

# SAFE ENERGY E-JOURNAL No.84

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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/2019/11/NuClearNewsNo119.pdf>

## 1 Hunterston

The graphite cores of the two Hunterston B reactors have begun to crumble as cracks spread, prompting safety inspectors to impose tough new conditions threatening future operations. Technical reports released by the Office for Nuclear Regulation (ONR) reveal that at least 58 fragments and pieces of debris have broken off the graphite bricks that make up the reactor cores. According to ONR there is "*significant uncertainty*" about the risks of debris blocking channels for cooling the reactor and causing fuel cladding to melt.

ONR warns that it will require "*more robust arguments*" before it agrees to allow the two reactors to restart in 2020. It also highlights concerns about the risk of "*fuel snagging*" from "*multiple cracked bricks*" and says that previous predictions have underestimated cracking.

But EDF Energy insists that graphite debris does not "*pose a risk to nuclear safety*". ONR's additional requirements are about "*theoretical risks which are extremely unlikely to develop*", it says. (1)

After permitting reactor four to restart for four months ONR posted five detailed technical reports online. One assessing "structural integrity" discloses for the first time that some of the graphite bricks in reactors three and four have begun to disintegrate. (2)

This could cause an accident and a leak of radioactivity. The NFLA is urging ONR to close down both reactors at Hunterston. "*These latest alarming revelations about the graphite reactor cores at Hunterston B starting to crumble and potential issues with the fuel make us even more convinced that reactor three should not be allowed to resume operation,*" said NFLA Scotland convener and Glasgow SNP councillor, Feargal Dalton. "*We will be pressing the Office for Nuclear Regulation very hard to examine very carefully any justification which EDF Energy puts forward to reopen reactor four after its initial four month trial, and to be open and transparent about what they find. The precautionary principle would suggest that this reactor too should stay closed.*"

Radiation consultant, Dr Ian Fairlie, described ONR's latest reports as "*very worrying*". By considering the melting of fuel cladding the regulatory agency was "*getting into even more dangerous matters than before*". He added: "*These reports and their harder language make one wonder why ONR*

*granted a four month extension to reactor four in August. Taken together the new revelations strengthen the calls by local residents to close both reactors at Hunterston B."*

Independent councillor Ian Murdoch asked a full meeting of North Ayrshire Council to remove of the council's current representatives on the Hunterston Site Stakeholders Group (SSG). He said he feels local matters in relation to safety are not being addressed and he wants to see better scrutiny of the industry. A motion was put forward by him, seconded by SNP Councillor Alan Hill, which asked for a vote of no confidence in the five and for replacements to be nominated. (3) His motion was defeated by 18 votes to 11 and resulted in a number of frank exchanges before and during the meeting. Several senior councillors threatened to quit their positions on other influential committees on North Ayrshire Council if the motion was approved.

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1. The Ferret 17<sup>th</sup> Oct 2019 <https://theferret.scot/hunterston-graphite-debris-nuclear/>
  2. ONR (accessed) 29<sup>th</sup> Oct 2019 <http://www.onr.org.uk/civil-nuclear-reactors/hunterston-b-graphite-blocks.htm>
  3. Largs & Millport News 25<sup>th</sup> Sept 2019 <https://www.largsandmillportnews.com/news/17923813.shock-call-made-five-councillors-removed-hunterston-group/>
  4. Largs & Millport News 7<sup>th</sup> Oct 2019 <https://www.largsandmillportnews.com/news/17938856.councillor-defends-bid-oust-rivals-hunterston-watchdog-motion-fails/>

## 2 ONR

In the first report of its kind Chief Nuclear Inspector (CNI) Mark Foy has reported on the performance of Great Britain's nuclear industry during 2018/19.

The report details a number of challenges which require continued focus over the coming year. These include:

Increased attention at defence weapons and propulsion sites, notably Devonport naval base and the Atomic Weapons Establishment, where programmes to upgrade ageing facilities have experienced delays;

Continued scrutiny of Hunterston B power station which features the most advanced symptoms of graphite reactor core degradation in the Advanced Gas-Cooled Reactor fleet;

Enhanced regulatory oversight at Dungeness B where both reactors have been shut down during the last year due to a range of complex age-related issues which are being addressed by licensee EDF Energy;

Ageing plutonium storage facilities at Sellafield which require sustained investment and focus by Sellafield Ltd, the Nuclear Decommissioning Authority and government.



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1. ONR 11<sup>th</sup> Oct 2019 <http://news.onr.org.uk/2019/10/chief-nuclear-inspectors-annual-report-on-great-britains-nuclear-industry/>

### 3 Torness

Torness has awarded a contract for ultra large high-pressure cylinders to store nitrogen on site. (1) EDF Energy decided to install these as a result of learning from Hunterston and the graphite core cracking. Nitrogen helps in the process of shutting down a reactor in an emergency. At the moment Torness has the nitrogen capability to shut either one reactor or the other down, but not both at the same time. The new cylinders will give EDF Energy the capability to shut both at once. (2)

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1. Insider 9<sup>th</sup> Oct 2019 <https://www.insider.co.uk/news/engineering-group-bags-3m-contract-20542226>
  2. EDF Energy answer to a question at the Scottish Nuclear Sites Meeting October 2019.

### 4 Chapelcross

SEPA issued Magnox Ltd with a final warning letter in September after water had been found to be ingressing into an item of bulk LLW. Magnox Ltd will now be required to provide information on all the LLW currently on site along with a programme, including timescales and milestones for its disposal. Magnox Ltd will have to show that its plans are consistent with Best Practical Means requirements with regard to storage and timely disposal.

All the information provided to SEPA will be publicly available.

### 5 Hunterston A

Hunterston A is part way through its preparation to enter the “Care and Maintenance” phase. These preparations are not expected to be completed until 2026.

The Solid Active Waste Bunker Retrieval (SAWR) programme is now emptying the last of five bunkers - retrieving and packaging solid Higher Active Waste. Contractors started in bunker 5 in March 2014. They expect to finish emptying the last bunker by May 2021. By October 913 packages (3m<sup>3</sup>) has been placed in the Intermediate Level waste store from all 5 bunkers. Magnox expect there will be 1,110 packages by May 2021. Unfortunately these packages still have to be grouted in the Solid Intermediate Level Waste Encapsulation (SILWE) Plant which is still being built and is not expected to be commissioned until 2022. So when it's operational the packages from the SAWR project will have

to come out of the store to be encapsulated and then sent back to the store. This will take about 3 years.

