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1. Welcome to the Fantasy World of Amber Rudd

The Secretary of State for Energy and Climate Change, Amber Rudd, is living in a "fantasy world" where nuclear is affordable and fracking produces useful amounts of gas, according to Richard Dixon, director of Friends of the Earth Scotland. "*Aiming to close down coal power stations is commendable but planning to replace them with a new fleet of gas-fired power stations will automatically lock us into a high-carbon power system, guaranteeing we won't meet UK climate targets*," he added. (1)

In her "Energy Policy Re-Set" speech on 18th November, Rudd announced that the UK will close all coal-fired power plants by 2025 but they will be replaced largely with new gas and nuclear plants rather than renewables. Rudd acknowledged that gas and nuclear power generation would in effect need a government subsidy for building power plants, but insisted they were the most secure energy sources. (2) Meanwhile she is stopping support for renewable energy and energy efficiency even though (or perhaps precisely because) they are being delivered in substantial volumes.

Rudd compounded the fantasy by failing to provide any realistic policies for delivering her objectives, said reader in Energy Policy at Aberdeen University, Dr Dave Toke. (3)

The re-set speech exposed Rudd's total failure to assemble a coherent energy strategy said Oliver Tickell writing in *The Ecologist*. It reveals the increasingly certain failure to meet EU renewable energy targets, proposes a new tax on wind and solar generation, and leaves the country facing the real prospect of lights going out in the next decade. What she presented was a rag bag of missed opportunities, worn out ideas, wishful thinking, disconnected themes and downright bad news - like the prospect of a new tax on wind and solar - that only increase the chances of the 'lights going out'. Even her headline announcement of 'an end to coal' was - while a clever way to confuse environmentalists - not all it seems. Coal power stations still have ten years to run under her proposals. And they would almost all have to close down within that time anyway in order to comply with EU pollution regulations.

Rudd said: *"In the same way generators should pay the cost of pollution, we also want intermittent generators to be responsible for the pressures they add to the system when the wind does not blow or the sun does not shine. Only when different technologies face their full costs can we achieve a more competitive market."* The Ecologist suggests this could mean a new tax on renewables at some point in the future. (4)

Here at the key points from the speech and the subsequent reactions - everything you need to know. (5)

1. The plans to phase out coal by 2025 are just that – plans. Craig Bennett, Chief Executive of Friends of the Earth said phasing out coal power stations by 2025 would be a very good thing, but Rudd added two caveats. First the Government will be launching a consultation on the coal phase out early next year which will set out the proposals to

close unabated coal-fired power stations by 2025, and restrict use from 2023. But nothing is set in stone. Secondly, it will only go ahead if they've managed to build enough gas power in the meantime to replace old coal. (6)

2. Paul Ekins, Professor of resources and environmental policy and director of the UCL Institute for Sustainable Resources, says most of the UK's coal stations would have closed anyway by 2025. (7) The UK's coal use is already plummeting. The amount of coal used for electricity supply in the UK fell from more than 16m tonnes in Q2 2012 to less than 8 million tonnes in Q2 2015. However, much of that reduction is because the UK's overall electricity consumption has also fallen. As Rudd pointed out, a higher proportion of our electricity came from coal in 2014 than in 1999

3. Rudd has sent out a powerful message; former US Vice President Al Gore said: "*With this announcement, the UK is demonstrating the type of leadership that nations around the world must take in order to craft a successful agreement in Paris and solve the climate crisis. I am hopeful that others will follow suit as we repower the global economy with the clean energy we need for a sustainable future*."

4. Gas is expected to pick up the slack. In her speech, Rudd gave her explicit backing to new gas generation. She said: "*We need to give a clear signal to people who are in the market for building gas stations that coal will no longer crowd out new gas. One of the greatest and most cost-effective contributions we can make to emission reductions in electricity is by replacing coal-fired power stations with gas*". Only one large gas-fired plant is currently under construction in the UK. Another, which secured a subsidy last year, is reportedly struggling to find investors. According to *Bloomberg New Energy Finance*, the cost of combined cycle gas generation in the UK is $115/MWh once carbon costs are taken into account – the same as coal and higher than the average $85/MWh for onshore wind. Strong words from the secretary of state will not necessarily precipitate a renewed dash for gas, according to Dave Jones, carbon and power analyst at think-tank Sandbag. He said as renewables and new nuclear are built, gas is likely to play a reduced role for power generation in the longer term, regardless of how strong the government rhetoric on gas is today.

5. Rudd's 'dash for gas' is unpopular with some green groups; Friends of the Earth likened the switch from coal to gas to "*an alcoholic switching from two bottles of whisky a day to two bottles of port. The UK Government's ongoing addiction to fossil fuels sends a terrible signal to crucial Paris climate talks, starting in a fortnight*," said Friends of the Earth's senior energy campaigner Simon Bullock.

