

SAFE ENERGY E-JOURNAL No.63

October 2014

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

This briefing does not 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/NuClearNewsNo67.pdf>

If you would like to receive Daily Nuclear News updates by e-mail you can sign up here:

<http://www.no2nuclearpower.org.uk/mailling-lists/>

1 Scotland and New Nuclear Reactors

Hinkley – Economically “insane”.

The Stop Hinkley Campaign expressed extreme disappointment after European Commissioners decided to approve subsidies of up to £17.6 billion to EDF Energy to build two new nuclear reactors at Hinkley Point in Somerset.

Stop Hinkley Spokesperson Allan Jeffery said: *"This deal is clearly illegal under European law; it will saddle UK consumers with the bill for paying huge subsidies for decades, and yet there are more cost effective and safer ways of providing low carbon electricity or not using the energy in the first place. It is mind boggling how the UK government managed to convince the Commissioners to go along with this crazy plan without even the pretence of a competitive process."*

But the group vowed to continue its campaign to halt the £16 billion project. The group said the Government should examine in detail the flurry of recent reports from investment and energy analysts predicting a bright future for solar energy and other renewables as well as energy storage.

"The technology proposed for Hinkley Point C is well past its sell-by-date. It's time for Somerset to look to the future and develop a locally-controlled sustainable energy industry which doesn't involve leaving a toxic legacy for our grandchildren's children and which can tackle climate change and fuel poverty in a much more cost effective way."

Over the last year a series of reports from financial and energy analysts have concluded that, amongst other things, conventional utility models are no longer fit for purpose. The reports highlight the changes to the old centralised utility model which are on the horizon and the importance of new technologies. They suggest that decentralised energy supply will be increasingly important in the future. A selection of these reports is listed below:

UBS 20 th August 2014 Will Solar, batteries and electric cars re-shape the electricity system?	UBS declares it is “ <i>time to join the [solar] revolution</i> ”. Large centralised power stations could be obsolete with 10 - 20 yrs, because they are too big, inflexible, and “ <i>not relevant</i> ” for future electricity generation, according to the bank.	http://tinyurl.com/qxqf2j2
HSBC – Energy Storage, Power to the People	Conventional generators will be the biggest losers from an upcoming energy storage boom , as both consumers and grid operators look to battery and other storage technologies.	Reported in Renew Economy 1 Oct 2014 http://tinyurl.com/kgj246n
Citi Research 28 July 2014. Energy 2020: The revolution will not be televised as disruptors multiply	“We predict that solar, wind, and biomass continue to gain market share from coal and nuclear into the future”.	http://tinyurl.com/lsz8nf9
IPPR, 8 th Sept 2014. A new approach to electricity markets: How new disruptive technologies change everything.	The UK’s electricity system, and the policy framework underpinning it, is holding back innovation and cost-reduction because it is propping up a large-scale, centralised utility business model that is fast becoming obsolete.	http://tinyurl.com/ok7a5g8
Citibank	The big six energy suppliers are facing the loss of a quarter of their customers over the next six years.	Reported in The Guardian 1 st Oct 2014 http://tinyurl.com/pcolxmz
Barclays	The disruptive impact solar power is having on traditional utilities was highlighted, after Barclays downgraded the US power sector over fears it will struggle to compete with increasingly low cost renewable energy.	Reported in Business Green 30 th May 2014 http://tinyurl.com/nakrrhm
Centre for Economics and Business Research	With a stable policy, large-scale solar projects are on track to becoming the cheapest way to generate electricity in the UK. bold Government action to back British solar could create 60GW of generation capacity by 2030 – enough for 18 million homes – and support 50,000 jobs across its supply chain.	Reported in Business Green 25 th September 2014 http://tinyurl.com/n8hp3yd
International Energy Agency, Press Release 29 th Sept 2014	Solar Power could become the dominant source of power by 2050.	http://tinyurl.com/k37u5yo
Exeter University, Energy Policy Dept. Governance and Disruptive Energy System Change. Sept 2014	Annex 1 gives a table of 11 investment bank reports	http://tinyurl.com/obdpwyg

A selection of recent reports on the future utilities as decentralised energy grows making old centralised utility models obsolete.

The Austrian Government has declared its intention to take the Commission to the European Court of Justice over this decision, (1) and Germany is also considering it. (2) In the UK independent energy supplier Ecotricity is also among companies and organisations considering a legal challenge. There appears to be a groundswell of opinion among renewable energy companies and associations in Britain and Europe that something should be done. (3) This could leave the project in limbo. Legal action would take at least a year to conclude and EDF Energy would have to decide whether or not to risk proceeding with the project in the meantime in case it has to be abandoned if the legal action is successful. It seems very unlikely that a final investment decision will be taken before the 2015 General Election.

Scottish Energy Minister, Fergus Ewing says subsidies for nuclear power will “inevitably” mean less financial support for green energy, and support for nuclear power is harming investment in renewable energy projects. Offshore wind projects in Scotland for instance are not receiving enough financial support from the government in Westminster, despite being “extremely valuable” to Scotland’s economy and its efforts to reduce its carbon emissions. There is only around £235m of financial support available for renewable projects in “*stark contrast*” to the “*unprecedented financial backing*” for Hinkley. (4)

An analysis by Dave Toke, reader in Energy Policy at Aberdeen University, suggests that spending on Hinkley Point C and later nuclear reactors will obliterate spending on renewables. The levy control framework (LCF) is a device used by the Treasury to limit subsidies to different forms of energy levied on consumers’ bills. Consumers will probably be paying around £1bn every year after 2023 to subsidise Hinkley, which, barring any changes to the LCF, means there won’t be any further money available for subsidies until 2027, by which time Sizewell C could be ready to start gobbling up subsidy money. (5)

Despite welcoming the Hinkley deal Shadow energy minister Tom Greatrex has called on the National Audit Office to review the subsidy arrangement for the nuclear project. (6)

-
1. Times 7th Oct 2014 <http://www.thetimes.co.uk/tto/business/industries/utilities/article4229029.ece>
 2. Montel 9th Oct 2014 <http://www.montel.no/StartPage/SubPage.aspx?id=549518>
 3. Guardian 12th Oct 2014 <http://www.theguardian.com/environment/2014/oct/12/ecotricity-legal-challenge-eu-hinkley-point-c-subsidy-nuclear>
 4. Building 13th October 2014 <http://www.building.co.uk/communities/sustainability/scottish-minister-nuclear-subsidies-hurting-green-energy/5071430.article>
 5. Dave Toke’s Blog 13th Oct 2014 <http://realfeed-intariffs.blogspot.co.uk/2014/10/hinkley-c-deal-likely-to-wipe-out-uk.html>
 6. Utility Week 13th Oct 2014 <http://www.utilityweek.co.uk/news/labour-calls-for-scrutiny-of-hinkley-deal/1060952>

2 Hunterston

Hunterston Cracks

New cracks have been found in one of the reactors at Hunterston B nuclear power station in North Ayrshire. Two of about 3,000 graphite bricks¹ in the core of reactor four are affected. Plant operator, EDF Energy, said the cracking was predicted to occur as the station aged and it would not affect the safe operation of the reactor. These new cracks were found during a routine inspection which began in August, so they must have occurred since the last inspection in 2011. (1)

EDF Energy played down the significance saying that the cracks were as predicted by their mathematical models and that there is a massive safety margin.