The Wet Intermediate Level Waste Retrieval and Encapsulation Plant (WILWREP) was constructed to recover liquid ILW from associated sludge, acid and resin tanks around the site. The waste is put in 3m<sup>3</sup> stainless steel containers and mixed with encapsulant powders. Active commissioning of the plant was completed in October 2018 and it has so far processed 114 drums of waste.

Under the latest SEPA (and other Environment Agencies) Guidance on Requirements for Release from Radioactive Substance Regulation, Hunterston A will have to produce a waste management plan and associated site wide environmental safety case, as part of its “site end state” planning. SEPA will review these and probably consult on them. An ‘End State’ working group has been established. At some point the local authority will be invited to join. The Site Stakeholder Group has expressed an interest in joining too, but no commitments have been made to invite them so far.

## 6 Dounreay

### 6.1 Breeder Fuel

Half of the jammed breeder fuel from the Dounreay Fast Reactor (DFR) has now been removed and dispatched to Sellafield for reprocessing. After the 1950s-built DFR was closed in 1977 most of the breeder elements were removed, but almost 1,000 cylindrical breeder elements were found to be swollen and jammed in place. They had to be left where they were until remotely-operated tools could be developed. (1) Recovering the jammed elements began in 2017, so it could take another 2 years to finish the job. (2) Not all of this fuel is going to arrive at Sellafield in time to be reprocessed in the Magnox Reprocessing Plant which is scheduled to close next year, so arrangements are being made to dry store the remainder of the breeder fuel at Sellafield.

### 6.2 Metal ‘recycling’

Dounreay has been recycling various large bits of contaminated metal. This has been sent to the Cycliffe plant at Lillyhall in Cumbria (rather than the plant in Sweden).

### 6.3 Low Level Waste Pits

Dounreay is the site of some old ‘Low Level Waste Pits’. The current plan is to retrieve the waste from these pits, repackage it and then store it in the new low level waste bunkers. SEPA has now recorded that Dounreay Site Restoration Ltd has been ‘non-compliant with regard to its obligation not to allow radioactive substance to contaminate the groundwater near the pits’. DSRL is going to have to stop the groundwater being contaminated somehow. They are currently investigating options. It may mean having to remove the waste from the pits sooner than they had been planning.

Dounreay is the last site still run by private contractors. It is waiting to hear whether it will get taken in-house by the NDA and join Sellafield and Magnox as part of the NDA family.



## 6.4 Shaft & Silo

Work to retrieve the radioactive waste from the Dounreay shaft isn't expected to get under way for another 3 or 4 years' time. Preparatory and construction work have to be carried out before the waste can be removed. The shaft, which is more than 200 feet below ground, was built in the 1950s and was used to dump nuclear waste from 1959 until an explosion in 1977 ended the practice. The cover building on top of the shaft will first have to be removed and then replaced by new headworks. The contract to clear out the shaft is one of six worth up to an estimated £400 million which were announced earlier this year as part of the decommissioning of the site. They also include removing radioactive waste disposed in the silo. (3)

In the 2000s £16 million was spent to surround the shaft by an oval ring of 230 boreholes through which grout was injected to seal it off from the surrounding rock. This greatly reduced the water ingress to the shaft. But the drive to clean it up was temporarily mothballed after Dounreay's work programme was rejigged to prioritise running down the site's reactor fuel stockpile. (4)

## 6.5 Intermediate Level Waste Store

Construction work on a new intermediate level waste store at Dounreay is setting records, as the concrete floor slab has just been completed ahead of schedule and with an excellent safety record. The work continues with construction on site and manufacture of key plant and equipment off site. (5)

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1. BBC 15<sup>th</sup> Oct 2019 <https://www.bbc.co.uk/news/uk-scotland-highlands-islands-50055003>
  2. Energy Voice 14<sup>th</sup> Oct 2019 <https://www.energyvoice.com/otherenergy/nuclear/209706/half-remaining-fuel-elements-in-dounreays-reactor-removed/> See here for a short video <https://www.gov.uk/government/news/half-the-fuel-gone-from-iconic-dounreay-reactor>
  3. John O'Groat Journal 7th Sept 2019 <https://www.johnogroat-journal.co.uk/news/timescale-outlined-for-dounreay-shaft-work-182669/>
  4. Press & Journal 13th Sept 2019 <https://www.pressandjournal.co.uk/fp/business/north-of-scotland/1840933/work-begins-to-empty-70-year-old-nuclear-dump-in-the-highlands/>
  5. John O Groat Journal 18<sup>th</sup> Oct 2019 <https://www.johnogroat-journal.co.uk/news/construction-work-on-dounreay-waste-store-sets-records-184767/>

## 7 Vulcan

Vulcan is the Naval Reactor Test Establishment run by the MOD for testing new designs of reactors for nuclear submarines, adjacent to the Dounreay site. PWR1 was operated until 1987 and is now in care and maintenance. PWR2 was shut down in July 2015. Defueling and fuel management activities will continue until 2022. (No cooling is required during defueling) The MOD is working closely with the NDA to assess the strategy for decommissioning after 2022. 12 spent fuel transports to Sellafield are anticipated before then.

The future of site once decommissioned is of great interest to the DSG (Dounreay Stakeholder Group), which visited the site in September, but not much information has been forthcoming on this. The reason the MOD representative gave for not revealing much about the future of the site they said related to commercial confidentiality as they are negotiating with private sector companies about future contracts.

## 8 Submarines

### 8.1 Astute Class

The UK government's £11 billion programme to deliver seven new nuclear-powered submarines to the Clyde has been delayed for 17 months because of "emergent technical issues". Delivery of the next submarine, Audacious, to Faslane has been postponed from August 2019 to January 2021. This will delay subsequent boats and may lead to increased costs in future. Critics say the delay is likely to have knock-on effects on the planned introduction of new nuclear-armed Dreadnought submarines. It could also force ageing Trafalgar-class nuclear-powered submarines to be kept in service for longer. The MoD refuses to say anything about problems "for operational security reasons".

The first three Astute class submarines – Astute, Ambush and Artful – are already in service and based at Faslane. The three Trafalgar-class nuclear-powered submarines still in service are Talent, Trenchant and Triumph. They were launched between 1986 and 1991. There are also four Vanguard-class submarines armed with Trident nuclear missiles at Faslane. They are due to be replaced by a new generation of Dreadnought submarines from the 2030s. (1)

### 8.2 Submarine Dismantling

The MoD says the Submarine Dismantling Programme is making good progress with Resolution now in dock undergoing the first stage of LLW removal. To date 92 tonnes of waste have been removed with 37 tonnes of non-active waste being sent for recycling.