6. Fracking and nuclear power are the priorities; Despite opinion polls which suggest the UK public would prefer to see resources allocated to renewables, Rudd confirmed that shale gas would play an important part in the transition to gas generation. And she said opponents of nuclear power 'misread the science' the technology could provide up to 30% of the UK's low carbon electricity through the 2030s and create 30,000 new jobs.

7. Renewables are still largely out in the cold (except for offshore wind); Craig Bennett said time and again, over these past six months, ministers have evoked language and principles in their crusade against renewable energy, which they blatantly then fail to

apply to gas, its ugly sister fracking and the white elephant of nuclear power. Rudd has, time and again, justified the decimation or complete removal of short-term, modest subsidies for the relatively new technologies of solar and wind energy, by saying that it is time for "*renewable energy to stand on its own two feet*" while negotiating a brand new subsidy regime lasting 35 years for Hinkley Point nuclear power station.

8. Continued support for offshore wind, but "*no blank cheques*"; Rudd confirmed there would be three auctions for offshore wind subsidies by the end of this Parliament, "if - and only if - the Government's conditions on cost reduction are met." The first of these auctions could be held as soon as 2016, but the cost target that Rudd mentioned is expected to be £100/MWh. Current costs are around £110/MWh. Green Alliance director Matthew Spencer welcomed the move, commenting: "*The cost of offshore wind is falling, but Amber Rudd has been wise to make future support conditional on the industry bringing costs down further*. *Future conditional support protects the consumer, whilst giving the industry greater confidence to invest in the supply chain, which is crucial to growing UK content and lowering costs*." Green Alliance said the subsidy rate for offshore wind electricity has fallen by 52% in the past three years, while the technology has grown from 1% to 10% of the UK electricity supply. The technology is likely hit an existing target the government has set for it of £100/MWh by 2020, which will be a cost reduction of 30-40%.

9. The electricity system is going digital, says Jimmy Aldridge at IPPR: Smart technologies will bring a whole new level of flexibility to the system. Dramatic cost reductions in solar and batteries will mean that householders no longer rely on the grid. Whatever happens to UK energy policy in the short-term these technologies will become ubiquitous because the trend is far bigger than this country. We need the building blocks in place to deal with this inevitable development. What is needed is flexibility. Gas stations can do that to a degree and we will certainly need some of them as a backstop. However, smart demand-side technologies have the potential to achieve it far more efficiently and at far less cost. The closure of the UK's old coal stations is a very welcome development. Let's take the opportunity it provides to bring forward a balance of kit to keep the lights on over the long term. (8)

10. The UK Department of Energy and Climate Change (DECC) has slashed its forecasts for new renewable power capacity by more than a third over the next decade, according to Carbon Brief. Last year, DECC said 34 gigawatts (GW) of new renewable capacity would be built by 2025. Now, it has reduced this figure to 22GW. The updated forecasts lay bare the consequences of policy changes introduced by secretary of state Amber Rudd since the May general election. They were published in an obscure annex on DECC's website, on the same day as Rudd was giving her "reset speech" DECC has also raised its forecasts for new-build gas and interconnector capacity, but scaled back expectations for new nuclear and carbon capture and storage (CCS). The forecasts suggest it will now be harder for the UK to meet its legally-binding carbon budget for 2028-32. The new forecast reflects the latest delay to the completion of the planned Hinkley C plant in Somerset, which will not now be ready before 2025. (9)

Paul Barwell, of the Solar Trade Association (STA), said that replacing fossil with fossil makes little sense, stressing: "*Phasing out coal power is of course good news and was expected. However, it makes little sense to replace fossil coal only with fossil gas*." Barwell added that both solar and gas require government subsidy support of similar levels, but solar has the "*bonus of zero carbon emissions, future price certainty and no dependency on imports from unstable countries*". The Renewable Energy Association (REA) said the policy reset will fail to decarbonize the U.K.'s energy future in the most cost-effective way. It will do nothing to save industries such as solar, anaerobic digestion and biomass, which have been left reeling over successive damaging policy interventions. (10)

Niall Stuart, Chief Executive of Scottish Renewables said it appears that the Secretary of State is bending over backwards to highlight the benefits of gas-fired and nuclear power, whilst overstating the challenges of increasing our renewable energy capacity. She fails to mention that the cost of nuclear power being significantly more expensive than onshore wind and solar, nor the challenges of managing large and inflexible nuclear power plants. (11)

Rudd said "*Some argue we should adapt our traditional model dominated by large power stations and go for a new, decentralised, flexible approach. Locally-generated energy supported by storage, interconnection and demand response, offers the possibility of a radically different model*."

But she says it's up to the market to decide whether to choose the traditional model or a decentralised one. The decentralised model is a model that could use much less gas (from fracking or otherwise) so what would it look like? Right now nearly 30% of our power comes from coal with around 20% from renewable sources. But if the government is to meet its targets to reduce carbon dioxide emissions then its independent climate advisers say that, within 15 years, 44-55% of the country's power should come from renewables sources like wind, solar and hydro. Not all of that would be on stream by 2025 – when coal must finally be phased out – but it would be reasonable to assume that the fall in coal generation would be covered by the rise in renewables generation. That means lots more offshore wind – the kind of big energy infrastructure trumpeted by the UK government – but it also means around 5 times more onshore wind and solar than we had last year.

