Renew on Line 128
July-Aug 2017
Technology for a Sustainable Future

A bimonthly roundup of news and views on renewable energy developments and policies

Produced by NATTA, the independent Network for Alternative Technology and Technology Assessment.

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Solar and wind still doing well. Election issues and policy uncertainties, nuclear woes

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Renew was for many years produced by Prof. Dave Elliott and Tam Dougan, then based at the Open University, as a bimonthly NATTA membership subscription journal, with, after issue 100, a free shortened version, Renew on Line (ROL), also produced for NATTA’s web page. Now run by NATTA independently of the OU, ROL is currently delivered as a Blog, and continues with the same numbering system. It includes a Forum section for commentary and feedback. An expanded version, called Renew, continuing with the old Renew numbering system, is also produced for use by students on relevant courses, on a course linked password protected subscription basis. Course leaders wishing to subscribe on behalf of their students should contact NATTA for details of charges. Students on the OU Renewable energy course T313 have access to it: www3.open.ac.uk/study/undergraduate/course/t313.htm

Send comments/contributions for the Forum section to NATTA at D.A.Elliott@open.ac.uk

Also see Renew Extra which is posted alternate months to the bimonthly Renew On Line at: http://renewextra.blogspot.co.uk

For a full guide to NATTA’s various offerings, and access to our free annual end of year review, see: http://renewnatta.wordpress.com

Green Energy Futures  Dave Elliott’s Palgrave book: www.palgrave.com/page/detail/green-energy-futures-david-elliott/?sf1=barcode&st1=9781137584427  Also see this on his new IoP one: www.theecologist.org/News/news_analysis/2988856/false_promise_nuclear_power_past_present_and_no_future.html
1. UK Developments  *Growth and costs*


**Committee on Climate Change** assessment of the costs of electricity generation in 2030 on the ‘High Renewables’ scenario from *The 5th Carbon Budget*.

This includes generation from existing and contracted low-carbon generation under Feed-In-Tariffs, the Renewables Obligation and Contracts-for-Difference expected to remain online in 2030, additional low-carbon generation installed in the CCC’s scenarios in the 2020s as well as gas generation and existing hydro & nuclear generation that they expect to remain online in 2030. The costs cover gas generation with a carbon price (used as a proxy for the wholesale price before merit order effect and capacity payments), as well as support costs for low-carbon generation. Additional costs of £10/MWh for each unit of intermittent low-carbon generation have been added, as well as the additional costs of upgrading the transmission and distribution system to accommodate the low-carbon generation. The analysis assumes a gas price of 62p/therm in 2030, and a carbon price of £65/tCO₂ in 2030.

PV powers ahead - to 12 GW

The impending closure of the RO support scheme in mid 2016 led to a burst of projects in the 10kW-25 MW range - now showing up. The FIT cut backs have slowed smaller domestic project growth


PV does take up room, but some say not that much - a bit OTT:
www.facebook.com/greenpeaceuk/videos/10153687631229229/?hc_ref=NEWSFEED

Further Tidal lagoon delay?

Tidal Lagoon Power Ltd needs a marine license from Natural Resources Wales (NRW) before it can start work on the £1.3 bn Swansea tidal lagoon. Discussions between the two parties have been under way for nearly two years since planning consent for the lagoon was granted by the UK Government, but there’s still a way to go. NRW’s briefing note reportedly says the timelines ‘currently indicate a completion date of June 2018 if all steps [that] need to be undertaken for this application and no additional steps are found to be necessary’. It added that this could ‘add a significant number of months to the determination timescales’. That’s not certain, but it would scupper hopes of starting construction next spring - a move already dependent on a swift financial agreement between it and the UK Government. There’s been no word from them yet:
www.walesonline.co.uk/news/wales-news/consent-needed-swanseabay-tidal-12954699

Also, on eco-issues:
www.mcsuk.org/wales/MCS+in+Wales/MCS+in+Wales/Swansea+lagoon+review+takes+no+account+of+adverse+ecological+impacts

Hydrogen for heating

BEIS is to appoint a contractor to manage the delivery of a £25m programme to explore the potential use of hydrogen gas for heating UK homes and businesses. The programme will run from 2017 to 2020 and will aim to define a hydrogen quality standard, and to develop and trial domestic and commercial hydrogen appliances.


Plans to convert the gas grid in Leeds to run entirely on hydrogen have moved a step closer to becoming reality after Northern Gas Networks opened an office in the city dedicated to this H21 project. It will consider alternative methods for hydrogen production & storage-steam reformation of fossil gas being the main one, but P2G conversion of surplus renewable power being another.


Heat losses

Dr David Coley et al at Bath University say home energy use is higher than thought, due to poor modelling of energy losses in buildings.


Most large/on-land

47% (5,600 MW) of total installed UK solar PV capacity is in large projects of over 5 MW, with 21% (2,481 MW) being in small 0 to 4 kW installations- e.g. on roof tops. At the end of 2016, 57% of capacity (6,653 MW) came from ground - mounted or stand-alone installations, including the first operational solar farm to be backed by a CfD - Charity solar farm.
Offshore wind - 2.3 GW more to go ahead after appeal

Danish company Dong Energy has installed 32 turbines in Liverpool Bay- in the 258 MW Burbo Bank extension: www.windpoweroffshore.com/article/1433750/burbo-bank-extension-opens-business

That brings UK offshore wind to 5.3 GW in all, with much more in the pipeline. For example, planning permission should now move forward for four offshore wind farms, of 2.3 GW capacity in all, off the Scottish coast, following an appeal ruling by three judges at the Inner House at the Court of Session in Edinburgh. They said a judge in the Outer Court was wrong to revoke consent last July for the wind farms: the Judge had asserted that Scottish ministers didn’t properly assess how the projects would threaten migratory seabirds such as the puffin.

But that view had ‘strayed well beyond the limits of testing the legality of the process’, according to the new ruling: ‘Matters of scientific fact and methodology which, whatever the judge’s own particular skills may be, are not within the proper province of a court of review’. www.scotcourts.gov.uk/search-judgments/judgment?id=116833a7-8980-69d2-b500-ff0000d74aa7

Turgid stuff

One of the main developers, Mainstream Renewable Power Ltd., said it would now seek to develop the £2bn Neart Na Goithe offshore wind farm as quickly as possible, while SSE will now consider the best options for the two Seagreen wind farms affected - see map.

The Royal Society for the Protection of Birds, which had brought the original case against the wind farm approval, claimed that the projects could ‘kill thousands of Scotland’s internationally protected seabirds every year, including thousands of puffins, gannets and kittiwakes’. www.bloomberg.com/news/articles/2017-05-16/scottish-offshore-wind-may-get-13-billion-lift-from-bird-ruling

The RSPB backs well-sited offshore & on shore wind projects, but has dug in on some others. Hopefully they can help the developers ensure that these new projects avoid major impacts, with further mitigation measures being adopted if needed; the original plans had already been reduced in size & turbine spacing distances changed, but there are disputes on likely impacts.