53 tonnes of metallic LLW were removed from Swiftsure. These have been smelted into ingots which are currently being analysed. These will then either be released for recycling or sent to the LLW repository.

Rosyth continues to store ion exchange resins on its licensed site in the Active Waste Accumulation Facility. Work to devise an appropriate method of disposal is ongoing. The successful treatment technologies are likely to be relevant to other wastes in the civil nuclear sector, so the MoD is keeping the NDA informed.

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1. The Ferret 22nd Oct 2019 <https://theferret.scot/astute-nuclear-submarines-delayed-technical-problems/>

## 9 Defence Waste

The MoD has been challenged to come clean about its environmental footprint in Scotland, amid anger that swathes of land and sea have been scorched and polluted by it over the past century. The SNP wants the MoD to publish a full audit of defence operations as a precursor to “rehabilitating” affected regions, including marine areas. Defence officials insist the scale and nature of many historical operations are no longer known because records were not kept or lost.

The SNP also raised concern about the environmental impact of decades of weapons testing and a “catalogue” of safety breaches at Faslane. More than 500 “significant” health and safety incidents were recorded at the site last year alone. The issue was raised at the SNP’s annual conference, in a motion put forward by Deidre Brock, the MP for Edinburgh North and Leith. (1)

In a resolution passed by acclaim with no opposition at the conference environmental spokesperson Brock argued that too little is known about either the activities or environmental footprint of the MoD in Scotland, and called upon the UK Government to start “cleaning up its messes”. She told conference delegates:

*“Take tonnes of phosphorus, a few more tonnes of mustard gas, add in radioactive waste for variety and as much unwanted high explosive munitions as you can find, add some stuff you’re not sure about, load it onto ships, and dump it into the sea. That is what the UK Government did for the best part of a century. Thousands of tonnes of explosives, chemical weapons, biological weapons and nuclear waste, all dumped into the seas around our coast. Just off the coast [of Aberdeen] there is a munitions dump - helpfully referred to by the MoD as ‘East of Aberdeen’ to narrow it down. There’s also a marine munitions dump in the Firth of Forth, at the Isle of May. They’re dotted around our coastline and we know nothing about them.” (2)*

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1. Times 6th Oct 2019 <https://www.thetimes.co.uk/article/f63f234c-e7a5-11e9-8f9f-a3d435965222>
  2. Common Space 13<sup>th</sup> Oct 2019 <https://www.commonspace.scot/articles/14803/snp19-delegates-condemn-mod-pollution-and-call-uk-government-start-cleaning-its>

## 10 Time to Abandon Hinkley Point C?

The cost of Hinkley Point C (HPC) has increased by as much as £2.9 billion, to £22.5 billion. In addition, it may be delayed by a further 15 months. It is due to be completed in 2025, but may not now be ready until 2027. Writing in *The Times*, columnist Alistair Osborne called for the “nuclear raft” to be scuttled. (1)

Stephen Fitzpatrick, the founder and chief executive of Ovo Energy - soon to be the UK’s second-biggest supplier on the acquisition of SSE’s consumer business - has called for HPC to be scrapped. He says it wastefully expensive and out of date. The industry should instead look to the future with ever-cheaper renewable energy.

Mr Fitzpatrick would prefer the industry to invest in restructuring the energy network to handle more renewables, including the variable supply of wind and solar. This could be handled in part with a “smart network” using batteries to handle shifting supply and demand. *“If you think about the £39/MWh that was achieved at the last auction for offshore wind, and when Hinkley Point goes live it is going to be about £100 more per MWh sometime in the late 2020s,”* he said. *“If we make smart decisions and focus on value for money and what is best for the end consumer, I am quite sure we can keep costs [of decarbonising the network] under control.”* (2)

Abandoning Hinkley Point C could save electricity consumers between £17bn and £40bn over the first 35 years of its life. (3) These savings could be spent on energy efficiency techniques which could save householders around a quarter of the average energy bill.

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1. Times 26<sup>th</sup> Sept 2019 <https://www.thetimes.co.uk/article/50b3a652-dfd3-11e9-9f61-dcefea5f5359>
  2. Telegraph 28th Sept 2019 <https://www.telegraph.co.uk/business/2019/09/28/scrap-hinkley-point-nuclear-plant-expensive-date-says-ovo-energy/amp/>
  3. Time to Cancel Hinkley? By Professor Steve Thomas, September 2017  
<http://www.no2nuclearpower.org.uk/wp/wp-content/uploads/2017/09/Time-to-Cancel-HinkleyFinal.pdf>

## 11 Delivering on Net Zero: Next Steps for Scotland

The Scottish Parliament passed the new Climate Change Act at the end of September which sets a target for Scotland to reach net-zero greenhouse gas emissions by 2045. Environmental campaigners say the 2030 target is more important, because the next decade is crucial. Any long term target allows the Government to continue to kick the can down the road, and push more difficult decisions onto future generations. When the Climate Bill was first published, the Government proposed a target of 66% for 2030. But all parties in Parliament voted for an amendment – lodged by Labour MSP Claudia Beamish and supported by Lib Dem MSP Liam McArthur – to cut emissions by 75% by 2030. While this isn’t as strong as campaigners wanted - Parliament rejected a stronger 80% option tabled by Green MSP Mark Ruskell - it is progress and it will mean that Government immediately have to get to work to implement new action to drive down emissions.

The new legislation enshrines Just Transition principles, and requires that future Climate Plans explain the impact of proposals and policies on employment in different sectors and regions, setting out support for the workforce, communities and employers. However the Scottish Government rejected moves to put the Just Transition Commission on a statutory basis.

The Government must now publish a new Climate Change Plan within 6 months of the Bill becoming law. That plan must set out all the action they are going to take in the next decade to deliver on the new 2030 target. The plan must set out what the Government is going to do to improve the energy efficiency of people’s homes, and what Ministers’ policies are on oil and gas exploitation. (1)

A Citizens' Assembly on Climate Change will be established to make recommendations on how a net-zero transition should be achieved. The Greens, who abstained on the final vote says to achieve meaningful system change and build a future for all we need a Scottish Green New Deal. *"This would mean taking action to phase out reliance on fossil fuels, creating an integrated public transport system to cut car use, meeting warm homes commitments with mass retrofitting and reforestation Scotland to at least the EU average."* (2)

Robin Parker, climate and energy policy manager at WWF Scotland, writing in the *Herald*, said the Act provides a comprehensive framework for concerted action to tackle climate change. But it's only a framework, so attention must now be focused on delivering the necessary transformation. (3)

WWF's latest report sets out some of the next steps for Scotland on its journey to climate neutrality. (4) The warnings are clear. Current action remains insufficient to meet existing climate targets, let alone the more challenging ones set in the new climate law.