But Nuclear Engineer, John Large, described EDF's statements as "*overly reassuring*". He said the reasons for the cracking and any associated risk remain unknown. Over time, as a result of being bombarded by radiation, the graphite bricks gradually lose weight. The ONR regulates the state of the bricks and doesn't normally allow them to lose more than a set percentage of their weight before they are classed as having reached the end of their life. Cracking has to be taken into account by the Regulator when setting a weight loss limit. As the bricks line the reactor's core, they cannot be replaced which means once the bricks have lost a certain percentage of their weight this should signal the end of the power station's life. However, EDF, the station's owner, can apply to the regulator to increase the weight loss limit in order to extend the life of the power plant. (2)

It is not particularly reassuring that the Office of Nuclear Regulation simply raise the limit it sets for weight loss in the graphite blocks when asked to do so by EDF. (3)

The cracking is not a new issue. The problem of cracking bricks within the core of the reactors was first identified following maintenance checks during 2002 through to 2004. Large first studied and reported on the problem in 2006. His conclusions, which were later backed by the nuclear safety regulator, Office for Nuclear Regulation (ONR), were that the processes leading to the cracking were not fully understood.

The main area of concern in 2006 was the difficulty in locating cracked bricks, "*because of the limited time during a servicing outage to access all of the fuel and control rod channels - about 240 in total - that pierce through the core and the fact that the cracking develops on the outer face keyway locality which is not directly accessible from within the channel. So whereas only one or two cracks might be actually detected, this presence of these cracks is a clear indication that other cracks have developed and exist but which are beyond detection,*" Large said.

Large added that an indication of how serious an issue the problem was is reflected in the ONR's ongoing research and development program and the fact plant operators, EDF Energy, claims to

¹ Some news reports said 6,000 graphite bricks. Whether it is 3 or 6,000 depends on your definition of a brick – in other words it depends on whether you count the plugged channel and interstitial bricks. (See third diagram)

have 200 staff and engineers working to find a solution to the problem. The problem is likely to be happening in all 14 of the UK's Advanced Gas-cooled Reactors (AGR). "*Little progress seems to have been made in the understanding of why and at what rate the graphite bricks are degrading and cracking and, particularly, how this affects the residual strength of the individual bricks and overall core assembly in the event of a sudden pressure change in the reactor gas circuit,*" Large said (4)

Serious distortion of the graphite core due to cracking could prevent the insertion of control rods, which are essential for safety and are used to shut down the reactor in an emergency. (5)

In 2006 Large analysed a bundle of documents received under the Freedom of Information Act about Hinkley Point B and Hunterston B. It concluded that there are "*...significant uncertainties over the structural integrity and residual strength of the moderator cores in ...AGR plants ... in view of the increased risk presented by continued operation of these nuclear plants, the reactors should be immediately shut down and remain so until a robust nuclear safety case free of such uncertainties has been established.*" (6) John Large said it was "*gambling with public safety*" to allow Hinkley Point and Hunterston to continue operating. (7) The documents, written by the former Nuclear Installations Inspectorate, reveal that AGRs are structurally defective and their continued operation is increasing the risk of a radioactive accident. (8)

The Office for Nuclear Regulation (ONR) says it strictly regulates the state of the bricks. However, in June, it approved a request by EDF Energy to increase the limit of graphite weight loss from 6.2% to 8%, at Dungeness B. Now, EDF Energy has published more information about graphite loss across the AGR fleet Hunterston & Hinkley Point B have an estimate weight loss of 12.8% and a limit set at 15%. (9) So the limit will probably need to be raised if Hunterston B is to continue generating until 2023.

Nuclear commentator, Peter Lux, points out that the 12.8% figure is for the core as a whole. Some areas might have over 40% weight loss. The graphite blocks are also cracking as well as losing weight. Short of decommissioning the reactors it is very difficult to accurately determine the weight loss and cracking in the bricks. This level of weight loss was not expected when the reactors were originally designed and the weight loss and cracking is still not adequately understood. ONR have expressed concern about the methodology being used to calculate weight loss and the small margins between weight loss and the limits. (10)

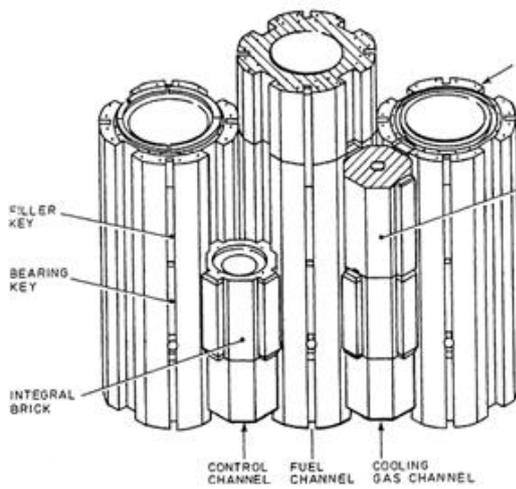
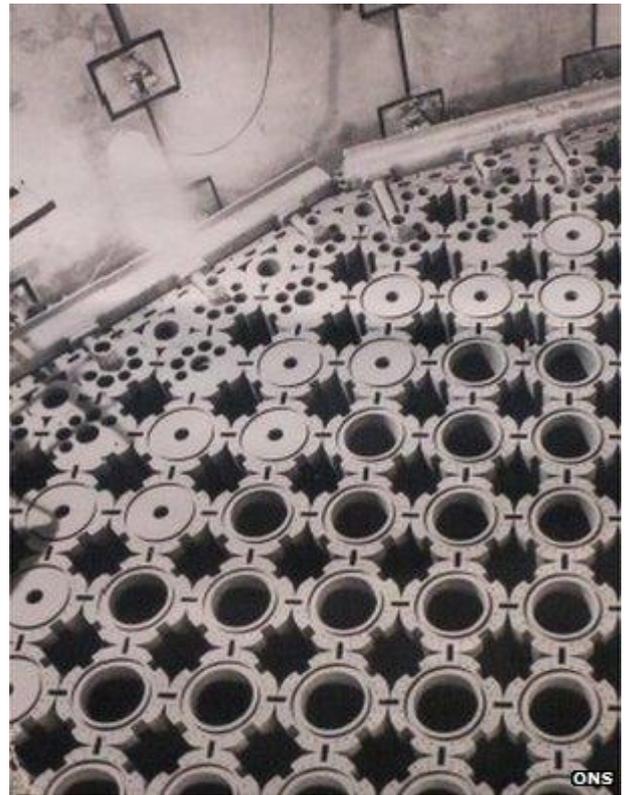