Hywind

Five 6 MW floating/spar buoy turbines have been under construction in Norway. They are to be installed 25 km off the Scottish coast, in a 30 MW test project. See the video: www.windpoweroffshore.com/article/1432575/video-hywind-scotland-turbines-shape

Next: ‘Offshore wind could easily provide 20-30% of UK electricity supply in future’. A good overview of the state of play from Siemens, with 1000 jobs soon having been created: https://cleantechnica.com/2017/05/11/offshore-wind-represents-major-challenge-competing-technologies

Storage 1MW 20kWh flywheel-battery hybrid storage in Sheffield: www.edie.net/news/6/UK-set-for-first-hybrid-battery-flywheel-system/

Biomass Useful UK power generation sites map: www.renewables-map.co.uk/biomass.asp

The debate over the pros and cons goes on. This cartoon series actually sums it up very well: http://epsassets.manchester.ac.uk/medialand/bio_eng/PDFs/Bioenergy_Graphic_Novel.pdf

DIY The M&S Energy Community Energy Fund is back with £300,000 to support renewable energy projects and technologies across the UK: www.mandsenergyfund.com/


Mail kite flying www.dailymail.co.uk/sciencetech/article-4544542/Kites-power-5-000-British-homes-2020.html
The Tory energy policy

In its election Manifesto, the Conservative party said it would aim for ‘competitive and affordable energy costs following a new independent review into the cost of energy’. It added ‘Our ambition is that the UK should have the lowest energy costs in Europe, both for households and businesses’. It went on ‘We want to see a diverse range of sources for Britain’s energy production, because a diverse energy economy is the best way to stimulate innovation, and also to ensure that we are getting the right generation in the right place. For instance, while we do not believe that more large-scale onshore wind power is right for England, we will maintain our position as a global leader in offshore wind and support the development of wind projects in the remote islands of Scotland, where they will directly benefit local communities.’ There will also be continued support for oil & gas exploration, including shale gas. And it wants Britain to lead the world in electric vehicle technology: ‘We want almost every car and van to be zero-emission by 2050 - and will invest £600 m by 2020 to help achieve it’; www.conservatives.com/manifesto

Labour had said it would ‘ensure that 60% of the UK’s energy comes from zero-carbon or renewable sources by 2030’, and mentioned lagoons, but also nuclear, with Jeremy Corbyn saying ‘Labour supports nuclear power as an important part of a low carbon energy mix and would continue to support the construction of Hinkley C’; www.ecns.cn/2017/05/15/energy-investors-underwhelmed-uk-renewables-market/

Labour’s 60% of energy by 2030

The UK continues to underwhelm investors who are waiting to see if future UK policy will support & encourage the renewable energy industry towards a subsidy-free environment, where consumers can benefit from the UK’s excellent natural resources for renewable energy’. www.telegraph.co.uk/business/2017/05/15/energy-investors-underwhelmed-uk-renewables-market/

What next?

BREXIT

The UK may try to duck out of the EU 15% by 2020 renewable energy target:


And a fight over costs

IoD says halt/ review smart meter roll out:

http://theenergy.co.uk/brexit-bonfire

Dual electricity and gas bill costs

www.energy-uk.org.uk/customers/about-your-energy-bill/the-breakdown-of-an-energy-bill.html

But FOE look to 75% of electricity by 2030:

Industrial Strategy UKERC’s systems-level response

In its response to the government Green paper on Industrial Strategy, the UK Energy Research Centre says its proposals for transition are generally welcome and highlight what it see as ‘good examples of priorities that would advance the transition to a low carbon energy system’ including ‘offshore wind, where the UK has considerable leadership in deployment, and UK policies have a significant impact on international innovation and costs; and smart energy systems, where the UK has been at the forefront of demonstration trials.’ However, it worries that the current approach and data-base puts too much focus on ‘discrete technologies’, and ‘pays less attention to the system innovations that will also be required (e.g. for smarter electricity grids and for low carbon heating systems). Such system innovation will be a key feature of successful low carbon transitions… Whilst it is right to highlight the significant opportunities in areas such as smart electricity grids and electric vehicles, the Green Paper pays too little attention to energy efficiency in homes and commercial buildings and to new systems for low carbon heating. There is also a gap in thinking about how the decline of incumbent industries such as offshore oil and gas will be taken into account, including any opportunities for existing skills to be transferred to newer industries for which they are still relevant’, www.ukerc.ac.uk/network/network-news/building-our-industrial-strategy-response-to-the-green-paper-from-the-uk-energy-research-centre.html

In its response to the strategy, RenewableUK, backed by Scottish Renewables, the Solar Trade Association, Regen and the Electricity Storage Network, called on the government to prioritise renewables to meet the challenge of providing affordable energy and clean growth, arguing that these industries are already providing major economic benefits to UK regions, offering growing export markets in manufacturing and services and being strongly placed to secure high value contracts for the UK. ‘Low carbon sources are now the low cost energy option, with cost reductions more akin to those seen in electronics than traditional infrastructure.’ www.r-e-a.net/news/renewables-and-clean-tech-can-power-goals-of-industrial-strategy See Box

Innovation backed

As part of the Industrial Strategy Challenge Fund and the ‘Faraday Challenge’, £246m is available over 4 years to help businesses seize opportunities presented by the transition to a low carbon economy, and to ensure that ‘the UK leads the world in the design, development and manufacture of batteries for the electrification of vehicles’. The government is also offering up to £13m Energy Catalyst support innovation projects that address a need for clean, affordable and secure energy supplies.

Green Investment Bank sold

The government owned Green Investment Bank has been bought by Macquarie Group Ltd in a £2.3bn sale. It aims to take an equity stake in the £1bn Swansea tidal lagoon project. Offshore wind too. www.bloomberg.com/news/articles/2017-04-20/u-k-sells-green-investment-bank-to-macquarie-for-3-billion

£76m for CCS
www.gasworld.com/uk-ccs-research-receives-a-76m-nudge-201262.article

‘Energy efficiency measures have already been cancelling out the low carbon policy costs for the typical household. The industry believes that energy efficiency should be a national priority to make the transition to a low carbon economy more affordable for both consumers and businesses.’ Energy UK
Policy failings and pressure points…

**Go** The [General Election](https://www.theguardian.com/environment/2017/may/10/challenge-conservatives-energy-priorities-cuts-renewables) debate was enlivened by this challenge from Prof Keith Barnham:

**Speed up** said industry [www.newpower.info/2017/04/businesses-call-for-faster-renewables-transition/](https://www.newpower.info/2017/04/businesses-call-for-faster-renewables-transition/)


**Faster on local power** [http://theenergyst.com/rise-of-the-local-authority-energy-companies/](http://theenergyst.com/rise-of-the-local-authority-energy-companies/)

**…and on exports** [RenewableUK](https://www.theguardian.com/environment/2017/apr/25/uk-green-energy-policy-implications-and-now-for-the-bottom-line) said their members were playing a leading role in the growing global market for wind and marine power. Using a sample of 36 UK-based companies it estimated that the total value of exports last year could be close to £2bn.

**Price cap** The [Conservative’s election](https://www.telegraph.co.uk/news/2017/05/08/unfair-energy-companies-raise-prices-37pc-theresa-may-can-bring/) push included a proposal to cap energy prices.


But all to no avail - and now we face a still Tory-led Brexit slog: [www.publications.parliament.uk/pa/cm201617/cmselect/cmbeis/909/90902.htm](https://www.publications.parliament.uk/pa/cm201617/cmselect/cmbeis/909/90902.htm)

**Brexit implications** [www.publications.parliament.uk/pa/cm201617/cmselect/cmbeis/909/90902.htm](https://www.publications.parliament.uk/pa/cm201617/cmselect/cmbeis/909/90902.htm)

The UK should stay in the EU’s new Energy Union framework or similar says Chatham House: [www.ukerc.ac.uk/news/antony-froggatt-on-the-need-for-a-pan-european-energy-partnership-post-brexit.html](https://www.ukerc.ac.uk/news/antony-froggatt-on-the-need-for-a-pan-european-energy-partnership-post-brexit.html)

**Scotland’s separate vision** with a 2030 ‘50% of all energy from renewables’ target. It includes 1 GW target for community/locally-owned energy by 2020, and 2 GW by 2030. It backs CCS, but not new nuclear. Draft: [www.gov.scot/Resource/0051/00513466.pdf](https://www.gov.scot/Resource/0051/00513466.pdf)

Many details are still to be sorted e.g. on energy saving,CHP/district heating.