And it's not just about generating power renewably. A study by the National Grid found that biogas produced from waste materials could meet between 5 -18% of the UK's existing gas needs by 2020 That's small and decentralised – but not something the government currently has in mind. The smallest, most decentralised of changes to our energy system comes when someone changes how they use power or heating in their home. In the UK - efficiency could reduce power demand by around a third according to consultants McKinsey – reducing the need for new gas or coal plants substantially. A study by Cambridge Econometrics based on scenarios from the government's independent climate advisers suggested UK gas imports would end up 45% lower (worth about £8bn a year) by 2030 if the government pushed for a 65% renewable energy target by 2030 (about double the likely deployment by 2020).

Bringing it all together, a study by the National Grid found that if the UK takes steps to invest in clean energy and improve efficiency – in line with our legal commitments on tackling climate change - gas use will fall by over 40% by 2030 under their 'gone green' scenario. Over the long

term – by 2050 – the UK government's climate advisers have recommended that both power and heating are gas free. (12)

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2. Sustainable energy under attack; targets likely to be missed

The Chancellor's Autumn Statement struck yet another blow against a sustainable energy future for the UK by cutting energy efficiency funds just as tens of thousands are set to die of cold this winter, betting £250m on pointless nuclear research, and raiding the renewables budget to fund subsidies to nuclear power and fossil fuels. And he even failed to reveal to MPs in his Parliamentary Statement that he was cancelling the £1bn competition for carbon capture and storage (CCS) technology - only six months before it was due to be awarded – breaking a pledge in the Conservative party's election manifesto. (1)

On the same day that official figures revealed that last winter's Excess Winter Deaths were at their highest level for 15 years, the Chancellor announced a 42% cut in the help available to households living in dangerously cold homes. And despite allocating £100 billion for infrastructure projects he chose not to spend one penny to make the UK housing stock more energy efficient. He ignored industry-wide pleas to release infrastructure funding for an energy efficiency programme. Instead, he has announced that the Energy Company Obligation – the only remaining help for householders living in cold homes – will be slashed to £640m a year from 2017, a drop of 42% on annual ECO spending to date. Having ditched the zero carbon homes standard earlier in the year, this means that the 40,000 'affordable' homes proposed by 2020 will be needlessly saddled with higher running costs. (2)

Amber Rudd admitted the UK does not have the right policies in place to meet its EU target of sourcing 15% of energy (not just electricity) from renewable sources by 2020. She told MPs in November that meeting the target would be challenging, and admitted the UK could end up having to buy renewable energy from its European neighbours if it fell short. Rudd said that the prospect of the UK getting just 11.5% of energy from renewables by 2020 without further action, first revealed in a letter leaked to *The Ecologist* was accurate. The gap would have to be addressed by the Department for Transport and by her department doing more on heat, she said. Making up the shortfall by increasing the amount of renewable electricity from sources such as windfarms was not an option, she said. (3)

Within the 15% target, the UK has set itself sub-targets of 30% of electricity from renewables, 12% of heat, and 10% of transport fuel. However, in the leaked letter sent by Rudd to fellow cabinet members, she says she expects the UK to miss its targets by around 25%, equivalent to a 50TWh shortfall. By comparison, the entire renewable electricity output in Q2 2015 was less than 20TWh. (4)

A report by trade body Scottish Renewables shows that Scotland will also miss its renewable electricity targets. The target of meeting the equivalent of 100% of Scottish electricity consumption with renewables by 2020 is not legally binding, but Scottish Renewables suggests that based on current trajectories, Scotland will only achieve 87% without immediate action. Scottish Renewables say that there are enough consented schemes onshore and offshore, but they can only go ahead if they are allocated a long term contract for their power. If there isn't an auction round for contracts by next spring, the delay could fatally undermine the timeline for

the projects on Scotland's main island groups, ending prospects for major developments on the Western Isles and Shetland. It would also raise serious questions about whether the proposed offshore wind projects can make the 2020 deadline. (5)

Rudd rejected claims that the government's subsidy cuts to renewable electricity over the summer had harmed the UK's ability to meet the EU target. Here is a summary of those cuts:

Onshore Wind – The Renewable Obligation (RO) will be closed to onshore wind a year earlier than expected in April 2016, and new projects are unlikely to be eligible for a subsidy through the Contract for Difference system (6)

Solar Farms – The Government confirmed in October 2014 that solar farms above 5MW would be ineligible for RO support from April 2015. (7) Then, in July 2015, the Government confirmed it was ending RO support for farms below 5MW a year early in April 2016. (8)