Figure 11: Diagram of the graphite keying structure



1. BBC 6th Oct 2014 <http://www.bbc.co.uk/news/uk-scotland-glasgow-west-29502329>
2. Utility Week 30th June 2014 <http://www.utilityweek.co.uk/news/change-to-dungeness-nuclear-safety-rules-approved/1026162>
3. See "PLEX" nuclear News No.65 August 2014
<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo65.pdf>
4. RIA Novosti 7th Oct 2014 <http://en.ria.ru/analysis/20141007/193777310/Concerns-Persist-Over-Safety-of-Cracking-Inside-Reactor-in.html>
5. BBC 6th Oct 2014 <http://www.bbc.co.uk/news/science-environment-29481481>
6. Brief Review of the Documentation Relating to the Graphite Moderator Cores at Hinkley Point B and Other Advanced Gas-Cooled Reactors. Large and Associates, June 2006.
<http://www.greenpeace.org.uk/files/pdfs/migrated/MultimediaFiles/Live/FullReport/7810.pdf>
7. Guardian 5th July 2006 <http://www.guardian.co.uk/science/2006/jul/05/energy.frontpagenews>
8. Greenpeace 5th July 2006 <http://www.greenpeace.org.uk/media/press-releases/secret-documents-reveal-government-inspectors-fears-over-defective-nuclear-reactors>
9. Nuclear Engineering International 11th July 2014 <http://www.neimagazine.com/news/newsdef-energy-publishes-agr-graphite-loss-levels-4316310>
10. Peter Lux 7th June 2014 <http://www.plux.co.uk/graphite-weight-loss-at-agr-reactors/>

Hunterston Life Extension should have an Environmental Impact Assessment

A decision taken earlier this year at an international convention known as the Convention on Environmental Impact Assessment (EIA) in a Transboundary Context, or the Espoo Convention, has huge implications for the UK's ageing nuclear reactors. According to the decision all ageing nuclear power stations in Europe will now have to have an environmental impact assessment (EIA) before a licence renewal or the approval of a 10-year-periodic safety review. And the EIA will have to compare the potential impact of extending the life of an old reactor with supplying energy from alternative sources such as renewable energy. (1)

A discussion at the Meeting of Parties of the Convention (MoP) on the lifetime extension of the Rivne 1 and 2 nuclear reactors in Ukraine endorsed the conclusions of its Implementation Commission. As a result, all ageing nuclear power stations in Europe will have to be submitted to an environmental impact assessment before a licence renewal or the approval of a 10-year-periodic safety review.

This is a groundbreaking decision. Most European countries extend the lifetimes of their ageing nuclear reactors by looking only at whether prescribed safety standards are met. Normally, there is no consideration of whether the risk of a severe accident and associated environmental impacts is justified at an ageing power station in comparison with other ways of generating the same electricity. And the public is not consulted. This now has to change.



The Espoo Implementation Committee urged Ukraine to carry out an EIA that would permit public participation and prepare EIA documentation before the next periodic safety review.

The next Periodic Safety Review (PSR) for Hunterston B is due to be submitted by EDF Energy to the Office for Nuclear Regulation (ONR) in January 2016, and ONR will make a decision on this in January 2017. The Scottish Government claims the PSR is not the same as a life extension but rather a routine safety assessment.

In response to a query about the Espoo Convention in relation to life extensions, the Scottish Government said signatories to the Convention agreed to the text of a nuclear declaration at a Meeting of Parties in June 2014. This includes the following: *“Consider that if an activity needs upgrade works during its lifecycle that might have significant adverse environmental impacts, this should be considered as a major change to the activity in question and be subject to the provisions of the Convention.”* The extension of an operating permit does not fall within the scope of the European EIA Directive unless there are also works or interventions involving alterations to the physical aspect of the site.

In other words the Scottish Government is claiming that unless there are works or interventions involving alterations to the physical aspect of the site, an Environmental Impact Assessment is not required.

But ESPOO says that a lifetime extension is a major change, even in the absence of any works, and therefore it is subject to the Convention. The ESPOO Implementation Commission agreed that the extension of the life of a nuclear power station originally expected to run for 30 years for a further 20 years is an activity which requires an Environmental Impact Assessment.

Under Article 6 of the Aarhus Convention public participation is required in Environmental Impact Assessments.

Alison Johnstone, Green MSP for Lothian raised this issue on 7th October in the Scottish Parliament. She asked Energy Minister Fergus Ewing if the Scottish Government would support the case for having full environmental impact assessments when licence extensions for plants such as Hunterston and Torness are considered.

Mr Ewing responded that:

“...the environmental case was considered when Hunterston B’s life was extended to 2023. That extension was made two years ago, and it has already been fully discussed and reported in the Parliament. In addition to that and the life extension case, it is my understanding of the process [that] the next periodic safety assessment is due to be carried out in 2016”.

Alison Johnstone MSP said:

"In light of the Hunterston cracks it is important we challenge the fact that the public has no say in the Periodic Safety Reviews and lifetime extensions granted to our nuclear plants. International law says extensions require public consultation and must compare the potential impact of extending an old reactor with supplying energy from alternative sources such as renewable energy."



-
1. Ecologist 9th June 2014

http://www.theecologist.org/News/news_analysis/2430353/europes_ageing_nuclear_reactors_will_have_to_undergo_environmental_assessments.html

Hunterston – more signs of ageing

Now reactor 4 Hunterston B has been plagued by two serious new breakdowns. The facility certainly seems to be showing its age and there are doubts about whether it can be kept running until 2023. Two large gas circulators vital for cooling the reactor and preventing meltdown were damaged when the lubricating oil was mistakenly switched off. The reactor had to be shut down again on 9th October because its turbine generator was shaking more than it should.