*Wind supply was 95% of its domestic power in May:* [www.bbc.co.uk/news/uk-scotland-40149604](https://www.bbc.co.uk/news/uk-scotland-40149604)

**Local solar PV**

**Solar CHP** [www.nakedenergy.co.uk](https://www.nakedenergy.co.uk)

[www.solarpowerportal.co.uk/news/cuts_to_subsidy_and_funding_leaves_over_70_of_councils_without_a_solar_stra](https://www.solarpowerportal.co.uk/news/cuts_to_subsidy_and_funding_leaves_over_70_of_councils_without_a_solar_stra)

But some have managed-for example:

[www.solarpowerportal.co.uk/news/west_sussex_solar_scheme_to_save_millions_for_council_and_schools](https://www.solarpowerportal.co.uk/news/west_sussex_solar_scheme_to_save_millions_for_council_and_schools)

[www.solarpowerportal.co.uk/news/solar_storage_homes_set_for_swanssea_under_historic_investment_deal_for_wale](https://www.solarpowerportal.co.uk/news/solar_storage_homes_set_for_swanssea_under_historic_investment_deal_for_wale)

Also: [www.solarpowerportal.co.uk/news/seven_glasgow_primary_schools_to_go_solar_by_april_under_council_programme](https://www.solarpowerportal.co.uk/news/seven_glasgow_primary_schools_to_go_solar_by_april_under_council_programme)

**UK Coal subsidy anomaly**


..and the bottom line

The Election leaves the UK headed for uncertain waters. But they will include offshore wind! Interestingly, see above, the Tory Manifesto, while backing shale gas and opposing onshore wind, ignored nuclear. That led to this speculative piece:


Post-election issues and possibilities

The Conservative government, though much weakened, has a lot on its plate, Brexit apart. On energy, DECC’s 2015 projection (see chart) had renewable energy production reaching around 125 TWh by 2020. After that it leveled off. The new BEIS projection (see p.1 earlier) actually has it then falling, but does see it expanding more later. Will that happen? Prof. Keith Barnham thinks not. He says that the government ‘has intervened in two highly successful exponentially expanding markets, PV and onshore wind, aiming to reduce their expansion to zero by 2020 so as not to threaten their top priorities: higher carbon and more expensive nuclear and natural gas electricity.’

Stop Hinkley’s Roy Pumfrey certainly agreed: ‘In effect the Government is trying to kill off an industry which promises to cut all consumers electricity prices so that it can afford to pay the ridiculously high price it has guaranteed to EDF Energy for Hinkley Point C.’

Are these views, and those that emerged at the CND conference (see below), too extreme? Scottish Power Renewables CEO Keith Anderson says: ‘Onshore wind is the cheapest form of renewable energy, it’s been hugely successful right across the whole of the UK & particularly in Scotland, yet we appear to have a UK government that is allergic to onshore wind’.

The FT even relayed this view: ‘Offshore wind progressively looks cheaper to run, even with all the subsidies, than Hinkley ever will’. All very odd. So what next? Will the promised new cost review lead to a shift? This view in the FT certainly does not look extreme: ‘Nobody outside the industry now thinks the future of electricity generation is nuclear fission. The cost of building the plants to comply with safety and antiterrorism standards is rising all the time, fears of a runaway price for oil and gas now look silly, while advances in wind and solar technology are destroying those projections of ever-dearer energy... The UK’s energy market is in an unholy mess, with attention distracted by the vacuous debate about switching electricity suppliers. The real costs lie with the “green initiatives” at the other end of the wires. Scrapping Hinkley Point would not solve all of them, but it would be a start. Perhaps best to wait until after June 8 for another U-turn from Mrs May, though.’

Energy security without nuclear or fracked gas

In a New Scientist piece, Prof. Keith Barnham relayed results from the GIFTS modeling system that he has helped to develop. He says that ‘GIFTS directs excess electrical energy to hydro-storage, which can then produce power to feed back to the grid when wind and PV supply fall below demand. The simulation then calculates the contribution required from bioelectricity generation to plug any gaps. The result? Just like Kombikraftwerk, an all-renewable electricity supply can cope, even with an extended period of low wind & high demand’.

Burn out UK coal fired power plant output fell by 72% between 2011 and 2016. Biofuelwatch says 41% of that was due to wind & solar, 22% to better energy efficiency and 21% to wood burning.
Labour - not a lost cause

A new approach to energy may still be possible

**Labour** may not have won enough seats in the June election to overturn the Conservatives, but it did very well, and is likely to play a significant role in the future - given the hung parliament. What might it do?

In a bold political move, on energy, in its Manifesto Labour had said it would seek to ‘**regain control of energy supply networks through the alteration of operator license conditions, and transition to a publicly owned, decentralised energy system**’. Specifically, it looked to ‘the creation of publicly owned, locally accountable energy companies and co-operatives to rival existing private energy suppliers, with at least one if every region’, and to ‘legislat[ing] to permit publicly owned local companies to purchase the regional grid infrastructure, and to ensure that national and regional grid infrastructure is brought into public ownership over time’.

With an emergency price cap meantime - and fracking banned. And an overall 60% by 2030 target for ‘zero carbon’ and renewable energy - including nuclear. Overall then, nuclear apart, a quite radical programme, funded, along with the rest of its £48.6bn programme, mainly by increased taxation on the 5% of the highest earners and by raised corporation tax: [www.labour.org.uk/index.php/manifesto2017](http://www.labour.org.uk/index.php/manifesto2017)

That (probably) won’t now be tested out, but we can be sure Labour will harry the government on its energy policy. But with the Tories in some disarray, all is in flux* and new political alignments may emerge: [www.edie.net/news/11/General-Election-results--Green-economy-set-for-further-uncertainty-after-hung-Parliament](http://www.edie.net/news/11/General-Election-results--Green-economy-set-for-further-uncertainty-after-hung-Parliament)

**See Box for some radical views.**

**Other views** However, not everyone agrees with or backs the re-nationalisation drive. For example, Prof. Jim Watson from UKERC, writing before the election, said: ‘**Labour’s plans for energy renationalisation are puzzling. They are part of a broader ideological commitment public ownership that also includes water and railways (the Green Party makes a similar pledge).**’ He went on, ‘it is unclear why renationalisation of energy networks would be a good use of public money (or borrowing), or what this move is seeking to achieve. Although public ownership is starting to come back at the local level, led by some Local Authorities, this is a bottom up phenomenon. The Labour plan to have a public company in every region seems un-necessarily top down, and runs counter to pledges to devolve power elsewhere in its manifesto. UKERC research shows that many Local Authorities are barely off the starting blocks in relation to energy strategies and preparedness. This is not because of a lack of political will - but due to a dearth of powers and funding so they can develop energy saving and local generation projects.’ [www.ukerc.ac.uk/news/how-do-the-party-manifestos-compare-on-energy-.html#stash.c4GeIk8F dpuf](http://www.ukerc.ac.uk/news/how-do-the-party-manifestos-compare-on-energy-.html#stash.c4GeIk8F dpuf)

* The proposed energy price cap wasn’t included in the governments programme, as outlined in the Queens speech. Indeed, very little of what was in the Tory Manifesto was included. The only energy commitment seemed to be for legislation to try to cope with the Euratom exit.