Feed-in Tariff Cuts – The Government has yet to announce the results of a consultation on proposals to cut incentives for solar installations by up to 87% from January 2016, slash support for small wind turbines and anaerobic digestion projects. (9) Average cuts to small hydro would be around 21%. (10)

Pre-Accreditation Scrapped DECC confirmed in September that it would remove pre-accreditation for all new participants in the feed-in tariff system from 1 October 2015. (11) The mechanism is particularly important to corporate and community renewables projects, such as mid-sized rooftop solar arrays, where developers would struggle to have an insight into whether a tariff cut is coming and would therefore be deterred from deploying or investing in renewable energy technologies by the risk of returns being lower than expected. (12)

Tax Relief Scrapped – At the end of October the Treasury announced that the various forms of tax relief – Enterprise Investment Scheme (EIS) and Seed Enterprise Investment Scheme (SEIS) tax relief and Social Investment Tax relief (SITR) – for investors in community energy would be scrapped from 30th November. (13)

Offshore Wind: The industry had expected an auction round under the contract for difference system this autumn, but DECC postponed it, and it is not clear when it will go ahead which is inevitably impacting on investor confidence across the industry. If we don't start the process by next spring it would also raise serious questions about whether the proposed offshore wind projects can make the 2020 deadline. (14) Amber Rudd's energy re-set speech said DECC would run three auctions over the course of this parliament. However, she warned there would be "*no more blank cheques*" for offshore wind farms, and that future auctions would depend on developers cutting costs. It remains unclear what target the government will set for the next auction, which will be held by the end of 2016. It is also uncertain how many projects the government will be able to support through the three planned auctions given it has previously warned the budget for clean energy subsidies is under intense pressure. (15)

Carbon Capture and Storage: The Chancellor's Autumn Statement confirmed that the £1 billion ring-fenced capital budget for the Carbon Capture and Storage (CCS) Competition has been withdrawn. (16)

The cuts to subsidies for renewables mean the UK could miss out on falling wholesale electricity prices in the next five years, according to a new analysis in the peer-reviewed journal *Nature Materials*, which compared the progress towards eventually delivering all-renewable electricity supplies in several countries, including the UK and Germany. The study looked at the extent to which energy capacity from photovoltaic panels, wind power and bio-electricity generation are rising in the different countries, and, based on progress over the last four years, extrapolated to see how the use of these technologies would increase through to 2020.

Had the UK not cut its plans for photovoltaics (PV) and onshore wind, it was catching up with Germany, and by the early 2020s it could have had enough PV and wind power for an all renewable electricity supply, according to Keith Barnham, Emeritus Professor of Physics at Imperial College London and lead author on the new study. The paper also detailed how sharp increases in renewable energy capacity leads to significant downward pressure on wholesale electricity prices, as has happened in Germany in recent years. Catherine Mitchell, a professor of energy policy at Exeter University, said she agreed that the study - which she was not involved in - confirms renewables do lead to cheaper electricity. "*It's somewhat baffling that the UK Treasury either isn't aware of this or inclined to take advantage of it, particularly when industries such as steel are complaining about high energy prices*," she said. (17)

Meanwhile, the Spending Review claimed to be increasing funding for the Renewable Heat Incentive (RHI) to £1.15 billion by 2020-21, while reforming the scheme to deliver better value for money. By the end of the Parliament the government expects to have incentivised enough additional renewable heat to warm the equivalent of over 500,000 homes. But analysts calculate that far from increasing the RHI budget, the Chancellor will actually implement a cut of 40% - some £700m- which the Chancellor dubs "savings".

But Osborne has found an extra £250 million for an "ambitious nuclear research and development programme" into 'small modular reactors' (SMRs) - widely promoted by the nuclear industry as the 'next big thing' despite the lack of any demand for the technology or any prototype. According to the statement the research "*will revive the UK's nuclear expertise and position the UK as a global leader in innovative nuclear technologies. This will include a competition to identify the best value small modular reactor design for the UK. This will pave the way towards building one of the world's first small modular reactors in the UK in the 2020s. Detailed plans for the competition will be brought forward early next year*." (18) (19)

And finally, the Treasury has re-defined payments to gas, coal and nuclear generators under the 'capacity mechanism' to put them under the renewable energy budget raised from energy users bills, known as the Levy Control Framework. "Given that the 'levy control framework' (LCF) is capped by the Treasury, and given that the cost of capacity provision will inexorably rise, funding for renewables and energy efficiency will increasingly be crowded out by subsidies to fossil fuel power stations and nuclear power," says Dr Dave Toke. (20)

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3. The Government's Nuclear Plans – Will they work?