Significant public investment, of the order of at least hundreds of millions of pounds, is needed, starting with the next Scottish budget. There can be no free passes - action needs to be led by the Scottish Government urgently in every sector of the economy, and that will mean significant changes to how people live their lives, and how our businesses do business.

The report also sets out the key actions that need to be taken urgently. In our buildings, for instance, the vast majority of us still rely on burning fossil fuels to stay warm. Addressing this requires very significant public investment, up to half a billion annually, in both improving the energy efficiency of homes, and in providing subsidies to support switching away from gas boilers to modern and efficient electric heat pumps, increasingly the norm in many developed countries.

In transport, the Scottish Government has work under way to improve charging facilities for electric vehicles, to improve bus journey times, and to improve walking and cycling routes. This should all continue and be accelerated.

WWF calls for a clear signal that petrol and diesel vehicles will be banned from Scotland's city centres from 2030. Doing so would provide an early signal and encourage many more people to buy an electric vehicle over the alternatives, and would give local authorities time to further develop alternatives to car travel.

Up to around £100 million is needed to further increase the rate of tree planting in Scotland, and to restore damaged peatbogs across the country so that they stop releasing damaging methane. In addition, Action is needed to continue to increase the amount of renewable electricity we produce, to support the decarbonisation of heat and transport. This needs the UK Government to open up a route to market for the cheapest renewables, onshore wind, as well as continued planning by the Scottish Government to support the growth of all types of renewables. There is also huge scope to support farmers with changing agricultural practices, to reduce the climate emissions from the over application of fertiliser and from other aspects of farm practices.

The report, commissioned from Vivid Economics, is the first of a series of reports, briefings and publications that WWF Scotland will publish over the coming year, using a range of methodologies.

Taken together, they will set out the full range of urgent and immediate actions that Scotland must take across the economy to tackle climate change.

The reports key messages include:

- Expand funding for energy efficiency and renewable heat. Additional spending on energy efficiency and low carbon heating in buildings needs to reach around £0.9 bn per year, compared to business as usual.
- Deploy local strategies and a national plan to regulate out fossil fuel heating. The Scottish Government should require councils to develop local strategies that reduce emissions using locally appropriate solutions. Scottish local heat and energy efficiency strategies are being piloted but are not yet widespread. While still in its early stages, the Scottish government has invited some local authorities to develop Local Heat and Energy Efficiency Strategies (LHEES). Devolving heating and energy efficiency strategies to local governments has been successful internationally, as local government can leverage the planning system and knowledge of the local context effectively.
- On transport the report recommends zero emissions zones in cities from 2030. This will directly reduce emissions, and indirectly help support low carbon vehicle uptake. To help support the implementation of the zones, supporting policy should improve the availability and attractiveness of alternative transport modes (e.g. cycling or public transport).
- The Scottish Government should leverage procurement rules to rapidly transition the sizeable vehicle fleets directly owned by public bodies (e.g. the NHS) or operating with strong government support (e.g. public transport buses).
- Procure zero emission ferries and develop a coastal shipping emission reduction strategy.

The Vivid Economics report was echoed by the Zero Carbon Communities report, commissioned by ScottishPower. This says Scotland will need to install around 400 electric vehicle charging points and domestic heat pumps every day for the next 25 years to reach its 2045 net zero climate target. This is part of 4,000 that will need to be fitted per day across the whole of the UK. The report warns that plans and investments must be put in place now for decarbonisation goals to be met and calls for more power to be devolved to local communities so they can make decisions tailored to their specific needs.

Keith Anderson, chief executive of ScottishPower, said *“More power needs to be devolved locally so that communities have a stronger voice in plans to decarbonise their neighbourhoods.”* (5)

The bill to replace nearly two million obsolete gas heating boilers with heat pumps is likely to reach £16bn. Another £3.6 billion will have to be spent on installing two million electric car charges, nearly 200,000 of them in public places, and another £5.2 billion bolstering the electricity network to meet new demands. However, the ScottishPower report also believes that 10,000 jobs could be supported by a giant decarbonisation drive as Scotland does its bit to tackle the climate emergency. (6)

- Scotland will soon generate 100% of its electricity from renewables according to the trade body Scottish Renewables. Renewables such as wind, solar and hydropower are now Scotland's main source of electricity, providing around three-quarters of all generation. New onshore wind and solar projects have seen huge cost reductions in recent years, making them the cheapest source of electricity of any type. Together, they're currently generating more than half of Scotland's electricity requirements. As a result of the success of renewable energy generation across the country, the sector now employs a total of 17,700 people, with thousands more involved in hundreds of community energy projects taking place. (7)
- The Scottish Government has launched a £30m Low Carbon Heat Fund to support low-carbon heating. Businesses and organisations working on "innovative" solutions to heating buildings can apply to the Scottish. Up to 50% of the capital cost of a new project will be available. The fund is part of wider programme backed by the Scottish government, Scottish Enterprise, and Highlands and Islands Enterprise.
- Citizens Advice Scotland (CAS) has said funding should be made available to individuals as well as larger organisations. It wants politicians to be "*honest about who will foot the bill*" of meeting climate change targets - the cost of moving to net zero emissions should not "*fall heaviest on the poorest in society*". A report commissioned by CAS on consumer attitudes to energy networks in Scotland highlights the dissatisfaction many electric-only households currently have with their heating systems. That needs to change if we are to see more homes heated with electricity. Stewart says "*...people will not switch from gas to electricity without reduced costs and substantial improvements to electric heating options.*" (8) We can't expect people who are already just about managing to support things like electric vehicle charging networks if it means paying more on their bills. These comments reflect the findings of a report published earlier this year by think tank Localis and SP Energy Networks. Unless it is well thought out the roll out of smart grid technology could mean those in higher income areas have lower bills but there is little or negative change in lower income areas. (9)