The two gas circulators are each the size of a bus, but were so badly damaged by the lack of lubrication they had to be replaced. They were being used to cool reactor four while it was shut down for maintenance and inspections. Repairs cost £100,000. The reactor was powered up again on Sunday 5th October, but then had to be shut again on Thursday 9th because of intense vibrations on the turbine generator.

The independent nuclear engineer, John Large, pointed out that ONR was under extra pressure while it assesses the designs of new nuclear stations planned for England and Wales. The simultaneous failure of two gas circulators would "*prove to be a very costly mistake*," he predicted. The loss of gas cooling could cause fuel pins to melt, with a risk of a fire in the reactor core, Large said. "*This could have run on to serious in-reactor consequences*."

-
1. Herald 12th October 2014 <http://www.heraldsotland.com/news/environment/alarm-after-serious-breakdowns-at-ageing-hunterston-nuclear-plant.25565033>

Hunterston and Torness Waste Yo-Yo

The Nuclear Free Local Authorities (NFLA) Scotland Forum has responded to a consultation by the Scottish Environment Protection Agency (SEPA) following a request by EDF Energy for changes to radioactive waste transfer authorisations at the Scottish nuclear power stations of Hunterston and Torness. (1)

EDF wants to be able to transfer Low Level Radioactive Waste (LLW) to any authorised site in Britain rather than just locations specified by SEPA. The likely new locations are not specified in the consultations, but will probably include sites with incinerators and metal treatment facilities.

EDF Energy also wants to be able to transfer certain types of Intermediate-Level Waste (ILW) to a list of incinerators (none of which are in Scotland) and metal treatment facilities, including Nyköping in Sweden (where contaminated metal from Rosyth has been sent), Krefeld in Germany, Lillyhall in Cumbria, and a facility in Tennessee.



Radioactive waste transfers are currently subject to annual activity limits set for individual radionuclides or groups of radionuclides. EDF Energy wants these restriction removed. It also wants any restrictions on physical or chemical characteristics removed. This would allow EDF Energy to send oils, classified as ILW, for incineration, and for wet wastes such as sludges and resins to be transferred off-site for treatment and disposal.

EDF Energy also wants permission to transfer wastes from other EDF power station sites to Torness and Hunterston for interim storage; loading of containers and onward transfer. Crucially the application says *“there will be no processing or treatment of waste”* that has been transferred to Torness or Hunterston from another site.

NFLA said if this EDF application is approved by SEPA it is likely to lead to the further incineration and recycling of LLW in breach of the *“concentrate and contain rather than dilute and disperse principle”*. It also runs counter to Scottish Government policy which favours on-site storage and the application of the proximity principle (waste should stay close to its point of origin). NFLA is particularly concerned about proposals to transport intermediate level waste by road between Torness and Hunterston, unnecessarily increasing the risk of accident. There will be no processing or treatment of waste transferred between the two sites, so again this runs counter to Scottish Government radioactive waste management policy.

The company wants the flexibility to pack ILW from both stations into the same storage container to save money. But critics say this will mean that waste containers will be increasingly moved between the west and east coasts, increasing the risk of accidents. Rita Holmes, a local resident who chairs the official Hunterston Site Stakeholder Group said: *“Because waste from Hunterston and Torness will be mixed up in one container, it could make it difficult to abide by the government policy of storing waste near where it was produced. This worries me, and it should worry others too.”*

A store for intermediate-level waste has recently been completed at Hunterston, but there is as yet no equivalent at Torness. This store is currently only permitted to store waste from Hunterston. EDF Energy confirmed radioactive waste would be transported between Hunterston and Torness by road. (2)

-
1. NFLA Press Release 11th Aug 2014 http://www.nuclearpolicy.info/docs/news/NFLA_Scottish_radwaste_transfer_consultation.pdf and NFLA Response to SEPA Consultation, August 2014 http://www.nuclearpolicy.info/docs/radwaste/Rad_Waste_Brfg_52_SEPA_Waste_Transfer_policy.pdf
 2. Sunday Herald 6th July 2014 <http://www.robwards.com/2014/07/nightmare-of-nuclear-waste-shipments-across-scotland.html>



3 Dounreay

Breeder Fuel

A Fast Breeder Reactor, like the Dounreay Fast Reactor (DFR) (the building with the dome) is generally fuelled by plutonium. But the core of the reactor is surrounded by breeder fuel which contains the normally useless portion of uranium (uranium-238), which during the nuclear reaction converts into more plutonium.

A survey carried out by a remote camera inside the closed DFR has revealed that more of the breeder elements still inside the reactor are jammed than was originally thought. The survey revealed that a greater number of these elements had swollen than previously thought. DSRL won't be able to remove the jammed elements by conventional means, so a special tool has been designed that will cut them free during the next phase of decommissioning.

See: <http://www.dounreay.com/decommissioning/dounreay-fast-reactor/breeder/outer-breeder>

Firstly any remaining liquid metal coolant will need to be drained from the system. About 10% of the 977 breeder elements were thought to have been distorted by radiation when the reactor was running, and therefore difficult to remove. Construction of a facility to remove them started in 2004. A robotic arm will reach down into the reactor vessel. There are 16 different tool heads on the robotic arm and these will be used to grip, cut and lift each element from the rack of the breeder zone. Each element will be lifted into a sealed container inside the sphere. They will then be dismantled inside a cell and the "pucks" lifted out and cleansed of any residues of liquid metal. In the next compartment, the pucks will be "recanned" inside a new tube that meets the specification for fuel going into the chemical works at Sellafield. Once recanned, the material will be moved into a robust transport container, known as a flask. At this stage it will be ready to be exported from the site.

DSRL had been expecting to have all the breeder fuel removed by 2021. But now that we know that more than 10% of the elements are distorted it could alter this date significantly. A revised timing and costing for removing the breeder fuel should be available by November when a re-profiling of the decommissioning programme should be published.

This re-profiling of the decommissioning programme will also take into account other changed issues at Dounreay such as security and nuclear fuel transportation. It will need to incorporate significant additional work associated with the transfer of nuclear fuels from Dounreay to Sellafield. Around one hundred tonnes of plutonium and uranium fuel have been accumulated at the Dounreay. Original plans envisaged long-term storage of the material, but last year NDA took the decision to move the fuel to Sellafield to consolidate a UK fuel stock. This means that some of the stores and Dounreay won't need to be modernised and replaced. So costs in the immediate future will go up because of the need for significant preparation and handling operations, and transport and associated security costs. But later on money will be saved costs because of not having to build the stores and provide security. (2)



The UK government announced in June that an extra £50m will be made available over the next two years towards the £1.6bn Dounreay clean-up. The funding has been made possible from savings elsewhere in the UK's nuclear estate. (3)

Sea Transport

Plans to move some of the radioactive nuclear fuel and waste due to be transferred from Dounreay to Sellafield by sea have emerged. The NDA says a successful trial could give them two potential routes for transporting the material to Sellafield. Contentious shipments by rail are already being made. Critics warn against the risks of navigating rough seas around Cape Wrath and the Minch. Highland MSP John Finnie said he had particular concerns, given the loss of the Coastguard's Stornoway-based emergency tug.