Last month we asked why the Government is persevering with the world's most expensive power plant ever at the same time slashing support for renewable energy. (1) Renewable energy is going from strength to strength. Solar photovoltaics could provide the same amount of electricity as Hinkley Point C for half the subsidy cost (2) and we could have six times the power-generation capacity for the same money by investing in wind turbines instead of Hinkley. (3) Although the Government's motivation is still a bit of a mystery – either it thinks we still need baseload; it wants to sustain a national nuclear industrial capability sufficient to maintain the UK's nuclear-armed status; or it is prepared to pay over the odds to the nuclear industry to avoid democratising the energy industry.

This month we want to look at how likely the whole nuclear adventure is to go ahead. For all the claims that EDF's 'final investment decision' on Hinkley Point C is a mere formality that will be made in a few weeks, there is more reason than ever to doubt it will go ahead anytime soon. As we pointed out last month the whole deal looks as though it's stitched together with paperclips and sellotape and could fall apart at any moment.

Under the deal agreed with the European Commission, the Flamanville EPR project must be up and running before the guarantees come into effect. And until that time, the shareholders must provide billions in 'contingent equity' to cover the bondholders' risk, protecting UK taxpayers. And if it is not operating by 2020 the guarantees will expire. (4) What this means, according to *The Ecologist*, is that there is now a near-zero chance of these guarantees ever actually being taken up. Under the terms of the European Commission's decision on Hinkley, the UK Government may only be able to guarantee loans. It may not be able to underwrite equity – or capital put into the project by the shareholders. Osborne's £2 billion promise in Beijing doesn't appear to be able to go ahead under the terms of the EC decision.

The original idea for financing Hinkley was for the promoters to put in £7.5bn in equity and then to borrow £17.5bn supported by UK Government Credit Guarantees (for which a premium would be paid). This was made up of £16bn cost plus £8.5bn interest. Now the price seems to have gone up to £18bn (or adjusted for today's prices). But EDF Energy seems to be talking about largely funding this out of equity. EDF said on 21st October: "*The project is due to be equity funded by each partner, at least during a first stage*." (5) So the Chinese will be putting in about £6bn, which means EDF has to find £12bn.

If EDF has to find all of the £12bn, it could do this partly by selling additional equity in the project, and this is certainly possible, but it has already been tried, and the Chinese have been the only takers, and they are taking less than EDF wanted them to. Alternatively EDF could flog off its assets. And that's exactly what it is doing - seeking to raise €10 billion by selling its Italian subsidiary Edison and its share in US nuclear company CEGN, and possibly a Polish coal mine, as reported in the FT. But that will still leave it many billions of pounds short. (6)

As well as raising the £12bn for Hinkley Point C, EDF is preparing for a large outlay on the reactor division of French nuclear group Areva as part of a deal negotiated alongside the government to save its rival earlier this year. It has agreed in principle to buy between 51 and 75% of Areva NP, which will cost between €1.3bn and €2bn. It faces a €55bn bill over the next ten years to upgrade its reactors to extend their lives. Flamanville's problems cost EDF an unscheduled €2 billion last year. And then there is the potentially enormous cost that EDF faces going forward in decommissioning its ageing fleet of nuclear power plants in France, the UK and other countries - just as its revenue stream from those reactors is cut off.

The company could take on more corporate debt, but it is already carrying far too much. Of course it may try to borrow much of the money after a few years into the project – backed by the Government Credit Guarantee, There probably isn't any reason for substantial spend before 2018/19. If completion is 2025, that implies first concrete in 2020 and long lead-time items (reactor vessel, steam generators, turbine generators might need to be ordered a year ahead, so no big spending until 2019.

So there is a very real possibility that EDF will be unable to raise the cash to proceed with Hinkley C. If it does, the project could spell doom for EDF as a company according to the association of employee-shareholders. (7) Investment bank Investec, Moody's and Standard and Poor have all advised clients to sell shares in EDF. (8)

If EDF does manage to get Hinkley off the ground the prospects for Sizewell C look minimal. But if Hinkley does collapse but it won't necessarily take Wylfa, Oldbury and Moorside with it. The Government could just blame the EPR and EDF.

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8. Dave Toke's Blog 27th October 2015 http://realfeed-intariffs.blogspot.co.uk/2015/10/could-hinkley-c-spell-end-of-edf.html

4. Energy Rebellion

The government's Finance Bill unveiled at the end of October proposed excluding community energy schemes from receiving Seed Enterprise Investment Scheme (SEIS) tax relief and Social Investment Tax Relief (SITR) from 30th November. Many groups rushed ahead with planned share offers to raise enough cash for the community-owned schemes before the deadline.

By the end of November a record £12.8m had been raised for 28 new renewable energy projects, according to *Business Green* thanks to a rush of investors driven by the end to tax relief. Jan-Willem Bode of crowd-funding platform Mongoose Energy said the record figures demonstrated wide-scale support for community energy from the British public.

Meanwhile, Community Energy England and its counterparts in Wales and Scotland have taken the first steps towards launching a judicial review over the move, last week serving a Letter before Action to the Treasury that accuses the government of reneging on a pledge in the March Budget to provide six months' notice on any changes to the tax relief schemes.