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1. FoE Scotland 25<sup>th</sup> Sept 2019 <https://foe.scot/people-power-delivers-increased-action-in-the-climate-bill/>
  2. Holyrood Magazine 26<sup>th</sup> Sept 2019 [https://www.holyrood.com/news/view,scottish-parliament-passes-climate-change-bill\\_10852.htm](https://www.holyrood.com/news/view,scottish-parliament-passes-climate-change-bill_10852.htm)
  3. Herald 21st Oct 2019 <https://www.heraldscotland.com/opinion/17983699.robin-parker-current-action-not-enough-meet-legal-climate-targets/>
  4. WWF Scotland 23<sup>rd</sup> October 2019 [https://www.wwf.org.uk/sites/default/files/2019-10/WWF\\_Report\\_VIVID\\_Climate\\_2019\\_web.pdf](https://www.wwf.org.uk/sites/default/files/2019-10/WWF_Report_VIVID_Climate_2019_web.pdf)
  5. Scotsman 24th Oct 2019 <https://www.scotsman.com/news/environment/scotland-has-no-time-to-lose-on-action-to-reach-net-zero-climate-target-1-5031704>
  6. Herald 24th Oct 2019 <https://www.heraldscotland.com/news/17988670.scotlands-shift-towards-green-future-will-cost-billions/>
  7. Energy Live News 23<sup>rd</sup> Sept 2019 <https://www.energylivenews.com/2019/09/23/scotland-will-soon-generate-100-of-its-power-through-renewables/>

8. Scotsman 14th Oct 2019 <https://www.scotsman.com/lifestyle/homes-gardens/domestic-electric-heat-options-in-scotland-must-improve-report-shows-1-5022793>
9. Scotsman 20<sup>th</sup> Sept 2019 <https://www.scotsman.com/news/politics/honesty-needed-about-costs-of-meeting-climate-change-targets-says-charity-1-5007614>

## 12 Scottish Energy Company

The SNP Conference voted overwhelmingly in favour of setting up a Scottish Energy Development Agency (SEDA) as proposed by the Common Weal Think Tank. The SEDA will serve as a strategic body for identifying areas of need in Scotland – be this areas of absolute poverty or areas where the current energy network can be upgraded and decarbonised in line with Scotland’s Green New Deal ambitions.

The SEDA can be an important tool in this transition by identifying areas where an energy project may offer poor commercial returns but would deliver co-benefits to the economy, society and the environment. Some projects, like hydrogen and wave power, may not measure well in terms of immediate and direct economic benefit but may act as a catalyst and test bed for future commercial projects.

The Scottish Government has already taken initiatives to promote energy efficiency, charging of electric vehicles, community energy schemes and the prevention of fuel poverty however the pace of these schemes is uneven across the country. The local authorities charged with delivering the national goals are often under-resourced especially in terms of availability of expert skills. A national level SEDA will be able to co-ordinate and direct those resources to where they are needed whilst also acting as a medium through which skills, techniques and successful experiments can be shared to others.

Common Weal wants to see a Scottish Energy Development Agency (SEDA) set up as a commercial entity, alongside the Publicly-Owned Energy Company (POEC), which would be regulated by Ofgem until a Scottish regulator was established. The SEDA would prioritise and co-ordinate the distribution of funding related to energy R&D, strategic planning and overcoming the rural-urban fuel divide. It would prioritise the training of experts in district heating technologies which have the potential to decarbonise heat in homes, offices and hospitals, alongside insulation where appropriate. It would work with local authorities, health boards, housing associations and other agencies to identify fuel-poor and vulnerable households and ensure schemes which meet their needs are prioritised. This would end the present system whereby authorities, in effect, bid for funding. A more holistic approach should enable the wider government’s social and economic objectives to be better incorporated. The SEDA would report directly to the Scottish Government. (2)

The Scottish government has so far failed to publish a business plan for the POEC with detailed funding levels and potential revenues for the scheme, despite spending more than £300,000 on a report assessing its feasibility. It has now commissioned a second report into the scheme but was unable to say when this would be published. Plans to publish an initial business plan into the project were abruptly scrapped last year despite £315,000 of taxpayers’ money being spent on a “strategic

outline case” report in 2018. It estimated the cost of setting up the energy company could be anything from £500,000 to £3.5m, depending on the “operating model” and “other key operational considerations that have yet to be determined”.

In addition, the report said the scheme could require up to £30m of government funding in the first five years of its existence to cover operational costs. The cost estimates forced the Scottish government to abandon its plan to own and run the energy provider, and instead focus on devolving the scheme to local councils, who would in turn buy the energy from established suppliers. A further outline business case report, aimed at creating a blueprint for how such an arrangement would work in practice, is currently being carried out for Holyrood. A Scottish government spokeswoman said: *“We are committed to delivering the ambition of a public energy company in partnership with local authorities by the end of this current parliament.”* (3)

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1. Commonweal 14th Oct 2019 <https://commonweal.scot/developing-energy>
  1. The National 8th Feb 2019 <https://www.thenational.scot/news/17417414.without-this-a-scottishnational-energy-company-risks-failure/>
  2. Times 20<sup>th</sup> Oct 2019 <https://www.thetimes.co.uk/article/4899d9d8-f297-11e9-836f-5a5fc3a0e5a5>

## 13 Scottish Transport Bill

The Transport Bill passed by the Scottish Parliament contains a suite of new powers which will help local authorities meet their climate emergency aspirations. These include:

- Low Emission Zones which will allow areas of cities to be designated so that the most polluting vehicles can be restricted. It is expected that only petrol vehicles bought after 2004 and diesel vehicles bought after 2015 will be allowed into these zones.
- Public ownership of buses. Since the majority of councils were stripped of the power to run bus services in the 80s, Scotland’s bus network has become patchy, expensive, and only adequately serves the busiest of routes. The Bill gives local authorities the power to run bus services in a way that works for them, whether it is through an arms-length company or as direct public service.
- Bus Franchising. The Bill also contains powers for councils to implement the franchising of bus routes. This is a method for planning a bus network, that allows private operators to compete, but gives the local authority much more power to decide the routes, and ensure operators can’t abandon communities if they’re not making enough profit.
- Workplace Parking Levy. Gives local authorities powers, which are already available in England and Wales, to charge large employers per parking space, and invest this revenue in sustainable transport, like buses and cycle lanes. (1)

Nottingham City Council charges hundreds of companies with more than 10 parking spaces a hefty £415 annual levy per space. But despite the fact that the UK’s only workplace parking levy has priced

many drivers off the road it is popular because the money is invested in public transport and the city's air is becoming cleaner. It introduced the parking levy in 2012 and has used the £61m raised to date, along with government money, to fund a £580m tram network covering 20 miles across a population of 630,000. (2)

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1. FoE Scotland 10th Oct 2019 <https://foe.scot/will-transport-bill-need/>
  2. FT 16th Oct 2019 <https://www.ft.com/content/d4fb89b0-ee61-11e9-ad1e-4367d8281195>

## 14 Climate Emergency Notes

The UK Government should follow through on its commitment to support local industrial strategies with new funding and devolved powers so local areas can drive the UK's transition to a zero-carbon economy, according to the think tanks Green Alliance and Localis in a joint study. 'The road to clean growth – using local industrial strategies to drive change', calls for local and combined authorities to be given greater freedom to develop local industrial strategies with clean, climate-resilient growth at their core. It argues that local authorities should be granted more powers to mandate greener building projects, and should be able to use council tax and business rates to meet clean growth objectives. It also proposes that a proportion of the forthcoming Shared Prosperity Fund – the domestic replacement for the EU funds that will fall away following Brexit – be ring-fenced for projects that enable clean growth.