The Nuclear Decommissioning Authority (NDA) would give no details on how and when the fuel will be moved to Sellafield by either rail or sea, on the grounds of national security. However, a trial by sea will be undertaken. John Boocock, co-chair of Highlands Against Nuclear Transport, said: *"We are concerned that the possibility of shipping nuclear waste by sea has not been discussed with our communities in the Highlands and Islands. We believe any proposals to avoid processing nuclear waste at the point of use by transporting waste elsewhere should be open to public scrutiny at all stages. We also believe that public fears should be taken seriously by the nuclear authorities."* (4) Comhairle nan Eilean Siar has written to the operators of Dounreay to seek reassurance that transportation by sea will be safe. (5)

Norman McDonald, of Western Isles Council and who is president of Kimo International (The European Local Authorities Environmental Organisation) said the possibility of a fire, collision and subsequent radiation leak would have potentially devastating and harmful effects on one of the most sensitive parts of the north east Atlantic. (6)

Ship Fire

A ship carrying Intermediate Level Waste from Dounreay to Belgium caught fire and began drifting in the Moray Firth. The MV Parida was transporting a cargo of cemented radioactive waste when a fire broke out in a funnel. The blaze was extinguished, but 52 workers were taken from the Beatrice platform by helicopter as a precaution. The NDA said the platform was evacuated because the ship may have crashed into it, but not out of any concerns about radioactive contamination. (7)

Scottish Environment Minister Richard Lochhead said "Presently, the Scottish Government does not have control over the transportation of radioactive waste or what happens with ships in incidents like this that occur in Scottish waters – all we can currently do is monitor the situation. I will be raising this issue with Baroness Verma to ask expressly that the relevant powers are devolved to the Scottish Parliament."

Questions were asked about why this ship set out given the severe weather warnings. Highlands Against Nuclear Transport (HANT) said the incident was a warning about transporting radioactive cargoes by sea, and called for proposals to move other nuclear waste from Dounreay to Sellafield by sea to be scrapped. Angus Campbell, the leader of the Western Isles Council, said the Parida incident highlighted the need for a second coastguard tug in the Minch. "A ship in similar circumstances on



the west coast would be reliant on the Northern Isles-based ETV [emergency towing vessel] which would take a considerable amount of time to get to an incident in these waters.” (8)

Meanwhile the first two of as many as six underground low-level radioactive waste stores have been handed over to Dounreay parent body, Cavendish Dounreay Partnership. Each vault is equivalent in volume to between 370 and 450 double-decker buses, with the floor 11 metres underground. A total of 7,600 cubic metres of concrete, 1,330 tonnes of reinforcement and 260 tonnes of structural steel were used during their construction. Each underground vault has been designed to take low-activity waste. Subject to regulatory and other consents, the first containers of waste are due to be moved off the Dounreay site later this year, filled with grout and placed in the vaults. Once each vault is full, it will be back-filled with grout to create a monolithic block. (9)

An investigation is taking place after a small fire Dounreay on 7th October in the Prototype Fast Reactor (PFR) sodium tank farm. The fire was extinguished by Dounreay Fire Brigade and the area confirmed to be safe within 30 minutes. No-one was hurt. (10)

-
1. Scotsman 19th Aug 2014 <http://www.scotsman.com/news/environment/dounreay-radioactive-material-more-than-expected-1-3514031>
 2. Nuclear Engineering International 6th May 2014 <http://www.neimagazine.com/news/newsdounreay-revises-site-closure-plans-4260101>
 3. BBC 26th June 2014 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-28034766>
 4. Scotsman 21st July 2014 <http://www.scotsman.com/news/environment/fears-over-plan-to-ship-nuclear-waster-from-dounreay-1-3483291>
 5. West Highland Free Press 26th July 2014 <http://www.whfp.com/2014/07/25/concern-over-nuclear-waste-shipments/>, Stornoway Gazette 3rd Aug 2014 <http://www.stornowaygazette.co.uk/news/local-headlines/concerns-raised-about-radioactive-material-1-3496576>
 6. Herald 30th July 2014 <http://www.heraldscotland.com/news/home-news/plans-for-radioactive-waste-by-sea-are-criticised.24898732>
 7. BBC 8th Oct 2014 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-29531395>
 8. Nuclear Engineering International 2nd June 2014 <http://www.neimagazine.com/news/newsdounreay-receives-first-llw-vaults-for-site-decom-4282695>
 9. BBC 8th Oct 2014 <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-29535028>
 10. Scotsman 8th Oct 2014 <http://www.scotsman.com/news/transport/inquiry-call-after-nuclear-ship-blaze-in-north-sea-1-3566474>



4 Chapelcross

Environmental inspectors have been called in after an increase in tritium gas discharges from the former Chapelcross nuclear plant, near Annan. The discharges are in breach of approvals. According to the Scottish Environmental Protection Agency (SEPA), the gaseous tritium is from an authorised outlet but is greater than it should be. SEPA says that while a sub-limit for gaseous disposals has been exceeded, it is a small fraction of the authorised disposal limit for the whole site.

On that basis, SEPA says it is confident there is no risk to the public or the environment, although investigations are continuing to find the reason for the increase. Tritium - a radioactive isotope of hydrogen - was a by-product of the nuclear operations at Chapelcross and was used in the weapons industry.

-
1. BBC 8th October 2014 <http://www.bbc.co.uk/news/uk-scotland-south-scotland-29526748>

5 Radioactive Contamination & Dalgety Bay

Radium-226 is one of **the most radio-toxic substances existing**, causing bone and lung cancer at relatively low concentrations. (1) It emits both alpha and gamma radiation, but when it is taken into the body (by ingestion or inhalation), it is the alpha radiation that poses the greater radiological hazard. It has a half-life of 1,600 years.