Boris Johnson has warned the Treasury it is endangering efforts by local communities around the UK to build their own renewable energy projects. In a letter to the financial secretary to the Treasury, David Gauke, the mayor of London and Tory MP called on the government to reconsider its proposals to remove various forms of tax relief for investors in community energy. More than 100 green energy groups have already said the change will “decimate” the sector, which has installed community-owned solar panels on village halls, small hydro schemes on rivers and wind turbines on farms. (2)

The Share Offers which were open during November are listed below. Many of them overshot their target.

Name of Project	**Type of Project**	**Capacity**	**Target or amount raised**	**Outcome**
Edinburgh Community Solar Co-op	Solar on 25 public buildings – schools and leisure centres.	1.5MW	£1.4m	Fully subscribed
Western Community Energy Rainepower Hydro Killington, Cumbria	Hydro Project	25kW	£420,000	Fully subscribed
Schools Energy Co-op	Solar on schools in East Sussex, Berkshire, Hertfordshire and Essex – bringing total up to 25	unknown	£700,000 (bringing total capital base to £1.5m)	Fully Subscribed

Meadow Blue Community Energy	Solar Farm near Chichester	5MW	£1.1m raised (It wanted £640,000)	Fully Subscribed
Bath & West Community Energy	Stowey House Farm solar Portworthy solar array Old Mill Hotel Hydro	250kw 4MW ~87,500kWh/yr	£1.24m raised in record time	Fully Subscribed
Applecross Community Hydro	Hydro	90kW	£780,000	Fully Subscribed
Rumbling Bridge Hydro	Hydro	500kW	£285,000	Fully Subscribed
Bristol Energy Co-op	500kW solar on community buildings 4.2MW solar Farm nr Avonmouth 4.5MW solar Farm nr Puriton Somerset	500kW 4.2MW 4.5MW	£2.65m	Raised £650,000 in the first phase. Share Offer will re-open.
Avalon Community Energy	Solar for schools and industrial roofs in Somerset	88kW 275kW	First target £100,000 £275,000	£170,000 raised 2nd share offer opens 25th Jan
Cornwall Community Power	Solar on 7 public buildings & some existing schemes with debt to swat out.	New projects Fowey 64kW Liskeard 140kW	£483,817	Funded
Brendon Energy	Solar roofs – community bdgs in Taunton & Wellington	School 30kW Friends Meeting 10.4kW School 40kW	£100,000	Funded
Awel Co-op	Community Wind	2 x 2.35MW turbines	£1m	Funded

Brighton Energy Co-op	Solar pv	1MW	£1m	Funded
Orchard Com Energy	Solar farm	5MW	£0.5m	Fully Subscribed – target exceeded
Nottinghamshire Community Energy	Solar Farm	5MW	£0.67m	Fully Subscribed – target exceeded
Harborough Energy	Solar for 2 sites – a school and a health centre in Market Harborough Leicestershire	160kW	£183,600	Fully Subscribed
South East London Community Energy	Solar for 2 schools in Lewisham and two in Greenwich	198kW	£250,000	Fully Subscribed
Maid Energy	Solar for 2 schools or community centres in Windsor and Maidenhead	100kW	£130,000	Fully Subscribed
Heartland Community Wind	Two wind turbines near Aberfeldy	500kW	£370,000	Fully Subscribed
Wolverton Community Energy	Solar for community buildings in Milton Keynes	330kW	£180,000	Fully Subscribed
Nadder Community Energy	Ten solar installations on commercial and agricultural buildings in Wiltshire	440kW	£476,500	Fully Subscribed
Burneside Community Energy	Solar array on James Cropper PLC's Burneside Mills, Nr Kendal, Cumbria	250kW	£250,000	Fully Subscribed
Pomona Solar Co-op	Solar Farm Herefordshire	50kW	£70,000	Fully Subscribed
Carmarthenshire Energy	Wind Turbine	500kW	£349,000	Fully Subscribed

Fetlar Wind	Wind Turbines	2 x 25kW	£223,000	Fully Subscribed
Dorset Community Energy	Solar panels for 3 extra schools	150kW	£352,200	Fully Subscribed
Teddington & Ham Hydro	Hydro	492kW	£2m	Fully Subscribed
Exeter Community Energy	Solar on 9 bdgs community centres, County Council bdgs, a Church, a medical centre, organic farm & hybrid van co.	300kW	£390,000	Fully Subscribed

Meanwhile a must-watch trailer has been released to a feature-length documentary called "Power to Change – The Energy Rebellion", which will be released in theatres on March 17th, 2016. (3)

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2. Guardian 11th Nov 2015 http://www.theguardian.com/environment/2015/nov/11/boris-johnson-treasury-is-endangering-community-renewables
3. Power to Change 30th Nov 2015 https://www.youtube.com/watch?v=1xgzrB6vdzc&feature=youtu.be

5. Municipal Energy

Most of Britain's major cities will be run entirely on green energy by 2050, after the leaders of more than 50 Labour-run councils made pledges to eradicate carbon emissions in their areas. In a highly significant move, council leaders in Edinburgh, Manchester, Newcastle, Liverpool, Leeds, Nottingham, Glasgow and many others signed up to the promise ahead of the Paris climate talks. Labour said this would cut the UK's carbon footprint by 10%.