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**A radical view**

In one of first energy policy related gatherings after the election, CND’s conference on June 17th ‘No Need for Nuclear: the Renewables are Here’, put the anti-nuclear pro-renewables case strongly, with presentations from academics, green NGOs and left-of-center speakers, including from the Green party. [http://cnduk.org/component/k2/item/2712-no-need-for-nuclear](http://cnduk.org/component/k2/item/2712-no-need-for-nuclear)

Nuclear apart, there was clear support for the Labour programme, although the greens wanted to go further and FoE thought we probably could. But as inputs from Greenpeace and others made clear, there was a big task ahead. Employment was an issue. A speaker from the PCS Union highlighted the union dilemma: unions were all about protecting jobs. But they could also be about fighting for better, greener jobs. So it’s about the type and quality of the jobs, not just the number. Though, even in terms of numbers, the CND conference organiser had previously relayed this argument - leaving aside nuclear fuel cycle/ reprocessing work, ‘in 2015 nuclear electricity generation provided about 3,000 direct jobs and the renewable electricity generation provided about 49,000 direct jobs, i.e. about 16 times more’: [www.ianfairlie.org/news/official-nuclear-power-provides-jobs/](http://www.ianfairlie.org/news/official-nuclear-power-provides-jobs/)

Maybe so, but nuclear investment also locks in many other workers.. and it will take time to change that.
UK Nuclear woes

The UN Economic Commission for Europe has asked the UK to suspend work on the Hinkley plant pending assessment of whether due notification and review of potential cross border environmental impacts had been carried out as required under the Espoo Convention. 


A House of Lords Select Committee has also slammed the £24bn Hinkley project as a good example of bad Government policy which puts cutting carbon above reliable, low cost energy. Too risky, poor value for money: 


There are also delays with some of the UK’s other proposed new reactor projects: 

http://corecumbria.co.uk/news/moorside-time-table-slips-further-behind/ (see ‘Moorside’ below)

Though some still talk of them in carbon saving terms: 

http://www.carbonbrief.org/analysis-how-important-moorside-new-nuclear-plant-uk-climate-plans

But really it seems an ever-deeper mess: 

http://energypost.eu/nuclear-safety-undermines-nuclear-economics/ So is a state bailout the only option?


Others look to radical restructuring of the whole industry globally, with the UK abandoning its plans: 

http://energypost.eu/nuclear-industry-must-change-die/

Things must be bad! Even the Daily Telegraph now seems to be completely disenchanted: 

http://www.telegraph.co.uk/business/2017/03/28/costs-nuclear-energy-just-keep-rising-could-stop-madness/

The NAO too: 

http://www.nao.org.uk/report/hinkley-point-c/ And the Euratom exit may yet block much of it: 


Unless, it seems, you live in the Northern Powerhouse! Let them eat (uranium) yellow cake! 


BANNING goes Bradwell The case for it has evaporated says local group BANNING:


Moorside AP1000 slips to 2030+, as Westinghouse goes bust & Engie exits. 


Toshiba’s role in the Nugen consortium is now unclear. S.Korea’s Kepco may step in: 


But Westinghouse’s AP1000 did get UK Generic Design Assessment safety approval! Now we await Nugen’s strategic review: 

www.bbc.co.uk/news/uk-england-cumbria-39804933

Bechtel exits SMRs It’s to pull out of small modular reactor development. It was unable to find investment for its programme, or a utility company that would provide a site. It has exited the £250m UK SMR programme that was set up last year to press ahead with projects for the 2030s. Earlier, the US engineering company was part of mPower, a joint venture with energy giant Babcock & Wilcox, formed in 2011 with the aim of developing the world’s first commercially viable SMR plant in Tennessee by the early 2020s, but the project fell through due to lack of funding. 

www.constructionnews.co.uk/10018348.article

Rolls Royce still keen on UK SMRs, NuScale too at ‘below £90/MWh’:


IMechE backs SMRs as a post-Brexit industry option. 

www.imeche.org
2. Global Developments

Positive views from IRENA

in the 3rd edition of REthikning Energy, the flagship International Renewable Energy Agency report. It says that accelerated deployment will fuel economic growth, create new job opportunities, enhance human welfare and contribute to a climate-safe future. Renewables, consequently, are crucial for sustainable development, including the pursuit of SDG 7, the UN goal of ‘affordable, reliable, sustainable and modern energy for all’.

It notes that over 170 countries now have renewable energy targets, and nearly 150 have policies to catalyse investments in renewables. At the end of 2016, at least 67 countries had held renewable energy auctions, which IRENA favours, compared to only 6 in 2005. They have helped solar PV reach new price lows in several countries and argueable are better at this stage of development than the Feed-In Tariffs initially used in the EU.

In the power sector, it says that complementary system breaks throughs, in particular storage, will enable the integration of larger shares of renewable electricity. Off-grid renewables, via both stand-alone systems & mini-grids, can increasingly complement grid-based options to expand sustainable energy access. Battery storage for electricity could say increase from less than 1 GW today to 250 GW by 2030. The market value of battery storage reached $2.2 bn in 2015 and may rise to $14 bn by 2020. Global solar PV capacity soared from 40 GW in 2010 to 219 GW in 2015 and PV could account for 7% of global power generation by 2030, a six-fold increase. There’s a way to go to 100% (see Box), but global investment in renewables has grown steadily for over a decade, from under $50 bn in 2004 to a record $348 bn in 2015, though it’s fallen back a bit since. But part of that is due falling costs - more output for less investment. www.irena.org/menu/index.aspx?mnu=Subcat&PriMenuID=36&CatID=141&SubcatID=3802

Not so positive views from Energy Matters

Energy Matters web site offers a grim take on global energy prospects, based on a review of global energy scenarios: see Table. Fossil fuel will continue to dominate in primary energy terms, and as demand rises, the renewables percentage stays quite low. But nuclear is even lower. So there’s no chance of getting under a 2°C rise. It’s hard to see where all the coal, oil & gas will come from, but we know where the CO2 will go & what that means.

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<th>Year begin/end</th>
<th>Consumption increase, % of energy mix, %</th>
<th>% of energy mix, %</th>
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<td>total energy fossil fuels renewable nuclear Low carbon sources</td>
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<td>EEI 2012/2040</td>
<td>36 23 72 16 11 28</td>
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<tr>
<td>Average</td>
<td>36 21 77 16 7 23</td>
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</table>


An even grimmer view: the coming climate war

Trumpism will triumph!

His Paris deal exit is certainly grim
Global growth - less investment but more capacity

The global green power investment boom slowed last year, partly due to a fall in price for PV solar—more output for less investment. The volume of wind and solar installations actually hit a new record in 2016. Bloomberg says that trend may continue this year—steady capacity growth.