In the early 20th century, one of the major industrial uses of radium was in the production of luminescent paint. The majority of luminising carried out in the UK was before, during and for a short period after the Second World War, peaking during the war years. It was used, amongst other things, to make aircraft instruments luminescent. (2)

Following the Second World War, large numbers of military aircraft were scrapped and the instruments stripped out; it was common practice for these materials to be incinerated to reduce the volume of contaminated material and the resulting ash buried. One location where both luminising and dismantling activities are known to have been carried out is at the airfield at Donibristle (HMS Merlin). Some 800 aircraft were scrapped on the site in 1946, but luminising activities on the site continued until 1958.

The UK Government has estimated that there could be as many as 150-250 contaminated sites across England and Wales, but the number could be as high as 1000 as the past disposal of luminised material was very widespread. (3) The MoD told the Committee on Medical Aspects of Radiation in the Environment (Comare) that it did not possess a comprehensive list of contaminated sites, but a limited list of 26 sites was provided to the Committee. Comare says this is unacceptable because these sites represent **a significant number of unregulated sources of potential radiological**



exposure that have not been well characterised and which have the potential to cause significant radiological harm.

Around twelve sites in Scotland have been reported as possible areas of contamination including Dalgety Bay and the beaches near Dounreay (See below).

Dalgety Bay

Radioactive contamination was discovered on the beach at Dalgety Bay during monitoring by Babcock Engineering Services for Rosyth Naval Base in June 1990. A limited survey was carried out which confirmed the presence of discrete sources of radium-226 on the beach. It was concluded that a more rigorous survey was necessary to determine the extent of the contamination. In 1991 the NRPB concluded that the radiation dose to any individual as a result of ingestion of the material would be negligible. But in June 2006, SEPA carried out a screening assessment of the area, which suggested that there was a realistic probability of harm occurring at Dalgety Bay due to the sources discovered. Subsequent surveys of the beach area were undertaken by various contractors for the MoD during which sources were removed from the beach to provide some protection to beach users.

In 2007 new legislation placed a statutory duty on SEPA for sites such as Dalgety Bay. Annual radiation surveys continued.

In 2011, SEPA found an increased number of sources of higher activity than in previous years, and it was decided to fence off a demarcated area and establish a monthly monitoring regime with the MoD. It is the higher activity sources found over the last two years that have raised the level of concern. In addition, it has become clear that areas which had been surveyed and cleared of contamination exhibited further contamination within a short period of time. In June 2013 an investigation by SEPA found that the MoD was responsible for the radioactive particles. (4)

The Nuclear Free Local Authorities has been strongly critical of the MoD's repeated attempts to wriggle out of paying for a clean-up at Dalgety Bay. It has resisted increasing pressure from the Scottish Environment Protection Agency (Sepa) to accept liability for the contamination. More than 2,500 radioactive hotspots have been found on the foreshore in the last 23 years, causing areas to be closed to the public and the harvesting of shellfish to be banned. (5) (6)

In May this year, the Ministry of Defence (MoD) was forced to abandon attempts to block publication of a report by the Committee on Medical Aspects of Radiation in the Environment (Comare) warning that radioactive contamination of military sites across the UK could pose a risk to public health.

The report (7) was submitted for publication in October 2013, but to the frustration of its authors and the Scottish government, UK ministers sat on it for six months after objections from the MoD. But after the 75-page report was leaked to *the Guardian*, the decision was taken in Whitehall to allow publication to go-ahead. It revealed that Comare is concerned about radium contamination at Dalgety Bay and at least 25 other sites across the UK. The contamination at Dalgety Bay poses "*a potential risk to public health*", the report says. It condemns the MoD's failure to provide a



comprehensive list of other potentially contaminated sites as "unacceptable" as it *"implies an unknown risk to the general population"*. (8)

The Ministry of Defence (MoD) has now agreed in principle to remove radioactive material from Dalgety Bay. (9) The plan may resolve the long-running row over who is responsible for managing risks to the public in the area. The plan, which was commissioned by the MoD's Defence Infrastructure Organisation, has been endorsed by the Scottish Environment Protection Agency (Sepa). (10)

The work will include removing the particles from the beach, building a wall and a replacement slipway for the Dalgety Bay Sailing Club to prevent other radioactive material from reaching the area and replacing and extending "coastal rock armour". The MoD said work should start later this year subject to permission and is expected to be phased until 2018. The report does not specify costs but local MP and former Prime Minister Gordon Brown believes the bill be about £10 million. (11)

Dalgety Bay Community Council has agreed in principle to back the MoD plan. Gordon Brown welcomed the plan but said he believed the timetable needed to be moved forward. (12)

In August there were concerns that the clean-up would be delayed after the MoD appeared to suggest that it might not start until 2016. Iain Robertson, Defence Infrastructure Organisation (DIO) senior environmental officer, announced that although *"significant progress"* had been made: *"This is a significant civil engineering project and substantial work is still needed to develop the detailed design, conduct the necessary environmental surveys, clarify roles and responsibilities and obtain planning consents prior to work commencing."* (13) However, in October the MoD reassured residents that the clean-up would be carried out without delay. But Gordon Brown has asked for clarification on the timetable. Dalgety Bay community council has called for greater engagement from the MoD on the issue and invited a representative to attend their meeting on 13th October. (14)

Other Sites

A dozen sites across Scotland suspected of being contaminated by radioactive waste from past military or industrial activities were named by SEPA last year. One is the Ministry of Defence firing range at Dundrennan on the Solway Firth, where depleted uranium tanks shells have been tested. Others are former air force, army and naval bases around the country where radium was used to make dials glow in the dark. There are also former radium factories in Wishaw and Balloch. (15)

The full list of sites in Scotland suspected of radioactive contamination includes:

- Ministry of Defence firing range, Dundrennan, Kirkcudbright, Dumfries and Galloway
- Former Defence Aviation Repair Agency, Almondbank, Perth and Kinross
- Royal Artillery Range, RAF Benbecula, Western Isles
- Former air base, RAF Edzell, Angus
- Former air base, RAF Kinloss, Forres, Morayshire



- Former air base, RAF Machrihanish, Mull of Kintyre
- Royal Marines base, RM Condor, Arbroath, Angus
- Former army luminising depot, Forthside, Stirling
- Former radium plant, Gowkthrapple, Wishaw, North Lanarkshire
- Boatyard on site of an old radium works, Balloch, Dunbartonshire
- Former military aircraft base, Dalgety Bay, Fife
- Beaches near the Dounreay nuclear complex, Caithness

Apart from Dalgety Bay RAF Kinloss has received the most attention. Environmental reports, known as Land Quality Assessments, prepared for the Ministry of Defence (MoD) highlights that the authorities have been aware of "*potential human health and environmental risks*" since at least 2004. The documents also suggest that radiological contamination could extend to land which was sold and is no longer part of the base. It is believed that more than 1,000 aircraft were dismantled at Kinloss after the end of WWII. (16) Radiation monitoring was carried out on sand dunes near to the former RAF base in 2013. (17)