The pledge, coordinated by Lisa Nandy, the shadow energy and climate change secretary, will mean green transport, an end to gas heating and a programme of mass insulation of homes in cities across the UK. The move will also pile pressure on the London mayoral candidates to make a similar pledge for the capital, with some Labour-led London boroughs, including Southwark, Lambeth and Greenwich, having already signed the promise.

Nandy said the move showed the impact that Labour could have locally when it comes to green energy, at a time when the government has slashed subsidies for renewable energy sources such as solar and onshore wind. She said. "*Ministers say they support devolution to our towns and cities so they should back these council leaders by ending their attack on the schemes that can help to make this safer, cleaner future a reality*." (1)

Even George Osborne's concept of a "Northern Powerhouse" could lead to one exciting possibility – Northern Power – a municipal energy business for the North of England. Local energy companies already exist. In Southampton a local company supplies the city's port and council buildings and is developing district heating and insulation schemes for council houses. In Nottingham Robin Hood energy – an arm's length business set up by the City Council – aims to provide cheaper energy and to tackle fuel poverty. Bristol has just decided to create a new business – Bristol Energy – which will focus on locally generated electricity and district heating schemes. (2)

Interestingly, public sector energy consultant Stephen Cirrell, speaking at the Solar Energy UK exhibition in Birmingham in October, said Councils have not been put off investing in solar by the recent subsidy cuts. They are simply adjusting the timeline for projects with many opting to wait it out for two years. Very few however, are walking away from a commitment to pursue solar energy. Storage, private wires and falling costs of PV panels will all help to make solar economic for local authorities. (3)

Around the world the cost of solar electricity continues to plunge. Two stunning auction results in India and Chile recently have underscored this. In both countries, India and Chile, solar is now clearly the cheapest option compared to new coal-fired power stations. In Chile, where the auction was open to all technologies, fossil fuel projects did not win a single megawatt of capacity. And the auction produced the lowest ever price for unsubsidised solar – US6.5c/kWh. (4)

As far as energy storage is concerned if current trends continue it could be cheap enough to allow 24/7 clean energy in the next 15-20 years. New natural gas costs around 7 cents per kWh. As solar and wind steal hours from natural gas plants (because they're cheaper when the

sun is shining and the wind is blowing), natural gas plants will sit idle longer. As a result, the price of natural gas electricity will rise to perhaps 10 cents per kwh, as the up-front capital cost of natural gas plants is spread over fewer kwhs out. To compete with that on a 24/7 basis, we need storage that costs no more than 5 or 6 cents per kwh, and ideally less. In other words, we need to cut the price of energy storage by a factor of 5 or 6 from today's prices. We've already cut energy storage prices by a factor of 10 since the 1990s. And if current trends hold, the world is very much on path to achieving cheap enough storage to allow 24/7 clean energy, and doing so in the next 15-20 years. (5)

In its first in-depth analysis on the costs of energy storage, US investment bank Lazard says storage is already competitive in some situations – particularly at the utility scale and in providing services such as frequency regulation that was previously the province of conventional fuels. Lazard for the past eight years has been producing an annual in-depth analysis of generation costs, tracking the fall in the costs of solar and wind energy in particular, and how they are now beating conventional fuels. The latest analysis shows wind and large-scale solar PV beating all conventional technologies on cost by a widening margin. And Lazard is hinting that battery storage is likely to follow the cost trajectory of renewable energy and be competitive without subsidies in many applications. In some cases, it already is. (6) Electricity storage has until recently been prohibitively expensive, but its emergence at an economically viable cost will enable increased use of wind and solar power. Tesla's battery "gigafactory", now under construction in Nevada, greatly increasing manufacturing capacity will help to reduce costs. Within five years, Lazard believes, the price of batteries is likely to have fallen to the point that they will be competitive against back-up fossil fuel power generation for a wide range of uses. New electricity storage installed on to the grid to support wind and solar power is likely to grow more than 60-fold from 196 megawatts of capacity this year to 12,700MW in 2025. (7)

Sooner than it takes to build a nuclear power station, lithium-air batteries could be helping wind and solar to make coal, oil and nuclear obsolete, say Cambridge scientists. Five times lighter and five times cheaper than current lithium batteries, Li-air would open the way to our 100% renewable future. (8)

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2. FT 26th Nov 2015 http://blogs.ft.com/nick-butler/2015/11/26/how-to-power-the-northern-powerhouse/
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6. 100% Renewables