How things might go next - rival views

IRENA Global energy scenarios up to 2050 compared. IRENA's new joint report with IEA has renewables at 65% of energy then www.irena.org/menu/index.aspx?mu=Subcat&PrMenuID=D=36&CatID=141&SubcatID=D=3828

IRENA Global energy scenarios up to 2050 compared. IRENA's new joint report with IEA has renewables at 65% of energy then www.irena.org/menu/index.aspx?mu=Subcat&PrMenuID=D=36&CatID=141&SubcatID=D=3828

IRENA Global energy scenarios up to 2050 compared. IRENA’s new joint report with IEA has renewables at 65% of energy then www.irena.org/menu/index.aspx?mu=Subcat&PrMenuID=D=36&CatID=141&SubcatID=D=3828

Wind globally hit 487 GW by the end of last year, and is now headed for 500 GW, with China at 169 GW, US 82 GW, Germany 50 GW, and India 29 GW, says GWEC: www.gwec.net/ Wind globally hit 487 GW by the end of last year, and is now headed for 500 GW, with China at 169 GW, US 82 GW, Germany 50 GW, and India 29 GW, says GWEC: www.gwec.net/ Wind globally hit 487 GW by the end of last year, and is now headed for 500 GW, with China at 169 GW, US 82 GW, Germany 50 GW, and India 29 GW, says GWEC: www.gwec.net/ Wind globally hit 487 GW by the end of last year, and is now headed for 500 GW, with China at 169 GW, US 82 GW, Germany 50 GW, and India 29 GW, says GWEC: www.gwec.net/ Wind globally hit 487 GW by the end of last year, and is now headed for 500 GW, with China at 169 GW, US 82 GW, Germany 50 GW, and India 29 GW, says GWEC: www.gwec.net/


EU - soon without the UK: will it be missed?  

The European Union is on track to meet its goal for renewables to supply 20% of its energy by 2020, although Britain, Ireland and Luxembourg are lagging behind - the UK is at 24 in the EU 28! See chart. The European Commission says renewables accounted for 16.4% of overall EU energy consumption in 2015: [http://europa.eu/rapid/press-release_MEMO-17-163_en.htm](http://europa.eu/rapid/press-release_MEMO-17-163_en.htm)

### Overview of progress towards 2020 renewable energy targets

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86% of the 24.5 GW of new EU power capacity added last year was renewable, over half being wind: [www.edie.net/news/10/Almost-90--of-new-power-in-Europe-from-renewable-sources-in-2016](http://www.edie.net/news/10/Almost-90--of-new-power-in-Europe-from-renewable-sources-in-2016)

Although overall emissions have risen slightly, led mainly by increased transport demand, EU power related emissions fell 4.5% in 2016, primarily through a major switch from coal generation to gas generation, according to Sandbag and Agora Energiewende. Year-on-year, coal generation across Europe fell by 12%, whilst gas increased by 20%. Half of the switch was in the UK with many coal plants permanently closed and a higher carbon price taking effect. There were also switches from coal to gas in Germany, Italy, Greece and the Netherlands, in part due to a temporary fall in gas price during 2016. Though renewables grew, growth was 3% less than in 2015, due to low PV & biomass growth, and, we assume, the cut backs in support: [https://sandbag.org.uk/project/energy-transition-2016/](https://sandbag.org.uk/project/energy-transition-2016/)

See PV box below.

The European Commissions ‘Clean Energy for All Europe’s’ plan for revamping green energy (see last Renew), with an emphasis on self-generation and more competitive markets, is meeting with some opposition, from, on one hand, those reliant on fossil fuels and on the other, from those keen to promote renewables more, who see it as too weak. It doesn’t bode well for the future, with concerns that renewables may lose their guaranteed ‘use’ privileged ‘must take’ delivery status: [www.theguardian.com/environment/2016/nov/01/renewables-could-lose-european-power-grid-priority-documents-reveal](http://www.theguardian.com/environment/2016/nov/01/renewables-could-lose-european-power-grid-priority-documents-reveal) So it’s a bit grim. And soon the UK is off alone out: [www.gov.uk/government/uploads/system/uploads/attachment_data/file/589189/The_United_Kingdoms_exit_fro m_and_partnership_with_the_EU_Print.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/589189/The_United_Kingdoms_exit_fro m_and_partnership_with_the_EU_Print.pdf) Though it says it will still take a lead on climate policy.
France  Macron seems likely to stay with the green plan. He’s talked of a 26 GW 5-year renewables target. So it should stick to its commitment, now agreed with EU, to provide $9 bn for solar over the next 20 years, so as to help meet its 2020 goal of getting 23% of its energy from renewables. www.upi.com/Energy-News/2017/02/10/French-government-gets-renewable-energy-endorsement/6571486732925/?st_rec=8481486734667 And more to come: http://reneweconomy.com.au/france-names-ex-greens-candidate-and-solar-advocate-as-energy-minister-16021/  

German gains & pains with 50 GW of wind  
4,625 MW of new wind capacity was installed onshore in Germany in 2016, a net gain of 4,259 MW over the dismantling of 336 turbines (366 MW). More may follow - see Box. But it now has 45.9 GW onshore, 4 GW offshore. www.windpowermonthly.com/article/1423622/end-sight-germanys-onshore-boom  
While progress thus continues, we’re never short of doubters: Germany can’t rely on renewables as they’re too variable, storage can’t cope with long lulls and if enough overcapacity is installed to meet lulls, it will take too much land: www.eurekalert.org/pub_releases/2017-01/s-re012517.php What about offshore? A grim glass half empty view! Here is another: http://thebulletin.org/germanys-energiewende-intermitiety-problem-remains94696 But here’s a glass half full view: http://reneweconomy.com.au/germany-says-solar-and-wind-have-won-technology-race-91713/  

Italy goes off shore with wind  
Italy has run a renewables auction that will see 870 MW of new capacity installed, including a 30 MW offshore wind farm to be sited off the port of Taranto, in the SE, Italy’s first. It’s focused on PV, 19 GW so far. www.renewableenergyworld.com/articles/2017/01/italy-to-venture-into-offshore-wind.html  

Nordic energy study - good in parts  
A review by Prof. Ben Sovacool in Energy Policy looks at green energy futures in the 5 countries making up the Nordic region - Denmark, Finland, Iceland, Norway, Sweden - which have very progressive energy & climate policies. Though it says progress is good, it identifies political and strategic issues, and says they may limit the replication of their approach elsewhere: www.sciencedirect.com/science/article/pii/S0301421516307091  

Sweden  ‘100% renewable by 2040’: www.windpowermonthly.com/article/1420984/sweden-sets-100-renewable-energy-production-target  

EU PV growth falters  
SolarPower Europe says new installations in the EU fell 20% in 2016, and from 8.6 GW of grid-connected PV in 2015 to ~ 6.9 GW in 2015. In contrast, in the rest of the world demand grows by 50%, with 76.1 GW added last year (including Europe) compared to 51.2 GW of on-grid solar installed in 2015. China led the way, growing by over 125% in 2016 with 34.2 GW added. The USA (14 GW of new capacity), Japan (8.6 GW) and India (4.5 GW) were the next largest, though Japan’s 2016 installations were down on 2015. SolarPower Europe’s head of market intelligence Michael Schlema says the EU is now in danger of being eclipsed by ‘Asian powerhouses’ in both PV production and installation. ‘Even the U.S., with a much smaller population that the EU’s 28 member states combined, added about twice as much solar power capacities in 2016.’ www.pv-magazine.com/2017/02/03/european-solar-demand-fell-20-in-2016-says-solarpower-europe/  


Many German on-shore wind projects to close as they reach the end of contracts www.windpowermonthly.com/article/1426012/germany-faces-wave-of-onshore-closures  
And its biggest PV company SolarWorld has gone bust: www.reuters.com/article/us-solarworld-bankruptcy-idUSKBN1862MN  

Denmark  Is active with bioenergy linked P2G conversion and storage: www.lemvigbiogas.com/Mega-stoREfinalreport.pdf  

Portugal  A retrospective claw back of maybe €140m, as the economy struggles. Renewable suppliers will have to repay any financial support received in addition to the feed-in tariff to the national electricity system, according to an industry ministry decree. www.windpowermonthly.com/article/1424824/renewable-producers-face-repaying-€140m  