Another coastal site which didn't appear on the list but may be contaminated with radium is the former seaplane base at Wig Bay Loch Ryan, near Stranraer. (18)

-
1. Hoppin, G. Rydberg, J. Liljenzin, J.O. Radiochemistry and Nuclear Chemistry, Butterworth, Heinmann, Oxford 1995
 2. COMARE 15th Report: Radium contamination in the area around Dalgety Bay, May 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/312674/COMARE_15th_Report.pdf
 3. Radioactive Contaminated Land Statutory Guidance, DECC April 2012 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48325/4472-draft-statutory-guidance-covering-radioactive-cont.pdf
 4. Scotsman 29th June 2013 <http://www.scotsman.com/news/environment/gordon-brown-mod-must-fund-dalgety-bay-clean-up-1-2982336>
 5. Sunday Herald 13th Oct 2013 <http://www.robedwards.com/2013/10/mod-under-attack-for-not-cleaning-up-dalgety-bay.html>
 6. The Radium Legacy and Other Contamination Problems, NFLA, October 2013 http://www.nuclearpolicy.info/docs/radwaste/Rad_Waste_Brfg_42_Dalgety_Bay_%26_the_wider_radium_legacy.pdf
 7. COMARE 15th Report: Radium contamination in the area around Dalgety Bay, May 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/312674/COMARE_15th_Report.pdf
 8. Rob Edwards 14th May 2014 <http://www.robedwards.com/2014/05/revealed-the-mods-failed-bid-to-block-expert-report-on-radioactive-health-risks.html>



9. MoD 10th July 2014 <https://www.gov.uk/government/publications/dalgety-bay-management-strategy-report>
10. BBC 10th July 2014 <http://www.bbc.co.uk/news/uk-scotland-edinburgh-east-fife-28257015>
11. Scotsman 11th July 2014 <http://www.scotsman.com/news/politics/top-stories/mod-will-clean-up-radiation-at-dalgety-bay-beach-1-3473378>
12. Dundee Courier 23rd July 2014 <http://www.thecourier.co.uk/news/local/fife/dalgety-bay-clean-up-bid-gets-backing-1.486386>
13. Dunfermline Press 29th August 2014
<http://www.dunfermlinepress.com/news/dalgetybay/articles/2014/08/29/508197-mod-bay-cleanup-to-start-in-2016/>
14. Dundee Courier 4th Oct 2014 <http://www.thecourier.co.uk/news/local/fife/mod-vows-fast-action-on-dalgety-bay-clean-up-1.610871>
15. Sunday Herald 29th July 2012 <http://www.robedwards.com/2012/07/agency-names-12-scottish-sites-suspected-of-radioactive-contamination.html>
16. BBC 18th May 2012 <http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-18122594>
17. BBC 1st Aug 2013 <http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-23531873>
18. Milcon Research and Consulting 1st July 2013 <http://milconrandc.blogspot.co.uk/2013/07/wigtown-bay-another-dalgety-bay.html>

6 Torness

Torness didn't have a very easy time during July. Unit 1 was closed down due to an "*an issue with the electrical system within the conventional plant*" on 1st July. (1) The incident happened just weeks after £30 million was spent on the same reactor to get it back online. Until 2nd July the Torness power station was only pumping out around a quarter of the energy it usually produces because the second reactor was working at a reduced capacity ahead of scheduled maintenance work. (2) Then Reactor 2 closed for planned maintenance on 2nd July and returned to power on 15 July. (3)

Then on 14th July Reactor 1 automatically shut down. It returned to service on 17th July. (4)

-
1. Edinburgh Evening News 1st July 2014 <http://www.edinburghnews.scotsman.com/news/torness-nuclear-reactor-shut-down-after-fault-1-3462909>
 2. Edinburgh Evening News 8th July 2014 <http://www.edinburghnews.scotsman.com/news/torness-nuclear-reactor-back-on-after-fault-alert-1-3470207>
 3. Torness Monthly Report July 2014
 4. Power Engineering 17th July 2014 <http://www.power-eng.com/articles/2014/07/torness-nuclear-unit-returns-to-service.html>



7 Radiation and Health

Children living near Dounreay or Sellafield are not at an increased risk of developing cancer, according to an article in the British Journal of Cancer. (1) But the article was similar to one published in the same journal in 2013, which was criticised by Dr Ian Fairlie who said it should not have been published. He says this new article (Bunch et al, 2014) is, if anything, is even worse than the 2013 one. (2)

A close reading of the actual data in fact reveals statistically significant cancer increases measured across all years and ages. The data is laid out in a way which hides these increases. Given the lack of statistical power in its chosen analyses and given the fact that increases were actually found, the report should not have concluded that people were not at risk. Instead it should have reported the cancer increases but added that the results of its own chosen analyses were not statistically significant as they were underpowered. However, it should also have added that, over all cancers and all years, observed cancer increases in fact were highly statistically significant.

-
1. Yorkshire Post 24th July 2014 <http://www.yorkshirepost.co.uk/news/main-topics/general-news/nuclear-plants-don-t-raise-child-tumour-risk-1-6748979>
 2. Ian Fairlie 25th July 2014 <http://www.ianfairlie.org/news/comments-on-another-bjc-article/>

8 Nuclear Security

A Freedom of Information request by the Sunday Post has revealed there have been almost 400 security breaches at nuclear power plants in the UK since 2010 with 42 breaches recorded in 2013, 121 in 2012, 116 in 2011 and 145 in 2010. SNP Energy spokesperson Mike Weir MP said:

"These revelations of 398 security breaches since 2010 at nuclear power plants across the UK are of great concern – as is the fact the information has only come to light through Freedom of Information requests."

Independent nuclear expert John Large said: *"It is deeply worrying that the ONR admit there are existing weaknesses and vulnerabilities in the nuclear plants. But on matters of nuclear safety and more so in security of nuclear facilities the ONR is compulsively secretive - so much so that it will not engage in any public debate."*

-
1. Newsnet Scotland 12th May 2014 <http://www.newsnetscotland.com/index.php/scottish-politics/9175-security-fears-raised-after-string-of-breaches-at-nuclear-plants>



9 Scotland's climate targets

Scottish ministers are under intense pressure to step up their action on climate change after missing their statutory targets for cutting emissions for the third year in a row. The latest figures showed Scotland missed its legally-binding emissions targets by 2.4 million tonnes equivalent of CO₂ in 2012. Under Scotland's climate act – touted repeatedly by Alex Salmond, the first minister, as the most ambitious in the world – the emissions target for 2012 was 53.226mte CO₂, only marginally lower than the 2011 target. But the country emitted 55.6mteCO₂, and has now failed to hit any of its targets.