Mark Jacobson and Mark Delucchi have spelled out how 139 countries can each generate all the energy needed for homes, businesses, industry, transportation, agriculture—everything—from wind, solar and water power technologies, by 2050. Their national blueprints follow similar plans they have published in the past few years to run each of the 50 U.S. states on renewables, as well as the entire world. The UK is amongst the 139 countries with plans for 100% renewable energy. (1)

A long-term goal of 100% renewable energy is increasingly possible for large corporations and local governments, according to a new report by Clean Edge. One of the largest areas to have achieved 100% renewable energy is Schleswig-Holstein, Germany, a state with nearly 3 million people. The windy rural northern German state is now producing as much renewable electricity as it consumes — although that is a net calculation. The current push for all renewables among global corporate powerhouses such as Google, Microsoft and Unilever has largely been met through tradable credits. But there is a strong shift toward onsite generation or direct power-purchase agreements, the report notes. The ambitious goals set by many large corporations started as sustainability programmes, but are increasingly economic decisions. The report, funded by SolarCity, outlines five trends that are enabling the shift to 100% renewables: the falling cost of distributed solar; maturing utility-scale renewables; maturing energy storage; efficiency and net-zero buildings; and a more intelligent electric grid. (2)

The world could soon be generating all its electricity from renewable sources, writes Dave Elliott, by harnessing diverse technologies for generation, grid balancing and energy storage. Add to that the use of power surpluses to make fuels, and it could even be feasible to make all our energy - not just electricity - renewable. A clean green future beckons. Some renewables are now cheaper than conventional sources, even when the cost of providing backup to deal with their variability is included. Can variability really be dealt with and at low cost? Actually we already do it. Grid systems already cope with quite large variations in supply and demand, mainly by ramping the output of some power plants up and down. With renewables on the grid, they will have to do that a bit more often, reducing the cost and carbon savings from not using fossil fuel very slightly. We don't have to build new plants for this extra back up - they already exist. As they age, new, better, ones will have to be built, for example flexible gas turbines using low net carbon biogas as a fuel, produced from farm and home wastes. (3)

Yes, a 100% Renewable Energy future is possible! This was the conclusion of the workshop "Decarbonisation - 100 % Renewable Energy and more" hosted by the German Federal Environment Agency (UBA) in Berlin on November 9th, 2015. It is technically feasible to have an energy supply system that relies solely on Renewable Energy (RE) and to reach carbon neutrality, as demonstrated by several studies conducted at national level in Germany and France, as well as at city-level focusing on the City of Rheine, Germany, developed by Solar Institute Jülich, and on Victoria-Gasteiz, Basque Country, Spain, developed by the City Council, and ICLEI member. (4)

New research shows that wind and solar can meet 80% of Germany's power demand, with biogas and hydropower providing the balance, writes Keith Barnham. And if Germany can do it,

so can other countries, many of them even more easily - with no need for fossil fuels or nuclear power. COP21 should raise its ambitions and commit to a 100% renewable electricity future, everywhere. There are powerful lobbies that argue that the renewables are too unreliable; expanding too slowly; and too expensive to supply the world's electricity needs. Without, that is, significant help from the technologies the lobbyists are paid to represent - be they fossil fuel or nuclear. Here is the evidence, some of it new and unexpected, that the lobbyists' arguments at a variance with the realities.

Two projects in Germany, under the collective name of Komikraftwerk (combined-power plant) have clearly demonstrated that the reliability objection is a myth. Solar PV and wind power are complementary. Together they can supply around 80% of the electrical power needs of Germany. The only backup required is 17% biogas electricity and 5% storage power. Together they provide a renewable electricity supply that is reliable 24/7, summer through winter. Recent evidence Barnham wrote with the head of Kombikraftwerk and an Italian colleague in *Nature Materials* explodes the second myth. Wind and PV and wind power are expanding exponentially in many countries. The expansion is so fast in Germany that wind and PV could provide the foundation of an all-renewable electricity supply as early as 2020. Had the savage cuts to the subsidies for PV and wind power in the UK not been implemented, wind and PV could likewise be on target to provide the backbone of an all-renewable electricity system just two years later, in 2022. Bristol Council has received applications to build 48 diesel electricity generators. The council should turn this down on the basis of carbon emissions. While doing so they could point out that the ideal flexible electric power would come from a combined heat and power (CHP) generator sited near Bristol's award winning anaerobic digestion (AD) plant. This would produce electricity from the plant's bio-methane with a carbon footprint around 70 times lower than diesel. In return, waste heat from the electricity generation could speed up the AD (5)

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2. One Step 17th Nov 2015 http://onestepoffthegrid.com.au/its-getting-much-easier-for-companies-and-cities-to-go-100-renewable/ and Renew Economy 2nd Dec 2015 http://reneweconomy.com.au/2015/getting-to-100-why-the-shift-to-mass-renewable-electricity-deployment-will-change-everything-see-more-at-httpcleanedge-comviewsgetting-to-100-why-the-shift-to-mass-renewable-electricity-deplo-75023
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