The report gives the example of supporting the grid infrastructure needed to expand renewable energy or improve public transport. The report also cites a series of examples of good practice, including Bristol's CityLeap project, which is creating local opportunities by attracting private investment in local energy systems, and the West Midlands, which has put the move to electric vehicles at the heart of its recently published local industrial strategy. (3) London Mayor Sadiq Khan and Birmingham Mayor Andy Street have also arguing they should be provided with more powers by Westminster in order to drive forward their decarbonisation strategies. (4)

### 14.1 Edinburgh Roadmap

A road map to deliver a carbon neutral Capital by 2030 has been set out by the City of Edinburgh Council. The 'short window improvement plan' outlines 37 immediate and short-term actions across all areas of Council business such as planning, transport, housing, energy, education, tourism, culture, festivals, economic development, waste/recycling, parks, biodiversity/green infrastructure, our communities and partners. The road map highlights the actions the Council is looking to take forward over the coming months while a City Sustainability Strategy is developed with partners and published next year.

The Council's immediate action plan includes proposals to:

- accelerate the transition to electric vehicles within the Council’s fleet and expand and accelerate provision of electric vehicle charging infrastructure;
- embed exemplar sustainable development and low carbon energy solutions across the Council’s new build housing programme;
- carry out a targeted energy efficient retrofit of the Council’s operational buildings and commit to Passivhaus Standard as the default standard for all Council newbuilds across the operational estate
- finalise a new tourism strategy for Edinburgh (with associated delivery programme) to focus on a sustainable approach to the visitor economy;
- increase the use of green infrastructure within new and existing infrastructure developments in order to increase permeability and cooling effects in the City;
- implement an exemplar approach to evaluating and reporting on the sustainability impact of Council decisions in committee reports;
- write to all Arms Length External Organisations (ALEOs) asking for them to adopt the 2030 target and to work with the Council to develop an action plan for implementation and indicating the Council’s intent to review service level agreements to reflect this request. (5)

The proposals to reduce Edinburgh’s carbon footprint by two thirds are estimated to cost around £8 billion to the entire city over the next 11 years – and be paid back in savings after 16 years – while the remaining carbon is set to be removed through embracing improved technology or by offsetting, which could include planting a new forest in the Capital. (6)

The £314m City Centre Transformation Plan has been approved by councillors. The overhaul will give priority to pedestrians and cyclists and see many key streets closed to traffic. Environmental campaigners have welcomed the plans. They include ambitious cycling infrastructure projects, a trial of a city “hopper” bus and car-free streets in the Old Town. More than £300m will need to be found for the final phase of the strategy, which includes creating a tree-lined boulevard on Lothian Road, integrated public transport ticketing and timetabling and a new cycling and walking bridge linking the Old Town and New Town. (7)

Meanwhile, a 10-tonne ‘Archimedes screw’ has been hoisted into place for a new hydro-electric scheme at Saughton Park which will make the park fully eco-powered. Ground source heating is already being used in the park’s buildings and glasshouse and the hydro-power generated by the Archimedes screw, using water directly from the Water of Leith, will provide electricity across the park. The micro-hydro scheme project was partially financed thanks to £482,107 from the SP Energy Networks Green Economy Fund. (8)

## 14.2 Glasgow City Council

Pirie Park Primary School is set to become a flexible energy asset on the demand side response (DSR) market. Through a partnership with demand response firm Flexitricity, the local authority will use’s cold storage, air conditioning and heat pumps to aggregate and store energy and dispatch energy to the grid on demand. Doing so will help National Grid balance the demands of the UK’s energy system, which are fluctuating more as more renewable generation comes online – and as the electrification of sectors such as power and transport begins to impact peak times. It will also enable

Glasgow City Council to generate additional revenue. The local authority has promised to ring-fence these earnings to invest in further renewable energy and energy efficiency schemes, as it strives to meet net-zero by 2030. (9)

Glasgow City Council has been urged to consider issuing special “climate bonds” – to raise the capital it needs to tackle the climate emergency by a working group of influential councillors and advisers. The city has ambitious plans for the city to become the first in the UK to get to zero-net carbon. The authority has concrete proposals to replace its entire fleet of 2000 cars, bin lorries and gritters with electric and hydrogen vehicles. It has already secured some Scottish Government funding to convert some of its snow-clearers in to dual-fuel hydrogen power. In the long run electric vehicles have lower running costs, experts believe. But they are more expensive to buy than their diesel equivalents. (10)

Glasgow City Council wants to invest in more district heating. However, if it does so, it will have to pay out non-domestic rates. That is because district heating systems are regarded as businesses and taxed – remarkably, say city insiders – more than the utilities which supply gas or electricity to personal boilers. The city bought and paid for a district heating system for the neighbourhood created as a legacy of the 2014 Commonwealth Games. This hefty gas-fired system heats hundreds of homes as well as the landmark Emirates indoor sports arena. That comes with a tax bill of first £137,000 a year and now – thanks to a Scottish Government cut – £70,000. The city has decided to take this on board, so that residents do not pay. But officials stress they cannot foot the tax bills of the network of district heating systems they would like to encourage, perhaps under a municipal energy firm. (11)

Glasgow is considering reforesting some of its golf courses. Local authorities across Scotland are struggling to find ways to make other uses of golf courses – public and private – as participation in the sport declines. (12)

### 14.3 Stirling Council

Investment in renewable energy has landed the local authority a UK-wide industry award. The Council’s Housing Service won the Best Residential Solar and Storage Project award at the annual UK Solar and Storage Awards 2019 in Birmingham, beating a short-list of four entries. The award recognises the significant impact the Council’s investment in renewable technology for its social housing stock over the past seven years has had on improving energy efficiency, reducing fuel poverty and carbon emissions. (13)

Aberdeenshire Council has awarded a contract to install solar and battery storage in 500 local authority houses in Inverurie and Macduff. (14)

