimates thanks to favourable weather conditions. (1)

The Solar Trade Association Scotland has been lobbying the Scottish Government to continue to championing solar power. Figures show Scotland has achieved two new solar power milestones during 2016, with over 200 megawatts (MW) of installed capacity and solar photo-voltaic (PV) systems at 50,000-plus locations. Over 49,000 homes and 1,000 business premises in Scotland now have solar PV arrays fitted, and there are almost 200 community-led solar PV schemes, with a combined installed capacity of 2MW. But UK Government policy decisions are having a detrimental impact on installed solar capacity north of the border. (2)

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1. Scotsman 19th Dec 2016 <http://www.scotsman.com/news/environment/scotland-s-largest-private-solar-farm-a-shining-success-1-4321086>
 2. The National 3rd Jan 2017 http://www.thenational.scot/business/14997980.Trade_and_green_groups_tell_Scottish_Government_to_back_solar_power/



14 Just Transition

The Scottish Trade Union Congress and Friends of the Earth have today agreed to work together on industrial policies which can create a 'just transition' to a low-carbon economy for Scotland to save and/or create new jobs in the Scottish energy sector. As the new Scottish Energy Strategy is being drafted, they will be pressing for bold measures which show that the Scottish Government is determined to make change happen. In a joint statement – also supported also by WWF Scotland and the Unite, UNISON, PCS, UCATT, UCU and CWU trade unions – they share their concern that plans so far have been too slow and not ambitious enough. (1)

Tackling climate change is good for the economy, good for business and good for people. This is the narrative often pushed out by campaigners, researchers and governments around the world. But while measures to curb emissions and reduce the impacts of rising temperatures will be good for the many, the few who work in industries affected by climate policies risk losing their livelihoods as the economy leans increasingly upon renewable energy. Around the world, there is a growing movement demanding a “just transition” for the workforce, so that workers are not left in the cold as fossil fuels become consigned to the past. (2)

Former coal-workers in Virginia have been reported to be looking forward to Trump giving them back their jobs. Unfortunately, for them, he is unlikely to be able to deliver, because demand for coal is collapsing.

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1. Scottish Energy News 13th Dec 2016 <http://www.scottishenergynews.com/scottish-tuc-and-friends-of-earth-join-forces-to-demand-new-green-jobs-in-the-scottish-energy-strategy/>
 2. Carbon Brief 4th Jan 2017 <https://www.carbonbrief.org/clean-energy-the-challenge-of-achieving-a-just-transition-for-workers>