Scotland's annual target for 2013 was the most ambitious cut of the entire programme, a cut of 10% in a single year to 47.976mte – a target the Scottish Labour party and Scottish Green party told Holyrood ministers are now almost certain to miss by a large margin, due to failure to take radical steps on transport, heating and industrial emissions. (1) An unprecedented alliance of all the opposition parties in Holyrood urged SNP ministers to look at proposals to make further cuts in emissions. (2)

Climate Change Minister Paul Wheelhouse said the Scottish government had set up a new cabinet sub-committee to coordinate its policies with a new climate change delivery board. He also announced a package of measures including working on new district heating schemes, more funding for energy efficiency, action on cycling infrastructure, transport planning, and electric vehicles. Gina Hanrahan, spokesperson for Stop Climate Chaos Scotland said: *"It's been a difficult start to the implementation of the Scottish Climate Change Act, but today's announcements show the government is serious about getting us back on track to meet future targets." "These are important first steps and we will need to build on them to realise the full potential of the Climate Change Act."* (3)

-
2. Guardian 10th June 2014 <http://www.theguardian.com/environment/2014/jun/10/scotland-misses-carbon-targets-for-third-year-in-a-row>
 3. Sunday Herald 8th June 2014 <http://www.heraldscotland.com/news/environment/climate-change-scotland-fails-for-third-time-in-a-row-to-meet-carbon-targets.24430132>
 4. Click Green 10th June 2014 <http://www.clickgreen.org.uk/news/national-news/124782-scotland-unveils-package-of-measures-to-hit-climate-change-targets.html>

10 Renewable Heat

A report from Scotland's Rural College (SRUC) has revealed that nearly 60% of over-60s in rural parts of Scotland are living in fuel poverty. That compares to 45% in towns and cities. Unsurprisingly,



perhaps, the fuel poverty rate is highest on the islands - 76% in the Western Isles and 75% in Orkney - and lowest in Glasgow, Renfrewshire and others near the central belt, where it is only 40%. (1)

The Nuclear Free Local Authorities (NFLA) Scotland Forum has responded to the Scottish Government's draft renewable heat energy policy statement consultation. It broadly welcomes the draft policy and encourages the Scottish Government to be even bolder. (2&3) The consultation document sets out the Scottish Government's vision for heat decarbonisation by 2050. The new concept of the heat hierarchy is introduced which will undoubtedly command widespread support. Demand reduction is at the top of the hierarchy and will therefore be prioritised. This is followed by efficient supply, such as district heating (DH) which has *"been shown in appropriate circumstances to offer a viable alternative to individual solutions and can offer lower cost low carbon heat to consumers."* Thirdly, renewable and low carbon heat resources, such as electric-powered air source heat pumps and biomass boilers should be used to deliver low carbon heat efficiently to individual buildings.

The NFLA submission argued that the Scottish Government should aim to meet 50% of heat demand from renewable sources by 2030. This would include air and ground source heat pumps, biomass boilers and district heating. To achieve the level of renewable district heating required by 2030 around 350,000 Scottish dwellings would need to be connected to (renewables-fed) district heating – the equivalent of 50% of all households in Aberdeen, Dundee, Edinburgh and Glasgow. To do this local authorities would need to provide strong leadership and work in conjunction with the Scottish Government and the public sector to develop large scale schemes connecting a mix of building types. Although DH schemes may start off being powered by gas boilers, these would gradually be converted to being powered by a variety of renewable and waste heat sources, especially geothermal.

Meanwhile, the City of Edinburgh Council is embarking on an energy retrofit programme for its buildings. It will become the first Council in Scotland to sign up to the RE:FIT programme. This award-winning energy retrofit scheme has been designed to help public sector organisations achieve substantial financial savings, improve the energy performance of their buildings and reduce their carbon footprint. (4)

-
1. Herald 2nd June 2014 <http://www.heraldscotland.com/comment/columnists/misery-of-fuel-poverty-faces-rural-residents.24361010>
 2. NFLA 2nd June 2014 http://www.nuclearpolicy.info/docs/news/NFLA_Scottish_renewable_heat_response.pdf
 3. NFLA 2nd June 2014 [http://www.nuclearpolicy.info/docs/briefings/A236_\(NB122\)_Scottish_renewable_heat_strategy.pdf](http://www.nuclearpolicy.info/docs/briefings/A236_(NB122)_Scottish_renewable_heat_strategy.pdf)
 4. Scottish Energy News 18th Sept 2014 <http://www.scottishenergynews.com/city-of-edinburgh-council-first-in-scotland-to-sign-up-to-refit-programme/>



11 Post Referendum

Like Scottish voters, the renewable energy industry was largely divided between yes and no. And even though the country rejected independence, power over Scotland's future energy market remains up for grabs.

Scots trade association Scottish Renewables has called for Scotland to be handed additional powers over its energy policy, in the wake of the vote. Scotland's islands in particular, while rich in wind power resources, have struggled to get the grid connections needed to transmit any energy to the mainland. Friends of the Earth Scotland echoed Scottish Renewables' call, suggesting that Scotland should now seek to take full control of its own energy policy to ensure that it can meet its ambitious renewables targets. (1)

Dave Toke, reader in Energy Policy at Aberdeen University says Westminster parties are planning to spend a lot of money on building nuclear power stations after 2020, and the Conservatives are promising to stop incentives for onshore wind. So where does this leave a Scottish Government which opposes building new nuclear power stations and which wants some ability to make its decisions on what renewables should be supported rather than being dictated to by Westminster based Conservatives? There is a plausible way of solving this problem, several in fact. But one way it could be done is simply to give the Scottish Government a portion of the 'Levy Control Framework' to spend as they choose. Then renewables developers could choose whether to use the Westminster incentives (contracts) or the incentive schemes organised by the Scottish Government. If the Tories do cut off the funds for onshore wind then the Scottish Government could fund Scottish schemes instead. (2)

-
1. Business Green 19th Sept 2014 <http://www.businessgreen.com/bg/news/2371160/no-vote-sparks-questions-over-energy-future>
 2. Dave Toke's Blog 19th Sept 2014 <http://realfeed-intariffs.blogspot.co.uk/2014/09/give-more-energy-powers-to-scottish.html>