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1. Edie 10<sup>th</sup> Oct 2019 <https://www.edie.net/news/11/C40-Global-Green-New-Deal-Bloomberg-Mayors-LA-Paris/>
  2. Guardian 11<sup>th</sup> Oct 2019 <https://www.theguardian.com/cities/2019/oct/11/inside-copenhagens-race-to-be-the-first-carbon-neutral-city>

3. Business Green 23<sup>rd</sup> Oct 2019 [https://www.businessgreen.com/bg/news/3082947/government-should-step-up-support-for-local-industrial-strategies-study-says\\_](https://www.businessgreen.com/bg/news/3082947/government-should-step-up-support-for-local-industrial-strategies-study-says_) and Edie 23<sup>rd</sup> Oct 2019 <https://www.edie.net/news/11/Report--Local-areas-to--miss-out--on-net-zero-goals-unless-Government-support/>
4. Times 22<sup>nd</sup> Oct 2019 <https://www.thetimes.co.uk/article/we-need-more-powers-to-tackle-climate-change-at-a-local-level-r50297f8g>
5. Edinburgh Reporter 23<sup>rd</sup> Oct 2019 <https://www.theedinburghreporter.co.uk/2019/10/council-publish-net-zero-carbon-roadmap/>
6. Edinburgh Evening News 23<sup>rd</sup> Oct 2019 <https://www.edinburghnews.scotsman.com/news/politics/council/action-plans-drawn-edinburgh-become-carbon-neutral-2030-818282>
7. BBC 19<sup>th</sup> Sept 2019 <https://www.bbc.co.uk/news/uk-scotland-edinburgh-east-fife-49754817>
8. Edinburgh reporter 1<sup>st</sup> Oct 2019 <https://www.theedinburghreporter.co.uk/2019/10/saughton-park-micro-hydro-scheme-has-bespoke-archimedes-screw-installed/>
9. Edie 14<sup>th</sup> Oct 2019 <https://www.edie.net/news/6/Glasgow-signs-up-primary-school-as-its-first-flexible-energy-asset/>
10. Herald 14<sup>th</sup> Sept 2019 <https://www.heraldscotland.com/news/17901374.glasgow-moots-climate-bonds/>
11. Herald 11<sup>th</sup> Sept 2019 <https://www.heraldscotland.com/news/17893851.revealed-tax-hitch-slows-efforts-grow-district-heating/>
12. Scotsman 9<sup>th</sup> Sept 2019 <https://www.scotsman.com/news/environment/golf-courses-in-glasgow-could-be-reforested-in-bid-to-make-city-greener-1-5000081>
13. Stirling News 29<sup>th</sup> Oct 2019 <https://www.stirlingnews.co.uk/news/18000427.stirling-leading-light-solar-power-award/>
14. Solar Power Portal 31<sup>st</sup> Oct 2019 [https://www.solarpowerportal.co.uk/news/emtec\\_energy\\_clinches\\_4m\\_aberdeenshire\\_solar\\_plus\\_storage\\_retrofit\\_tender](https://www.solarpowerportal.co.uk/news/emtec_energy_clinches_4m_aberdeenshire_solar_plus_storage_retrofit_tender)

## 15 Hydrogen

Scottish analyst Wood Mackenzie predicts the 252 MW of green hydrogen production capacity expected worldwide this year will expand to 3,205 MW by 2025. There is an urgent need for renewable-energy produced hydrogen not only as an energy storage grid balancing alternative to fossil fuels but also because of the hugely damaging CO<sub>2</sub> emissions created during the production of hydrogen at present for use in other sectors. WoodMac says green hydrogen production will be able to compete on cost with fossil-fuel hydrogen by 2030 in Australia, Germany and Japan – but only if renewable energy prices continue to tumble or more policy levers are pulled. (1)

Deployment of a 4GW floating wind farm in the early 2030s at an estimated cost of £12bn (\$14.8bn) could be the first step in the eventual replacement of natural gas by hydrogen in the UK energy system. Floating offshore wind turbines far out in the North Sea will convert seawater to ‘green’ hydrogen that will be pumped ashore and used to heat millions of homes, under the ambitious plan

just awarded UK government funding. A 4GW floating wind farm could produce enough hydrogen to heat 1.5 million homes. If you had 30 of those in the North Sea you could totally replace the natural gas requirement for the whole country, and be totally self-sufficient with hydrogen. (2)

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1. PV Magazine 22nd Oct 2019 <https://www.pv-magazine.com/2019/10/22/fate-of-green-hydrogen-depends-on-ever-cheaper-renewables-for-now/>
  2. Recharge News 13<sup>th</sup> Sept 2019 <https://www.rechargenews.com/wind/1850034/floating-wind-to-hydrogen-plan-to-heat-millions-of-uk-homes>

## 16 Energy Storage

Edinburgh company – Gravitricity - is planning to generate electricity from gravity and is getting noticed by investors, as an effective alternative to large batteries, so that renewable energy supply can be stored until there is demand. (1) Electricity would be stored and then regenerated by hoisting and dropping 12,000-tonne weights – half the weight of the Statue of Liberty – down disused mine shafts. Gravitricity, hopes to use Britain’s old mines to make better use of clean electricity at half the cost of lithium-ion batteries. Gravitricity said its system effectively stores energy by using electric winches to hoist the weights to the top of the shaft when there is plenty of renewable energy available, then dropping the weights hundreds of metres down vertical shafts to generate electricity when needed. Gravitricity wants to start with a tower in Edinburgh, to prove the concept. But it then wants to use mines which are closing, or recently closed, to make use of their deep shafts. (2)

Surplus renewable electricity could also be used to compress and cool air in a tank, so it becomes a freezing liquid. Then when demand peaks, you warm the liquid back into a gas, and as that expands it drives a turbine to create more electricity. Highview, has announced that a grid-scale 50MW plant will be built in the north of England on the site of a former conventional power plant. The technology has been supported by the UK government. One attractive feature is that it uses existing simple technology developed for storing and compressing liquefied natural gas (LNG). A key innovation is to store the excess heat given out when the air is compressed and use it to re-heat the liquified air when it is needed. (3)

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1. BBC 22nd Oct 2019 <https://www.bbc.co.uk/news/uk-scotland-scotland-business-50146801>
  2. Guardian 21st Oct 2019 <https://www.theguardian.com/environment/2019/oct/21/how-uks-disused-mine-shafts-plan-to-store-renewable-energy>
  3. Solar Power Portal 22<sup>nd</sup> Oct 2019 [https://www.solarpowerportal.co.uk/news/highview\\_power\\_unveils\\_plans\\_for\\_250mwh\\_cryobattery\\_in\\_the\\_uk](https://www.solarpowerportal.co.uk/news/highview_power_unveils_plans_for_250mwh_cryobattery_in_the_uk)



## 17 APSE Energy Summit Scotland 2019

Some of the speakers at the APSE energy Summit argued that a lot of authorities have passed climate emergency resolutions without knowing how they will get there. They will need to develop an Action Plan. It will be equivalent to a Medium Term Financial Strategy affecting the whole council not just environmental officers. The first thing to do is to find out where emissions are coming from. The resolution will say where the authority is intending to get (eg net zero for the area covered by the council by 2030), so the Action Plan will detail how to get there. Partnerships with external bodies, such as universities, NHS, police, large sports facilities etc is recommended. And Citizens Assemblies with a wide cross section of society can help bring the public along.