EU PV total - 102GW in 2016  

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EU PV total - 102GW in 2016
US fears v positive hopes

**Global roundup**

On one hand things are looking up, with for example the 90 MW South Fork Wind Farm, 30 miles off Long Island, getting the go ahead, but on the other, Trump seems set to rampage through all things green, with up to 70% DoE cuts proposed: www.axios.com/scoop-trumps-plan-to-slash-renewables-70-2410406110.html And now this > The South Fork wind project is part of New York Governor Cuomo’s Clean Energy Standard to secure 50% of the State’s electricity from renewables by 2030, illustrating that some states are ignoring Trump. But they will be hamstrung if Trump wins in his attempt to shut down the Clean Power plan and cut the EPA. Early signs weren’t good: www.theguardian.com/us-news/2017/feb/02/donald-trump-plans-to-abolish-environmental-protection-agency and www.washingtonpost.com/news/environment-energy/wp/2017/02/20/trump-to-roll-back-obamas-climate-water-rules-through-executive-action And that’s what happened - a massive cull of regulations: www.bloomberg.com/politics/articles/2017-03-28/trump-to-cancel-obama-s-policies-aimed-at-paris-climate-pledge It will be fought, so will the tragic Paris-deal exit, but the impacts in the US & globally could be huge: www.nytimes.com/2017/03/29/world/asia/trump-climate-change-paris-china.html Though, within the US, there were conflicting reports about improved grid transmission infrastructure (see below) meant to be a high priority for Trump. Will that survive if it was seen as aiding wind? Will it get that petty? www.renewableenergyworld.com/articles/2017/01/plains-and-eastern-clean-line-hvdc-and-hydropower-part-of-trump-priorities-list-for-infrastructure

**Curtailment can be cut by better grids**

A report from the US Dept. of Energy’s National Renewable Energy Labs (NREL) says that if a relatively small amount of transmission capacity can be added to the US grid network, wind farm output curtailment can be significantly reduced, even with 35% of electricity being sourced from wind, which the DOE said was ‘plausible’ by 2050. But without an upgrade of the US western transmission network, on which the report focused, 15.5% of wind power would need to be curtailed due to grid limitations. NREL suggested that if just four currently proposed transmission projects with 10.5 GW of capacity could be realised, at an estimated cost of $10.1bn, curtailment rates could fall by half (to 7.8%) on the US western transmission network: www.windpowermonthly.com/article/1420468/new-transmission-lines-required-avoid-curtailment NREL and Berkley Labs have also looked at demand savings from variable pricing for residential solar: https://emp.lbl.gov/publications/exploring-demand-charge-savings while Berkley Labs have been looking at the impacts of net-metered PV on retail prices. It says they will be less than the impacts of other market changes: https://emp.lbl.gov/publications/putting-potential-rate-impacts Meanwhile the overall energy mix is looking better. Renewables make up nearly 20% of total US power generation capacity: hydro 8.5%; wind 6.9%; solar 2%; biomass 1.4%; geopower 0.33%. Nuclear is at 9%, coal 24.6%. Renewable output is ~16%: www.ferc.gov/legal/staff-reports/2016/dec-energy-infrastructure.pdf www.renewableenergyworld.com/articles/2017/02/renewables-now-account-for-nearly-one-fifth-of-total-us-generating-capacity.html It’s unclear what Trump will do on nuclear, but he’s very keen on coal - that drove his Paris exit: www.cbsnews.com/news/trump-paris-climate-agreement-withdrawal-announcement-full-transcript/ Grim stuff. Though on jobs he should check this out:

**Jobs** The DOE says solar now employs near 3 times more people in power generation in the USA than fossil energy and over 5 times more than nuclear. In all, renewables employ over 7 times more - about half a million people. See right: www.ecowatch.com/solar-job-growth-2197574131.html www.energy.gov/sites/prod/files/2017/01/f34/2017 US Energy and Jobs Report_0.pdf

Is that’s what’s behind his wild PV wall idea?! http://www.washingtonpost.com/news/wonk/wp/2017/06/07/if-you-thought-getting-mexico-to-pay-for-the-wall-couldnt-get-weirder-you-were-wrong/ A 1000 mile long solar array…


Pittsburgh not Paris! US to exit the Paris deal...
China can do it  

Hydro is its main ‘green’ source at present, at 320 GW, wind, at near 170 GW, is next, but **PV solar** is catching up, at 79 GW, according to this report, which calls for more distributed generation: http://usa.chinadaily.com.cn/epaper/2017-03/08/content_28478726.htm

Left: China’s largest PV project - on a lake in Cixi city, Zhejiang province. Imaginechina/Rex/Shutterstock


Hopefully it will tackle the poor grid connection issue - that is one reason why, although now having twice as much wind capacity in place (169 GW) as the USA (82 GW), China only got 241 TWh from it in the last year, compared with 224 TWh in the USA: www.renewableenergyworld.com/articles/2017/02/china-widens-wind-power-lead-over-us.html

**Certificate trading to cut subsidy costs** In a pilot programme, NDRC, the state economic planning agency, said solar & wind producers would be issued with tradable certificates for each MWh, proving that electricity has been generated from renewable sources. Energy users such as private and state businesses would be encouraged to buy the certificates, which would entitle them to payment. Solar & wind power producers who had sold their certificates would no longer receive a direct subsidy for electricity production. The NDRC said it will monitor the pilot programme and may launch a mandatory green certificate scheme in 2018. About 11% of China’s energy is from renewables so far - 23% of its power. www.scmp.com/news/china/polices-politics/article/2067849/china-launch-trading-green-certificates-solar-and-wind

**India**  
**PV solar** contracts at $0.05/kWh emerged in an auction for 750 MW of capacity. An all time low. The auctions, in central Madhya Pradesh state, included payment guarantees: www.renewableenergyworld.com/articles/2017/02/india-s-new-solar-auction-lights-the-way-to-modi-s-green-targets.html

And a 500 MW **wind** capacity auction led to an only slightly higher tariff - $0.052/kWh.

**UAE : 44% renewables aim**

The **United Arab Emirates** is to invest $163bn in projects to generate nearly half of its power from renewables. UAE Prime Minister Sheikh Mohammed bin Rashid al-Maktoum said it was hoped that, by 2050, 44% of UAEs energy would come from renewables, 38% from gas, 12% from cleaner fossil fuel, 6% from nuclear: https://renewablesnow.com/news/uae-sets-44-renewables-goal-for-2050-553898/

**Saudi Arabia** also has big renewable plans - 9.5 GW by 2023! www.renewableenergyworld.com/articles/2017/02/saudi-renewables-reset-and-launch.html

But 2.8 GW of nuclear too. The UAE & Iran also plan some nuclear.

Climate/energy politics in the post truth era


Undermining consensus: www.thegwpf.com-energy-at-a-crossroads-fossil-fuels-renewed/


So who do you trust? Not Trump! But even when it comes to what ought to be easy to check economic costs, there are divergences. The hyper-respectable Lloyds Register says nuclear is ‘one of the most cost-effective methods of power generation’. It surveyed the views of 583 energy executives and experts globally, 323 of whom worked in renewables, 154 in the nuclear sector - which it said was ‘united in its belief that it will play a key role in the low carbon landscape’. No surprise there! But it didn’t relay the overall views of the respondents on nuclear. Though it notes that ‘70% of renewables respondents say that renewables are reaching cost parity with fossil fuels’ and it was positive on solar, wind less so. www.lr.org/en/low-carbon-power/technology-radar.aspx

Meanwhile, a report from the usually reliable Carbon Tracker & the Grantham Institute says PV could supply 29% of all global electricity by 2050: see their scenario below. But wind again is dissed.