Kim Pratt gave an interesting presentation on the circular economy, which is probably a neglected area of climate policy. For instance, Scotland's emissions may have fallen by 42% - but if you add in the emissions from all our imports, the impact is only 8%. 75% of emissions are due to material consumption. So repair is better than recycling. We need to make products which last longer. Interestingly a study which compared sending materials off to the mainland from Shetland to recycle with incineration in the Lerwick incinerator discovered it is still better to transport the material away for recycling.

Archie Dryburgh talked about the Dumfries and Galloway Climate Emergency Resolution. D&G is particularly proud of its community consultation process. It is working with Northern Ireland to make sure there is a suitable charging infrastructure for EVs from Derry to Newcastle. Some of the wind farms in D&G are offering to supply free electricity to charge points.

Yes Energy Solutions highlighted the benefits of using ECO3 funding for energy efficiency measures. Kirklees Council's programme was highlighted – it achieved a 13 to 1 ratio of savings to expenditure.

Warrington's presentation was probably the highlight. The Council doesn't have a sustainable energy strategy team – it is all done on a cross departmental basis. Warrington has 205,000 residents, 10,000 in fuel poverty, but any strategy needs to be commercial. Borrowing is at historically low rates. Grid is bending over backwards to help. The council has started a Public Sector Social Impact Fund for Councils to invest in.

Nottingham has launched SCATTER to help other councils with carbon reporting and inventory. (Setting City Area Targets and Trajectories for Emissions Reduction). They will be running some webinars. <https://scattercities.com/> And there's a You Tube video. Nottingham is also setting up offices across the Midlands. The Council will also be the first to receive a water license to supply water.

Gridserve ([www.gridserve.com](http://www.gridserve.com)) gave a presentation on their plans for 100 Electric Forecourts with ultra-rapid chargers, solar panels and energy storage. As they will be providing grid services the electricity should cost about the same as it does at home. The wisdom of making charge points free (75% in Scotland are free) because it probably stifles development and innovation.

Kensa gave an exciting presentation about providing domestic district heating using boreholes and ground source or air source heat pumps. This means that tenants only have to worry about their

electricity bill – they don't have a hot water bill as in most district heating schemes. Bills are about the same as they would be with gas central heating or slightly less. Kensa is working with Sunamp heat batteries in Oxford.

Stirling Council and Scottish Water did a joint presentation on the Stirling District Heating Scheme, Scottish Water is working on a similar project at the Clyde Gateway, and is looking at a scheme for Firrhill School in Edinburgh which would extract heat from the Firrhill Tank which is used to store drinking water.

The presentations are available on the APSE website here:

<https://www.apse.org.uk/apse/index.cfm/local-authority-energy-collaboration/apse-energy-events/past-events/the-apse-energy-summit-2019/>

## 18 Offshore and island wind

A new wave of offshore wind farms around the UK will generate power more cheaply than burning coal and for the first time will not require any subsidy. The cost of power from offshore wind has plummeted 30 per cent in two years with a raft of 12 new energy projects coming in at a record low price of between £39.65 and £41.61 per megawatt hour. That is less than half of the £92.50/MWh the government has committed to pay for Hinkley Point C. The government has secured almost 6GW of new renewables capacity, without spending any of the £65m budget allocated for this auction, due to the record low clearing prices. (1)

Six of the projects are in Scotland. The schemes include Forthwind and SSE Renewables' Seagreen Phase 1, which are both proposed for the Firth of Forth, and four onshore wind farms – Muaitheabhal and Druim Leathann in Lewis and Hesta Head and Costa Head in Orkney. The farms are expected to be built by 2025. All six could generate enough electricity to power the equivalent of 265,000 homes, according to industry body Scottish Renewables. (2)

Unfortunately the capacity of projects on Lewis and Orkney currently sit below the threshold MW level set by Ofgem to trigger new transmission links for both islands, which cast doubt on whether any of the island schemes will go ahead. Roddie MacKay, leader of Comhairle nan Eilean Siar, said it was "good news" two out of three planned wind farm developers had won contracts. But he added: "It is hugely disappointing, however, that Stornoway Wind Farm has not achieved a CfD. The 90-turbine Moray West Offshore Wind Farm also missed out on a contract, as did the Shetland Viking Energy wind farm. (3)

Meanwhile Radio4's Costing the Earth: has showcased Orkney's renewable energy pioneers. For much of the year the islands produce more energy than they can use. Turbines are shut down and green energy goes to waste. The UK government has spotted an opportunity, funding the REFLEX project which aims to use that excess energy to develop new ways to power a community. The programme looked at how hydrogen storage, huge batteries and electric ferries and cars can be lashed together with clever software to remove fossil fuels from an entire energy system. (4)

One project on Orkney is now planning to test the use of hydrogen technology in small passenger aircraft and has been awarded £2.7m in government funding. The HyFlyer project is set to demonstrate powertrain technology designed to replace conventional piston engines in propeller aircraft. The project would allow electric motors, hydrogen fuel cells, and gas storage to replace the powertrain typically used in such planes. (5)

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1. Independent 20th Sept 2019 <https://www.independent.co.uk/news/business/news/offshore-wind-power-energy-price-falls-record-low-renewables-a9113876.html>
  2. BBC 20<sup>th</sup> Sept 2019 <https://www.bbc.co.uk/news/uk-scotland-highlands-islands-49768198>
  3. Energy Voice 21st Sept 2019 <https://www.energyvoice.com/otherenergy/208271/moray-west-director-vows-to-build-this-project-after-cfd-disappointment/>
  4. BBC 8th Oct 2019 <https://www.bbc.co.uk/sounds/play/m0009372>
  5. Business Green 20th Sept 2019 <https://www.businessgreen.com/bg/news/3081732/zero-emission-aircraft-tests-set-for-take-off-in-orkney>