Lloyds Register say that while the value of stocks of notable renewable energy companies Vestas & SolarCity fell in the immediate aftermath of Trump’s election ‘growing global confidence in low-carbon generation could balance that out in the medium-to-long-term’. Moreover, software advances will soon improve the efficiency of existing battery storage. One key software innovation, blockchain, is a ‘distributed ledger’ technology. Lloyd’s Register says it has the potential to tap into the sharing ‘peer to peer’ economy and unlock a vast, decentralised energy market.

So it’s not all bad then…

Figure 3: Lower costs shift the balance towards solar PV from fossil fuel alternatives

Is this any more reliable? Yes, PV is going to be big, but so will wind, so you won’t need all that nuclear. And is it really sensible to install 10TW of PV to get 29% of global power?! And so much biomass?

PV & nuclear squeeze wind

Another mixed bag

Not fake - but maybe dubious?

However, it has a lot of nuclear, supplying about the same as PV. But not much wind (~7%). A bit odd, especially since it indicates that onshore wind is currently cheaper in capital cost terms than either. That stays true up to 2050 on its baseline scenario. But in its lower cost prediction, it sees PV undercutting all by 2050 - falling to MS390 - 643/GW, about a tenth of its rather low estimate for the current (and future) cost of nuclear (MS3706-4200/GW) and also much cheaper than the baseline capital costs for on shore wind (MS1640/GW) and offshore wind (MS2970/GW) by 2050. That ignores the likelihood that wind costs may fall faster too, and, given the low capacity factor for PV, to get to 29% of total output, they say 65% of global generation capacity would have to be PV by 2050 - about 10 TW! That and the big nuclear input wouldn’t be needed if they didn’t artificially squeeze wind out - as they admit they have. Not fake, but perhaps not very helpful. If you like wind! www.carbontracker.org/wp-content/uploads/2017/02/Expect-the-Unexpected_CTI_Imperial.pdf
Nuclear views & reality collide


French farce: dodgy forging and forgery

France has been struggling with potential generic reactor faults. It all started in 2015 with the discovery of anomalies in the composition of the steel in some zones of the vessel closure head and the vessel bottom head of the part built Flamanville EPR - casting errors which also seemed likely to effect other plants with forgings done by Areva’s Creusot Forge. Tests were run, but other faults then emerged, evidently including possible carbon concentration faults in the steam generator channel heads of 18 operating plants, 12 of them manufactured by Japan Casting andForging Corporation. They were all taken off line for test. In January these 12 plant’s were passed as safe to restart by the French nuclear regulator, the Autorité de Sûreté Nucléaire (ASN). But ASN has also been carrying out manufacturing quality reviews on parts at Areva NP manufacturing plants, since 87 ‘irregularities’ had been found in the files from Creusot Forge, with a forgery investigation evidently underway. Though Areva said there was no need for more reactor shutdowns: [www.reuters.com/article/us-areva-creusot-idUSKBN14V2SG](http://www.reuters.com/article/us-areva-creusot-idUSKBN14V2SG) and [www.world-nuclear-news.org/RS-EDF-gets-approval-to-restart-nine-units-16011702.html](http://www.world-nuclear-news.org/RS-EDF-gets-approval-to-restart-nine-units-16011702.html)

US SMR hopefuls


China is building a high-temperature gas-cooled reactor at Shidaowan. Work on the twin units, driving a single 210 MW turbine, started in 2012. They may run later this year. But China’s versions of the Areva EPR have been delayed: [www.world-nuclear-news.org/NN-China-revises-commissioning-dates-of-ERPs-2202174.html](http://www.world-nuclear-news.org/NN-China-revises-commissioning-dates-of-ERPs-2202174.html)

Fukushima


But there are still major problems: [https://independentaustralia.net/environment/nuclear-news/2017/01/11/fukushima-nuclear-meltdown-continues-unabated-100119](https://independentaustralia.net/environment/nuclear-news/2017/01/11/fukushima-nuclear-meltdown-continues-unabated-100119) Let’s hope there’s not another earthquake. Also see [https://lisfields.org/about/](https://lisfields.org/about/)


Going against the flow

Lloyd’s register (see above) says nuclear is a cheap option, but is more uncertain about SMRs: [www.lr.org/en/low-carbon-power/technology-radar.aspx](http://www.lr.org/en/low-carbon-power/technology-radar.aspx)

UAE and Saudi Arabia go nuclear: [www.foreignaffairs.com/articles/iran/2017-02-19/uae-nuclear-push](http://www.foreignaffairs.com/articles/iran/2017-02-19/uae-nuclear-push)
3. Forum  Odds and ends for you to chew on

Big changes ahead?  PV, storage & hydrogen will finish off fossil fuels:

Progressive green protectionism  The wider political debate heats up:
www.theecologist.org/blogs_and_comments/commentators/2988529/progressive_protectionism_the_green_case

Out with the old...
Will the UK’s ageing nuclear plants (Hunterston, left) be replaced by shiny new Small Modular Reactors (below, left) - which will allegedly be small enough to fit on a truck for delivery:  www.dailymail.co.uk/sciencetech/article-4141798/The-mini-NuScale-nuclear-plant-fits-truck.html  Not always easy:  a US reactor vessel (below right) didn’t quite make it, by train:  http://chronicle.augusta.com/news-metro-business-latest-news/2013-01-10/vogtle-reactor-vessel-slips-between-savannah-burke-county

..in with the new - Renewables with balancing
Wind, wave, tidal and solar energy do not have the problem associated with nuclear sources, but they do vary - sometimes providing to little, sometimes to much. However, there are ways to deal with that e.g. by Power to Grid (P2G) conversion of surplus wind-derived electricity to hydrogen gas, which can be stored and used when needed to make power e.g. when there in lull in the wind and/or high energy demand. It is sometimes said that this approach will be expensive since the conversion stages are inefficient. But ITM Power’s PEM electrolyser uses rapid response electrolysis and is claimed to be 77% efficient and 86% with heat recovery. So it can provide grid balancing for the power network and renewable heat for the heat network!

Combined Heat & Power (CHP) plants can also do this.  Gateshead now has a gas-fired CHP plant which feeds heat & power for sale directly to local customers via a new underground heat pipe network and high voltage ‘private-wire’ electricity cables funded and owned by the Council. It’s also linked into national grid balancing system run by Flexitricity, so, when called on, it can add 4 MW of electricity generating capacity to the National Grid:

CSP plants are very efficient in total energy conversion terms (80-90%), so there is less CO2/kWh than with power-only plants, and they can also be run on biogas, cutting CO2 even more. Big biomass power-only plants by contrast are less good - depending on the biomass source. In a recent Open Letter to the UK government, FoE, NRDC, Biofuelwatch and others said net carbon emission can be high, if forest biomass is used, when ‘changes to forest carbon stocks are taken into account’. They claimed that ‘the emissions resulting from those changes to forest carbon stocks are wrongly assumed to be zero when subsidies are awarded’. Actually there are supposed to be controls and biomass source eligibility criteria for net emission under the CfD system - it is not assumed to be zero, though they may not always be honoured and the level may well be set too high. But local energy-crop fired CHP may be a better bet.

Another idea:  rather than running gas-fired CCGTs part loaded and inefficiently, to balance renewables, run them all the time, full out, to make hydrogen when grid power isn’t needed.
Wind power then and now
In a Commons debate on ‘Energy (Renewable Sources)’ on 30th October 1987 (Hansard, Vol 121 cc564-623), Mathew Taylor, then Lib Dem MP for Truro, said: ‘It is said that up to 20% of our current demand for electricity could be met by onshore wind turbines, and if offshore machines became cost effective there would be even greater potential. Friends of the Earth predict that by the year 2025 about one fifth of our current annual demand could come from wind power providing 54 billion units of electricity through 6,000 medium & large wind turbines.’

The late Tom Dalyell, a pro-nuclear Labour MP, responded: ‘What scientific evidence, if any, does Friends of the Earth have for such a statement? Is there any basis for the prediction?’ Taylor replied ‘I understand that the CEGB itself has said that the potential is there for up to 20% of demand to be supplied by wind energy’. Dalyell would have none of it: ‘When has the CEGB said any such thing? I cannot imagine that Walter Marshall or anyone else has made such a claim’. But Taylor stuck to his guns: ‘I do not suggest that the CEGB said that 20% would be provided; it has said that the potential is there’.


And wind did get going. So renewables, including on and offshore wind, now supply ~25% of UK electricity. By 2020, over 20% from wind alone seems likely on current plans, and much more later: www.renewableuk.com

Some even look to 50% by 2030 from UK renewables. And what about this? Using wind mills to refreeze the Arctic! A huge remedial tech fix:

CCS and BECCS not on yet
In the study of potential ‘disruptive technologies’ in the energy sector by Carbon Tracker & the Grantham Institute, Carbon Capture & Storage was seen as still uncertain, and, while it said BECCS, the negative carbon variant using biomass, could be important, it probably would not start impacting globally until later on:

Hot new stuff
Call for Tesla’s Lithium-Ion Powerwall domestic battery to be banned in Austrian homes as a fire risk: www.teslarati.com/proposed-au-ban-lithium-ion-battery-systems/

Horrid old stuff

US hopes- Bernie bites back

SGR
The UK Scientists for Global Responsibility group response to the governments green paper on industrial strategy is big on renewables and dismisses nuclear and fracking:

Climate debate
Was the pause in warming an illusion?

But one key point seems clear, the sea is warming—see this data: http://advances.sciencemag.org/content/advances/3/3/e1601545/F4.large.jpg

So the ‘pause’ was not real: www.sonnenseite.com/en/science/whats-left-of-the-warming-pause.html

Or was it? www.thegwpf.com/new-study-confirms-the-warming-pause-is-real-and-revealing/ But see this:

‘Pittsburgh not Paris’ said Trump. But, actually, Pittsburgh didn’t mandate him on his proposed exit from the Paris climate deal: http://grist.org/cities/pittsburgher-to-trump-you-get-me-all-wrong/

But, although globally it was seen by most as a tragic step backwards, the USA’s exit from the Paris climate deal emboldened climate policy sceptics: http://carbon-sense.com/wp-content/uploads/2017/06/signs-of-sanity.pdf
EDF: Non au Nuclear

In *Echo*, a French business newspaper, a Senior Vice President of EdF said that ‘large nuclear or thermal power plants designed to function as baseload are challenged by the more flexible decentralized model’, based on local solar & wind, backed by batteries and intelligent management of supply & demand. He concluded that ‘the traditional model must adapt to the new realities, thus allowing the utilities to emerge from... hypercentralised structures in a world that is becoming more and more decentralised’. [http://us9.campaign-archive2.com/?u=a336c39e55a6260d59adbffb0&id=6945e1e273&c=59b188af48](http://us9.campaign-archive2.com/?u=a336c39e55a6260d59adbffb0&id=6945e1e273&c=59b188af48)

Certainly nuclear looks ever more expensive, especially now we are to leave Euratom. That provided a regulatory and support framework, including for fusion. e.g. for JET, the Joint European Torus at Culham. The UK may soldier on alone with its small national MAST spherical plasma project. And presumably we will still pay into the ITER project in France. [https://theconversation.com/brexatom-the-uk-will-leave-europees-nuclear-energy-authority-72136](https://theconversation.com/brexatom-the-uk-will-leave-europees-nuclear-energy-authority-72136)

Some do still look to nuclear fission playing a role, as in this manifesto, with big nuclear and big renewables: www.mygrideb.co.uk/the-mygrideb-manifesto/ and in this view: [www.carbonbrief.org/analysis-how-important-moorside-new-nuclear-plant-uk-climate-plans](http://www.carbonbrief.org/analysis-how-important-moorside-new-nuclear-plant-uk-climate-plans)


Radiation risks: inside and out

Counterblast [https://vimeo.com/211662517](https://vimeo.com/211662517)

It is sometimes argued that the fear of radiation is more of a health risk that radiation itself: ‘It is important that we learn how to put exposure to man-made radiation in perspective with the natural background radiation that we are all subjected to every day. This will help society deal better with the anxiety and distress caused by our fear of radiation’. [www.newsandstar.co.uk/news/Worry-about-nuclear-disasters-greater-health-risk-than-the-accidents-says-Cumbria-uni-speaker-ac03636c-9c74-4e99-8f0c-b2a0e07b7a46](http://www.newsandstar.co.uk/news/Worry-about-nuclear-disasters-greater-health-risk-than-the-accidents-says-Cumbria-uni-speaker-ac03636c-9c74-4e99-8f0c-b2a0e07b7a46)

But exposure, externally, to radiation, from whatever source, is very different to internal exposure to man-made radioactive material, over time, absorbed by ingestion or breathing dust in. Brief external exposure can kill, if the level is high enough, e.g. from a nuclear accident, but even if the level is very low, e.g. from a leak, internalised material can also kill - it continues to irradiate tissue over time. Natural radon gas is an issue, but man-made long-lived radioisotopes like cesium are more of an issue. Coal also contains radioactive materials in tiny amounts and burning it releases them into the atmosphere. Not surprisingly, given the scale of coal combustion at present, emissions from coal plants give a larger global collective radiation dose than the carefully limited routine emissions from nuclear plants, in normal operation, although about the same in terms of dose/MW since there are more coal plants. However, UNSCEAR has admitted that the collective dose to the global population from serious nuclear accidents was ‘many orders of magnitude higher’ than the collective doses from one year’s normal operation of both technologies, and, ‘more significantly, the distribution of doses after an accident is more localised geographically’. [www.world-nuclear-news.org/EE-UNSCEAR-studies-radiation-exposure-from-electricity-0902174.html](http://www.world-nuclear-news.org/EE-UNSCEAR-studies-radiation-exposure-from-electricity-0902174.html)

Nuclear power: past, present & future The Book...

Dave Elliott’s new IoP book looks at some early novel civil nuclear power ideas and how some of them are being re-explored, for good or ill. Thorium, molten salt reactors, fast neutron reactors - they have all been tried earlier on, often not very successfully. Will the revamped versions do any better? Do we actually need any of them - has nuclear really got a future? [Spoiler (no surprise!) - no not really, except maybe for fusion, off-planet: http://iopscience.iop.org/book/978-1-6817-4505-3](http://iopscience.iop.org/book/978-1-6817-4505-3) *The US Purchase details*: [www.morganclaypoolpublishers.com/catalog_Orig/product_info.php?products_id=1062](http://www.morganclaypoolpublishers.com/catalog_Orig/product_info.php?products_id=1062) edition has a For a more or less diametrically opposed view, see this Dutch Energy Collective contribution: [www.theenergycollective.com/raulipartanen/2403784/europe-ignoring-energy-reality](http://www.theenergycollective.com/raulipartanen/2403784/europe-ignoring-energy-reality)