

Phasing-out coal by 2023

Response to the BEIS coal consultation

February 2017

In 2015, the previous Conservative government promised to phase-out unabated coal in the United Kingdom by 2025 at the latest. The new government has recommitted to this promise, and launched a consultation¹ for suggestions on how the phase-out can be ensured.

Sandbag welcomes that BEIS is, as promised, proposing to implement a coal phase-out into law, turning a government promise into legislation.

Sandbag's key three asks of BEIS are:

1. To bring forward the deadline for the coal phaseout to October 2023:

BEIS's impact assessment shows coal is phased out by 2023, so this is not changing expectations, it is just making sure we get the benefits of a cleaner, more reliable, flexible grid without a delay. It would also guarantee investors could build replacement infrastructure by 2023, taking out the risk that they will continue to be crowded out by coal until 2025. And importantly, it gives a 2-year safety blanket in 2024 and 2025, where constrained coal could be available to keep the lights on only if there are delays in the new infrastructure coming online, before all coal is definitively closed by 2025. The response details two proposals that BEIS could use to implement this.

2. To change the capacity market to help transition from coal to clean.

The capacity market is keeping coal alive: payments worth £453m have already been signed for seven coal plants over four years. These payments are already keeping coal from closing now, they risk that all coal will not close in 2023 as BEIS anticipate, and they enable coal to run high loads instead of just contributing to keeping the lights on. To transition from old coal to building one-for-one new large gas plants with a big lifetime carbon lock-in is not acceptable. The capacity market needs changes to better encourage storage and demand response.

3. The carbon price support must be kept in place at least until the last coal plant closes.

The CPS provides a vital role in ensuring coal emissions are constrained; removing it would result in a huge increase in emissions.

Now follows our answers to the consultation questions. We have chosen to comment only on the areas in which we have significant experience.

¹ <https://www.gov.uk/government/consultations/coal-generation-in-great-britain-the-pathway-to-a-low-carbon-future>

Question 1: “Putting closure of unabated coal into effect”

- *Do you have any views and evidence on the options outlined above, including on relative benefits and risks? Are the principles above a sound basis for designing a regulatory approach?*
 - **Sandbag welcome that BEIS is, as promised, proposing to implement a coal phase-out into law, turning a government promise into legislation.** It is essential that this put into law, preferable primary legislation, else the very concept of a coal phase-out becomes meaningless. Both the two options proposed would broadly do that job (in our opinion), but BEIS needs to tighten some potential loopholes. This would need to be implemented into the plant’s environmental permit to ensure compliance.
- *With reference to the Impact Assessment published alongside this consultation, do you have any views and evidence on the impact of these proposals? Are there alternative approaches that meet the objectives of closing unabated coal generation?*
- *Under option 1, do you have any views on the proportion of generation capacity on which CCS demonstration should be mandated?*
- *Do you have any evidence or analysis on the impact of these proposals on the likelihood of generators moving to higher levels of biomass co-firing?*
- *Might there be any unintended consequences for other forms of generation? Are there better alternatives, and if so, why? If so, do you have any evidence to support your suggestions?*
- *Do you have any views or suggestions on the date in 2025 from which the proposed obligations should take effect?*
 - **Sandbag strongly believes the coal phase-out date should be moved forward to 2023, we explain our reasoning in Question 2 below.**
 - **To fit with capacity auctions, this means October 2023. This would mean a large auction in the December 2018 T-4 auction, to replace all coal capacity.**

Question 2: “Constraint in years ahead of 2025 closure”

- *Do you agree with the principle of establishing a constraint on coal generation in the years ahead of 2025?*
 - **Absolutely. The original announcement by the then Secretary of State was to “restrict use from 2023”.**
 - **BEIS should bring forward the deadline for the coal phase-out to October 2023.**
 - BEIS’s modelling itself shows coal is phased out by 2023, so this is not changing expectations, it is just making sure we get the benefits of a cleaner, more reliable, flexible grid without a delay.
 - It would guarantee investors could build replacement infrastructure by 2023, taking out the risk that they will continue to be crowded out by coal until 2025.
 - Importantly, it gives a 2-year safety blanket in 2024 and 2025, where coal could be available to keep the lights on if there are delays in the new infrastructure coming online, before all unabated coal is definitively closed by 2025.
 - **There is significant infrastructure investment needed to replace coal, and forcing all new investment by October 2023 would give certainty to all how the coal would be replaced.**
 - The investment for October 2023 would happen in the T-4 auction in December 2018.
 - That means there would be a large auction in December 2018; large enough to attract significant interest. There is currently 5833MW de-rated that has coal contracts in Oct-2020 to Sep-2021, and some may pull out in the next auction. The auction would be large: replacing 5833MW would result in a £2 billion of contracts over 15 years. However,

5833MW is not huge – in the last T-4 auction, there was 6000MW of excess capacity that bid below £25/KW and didn't get contracts, so there is that much replacement capacity already cheaply available.

- We would suggest changing this for the December 2018 auction, so no coal can bid in T-4 from October-2023. We would prefer this to the December 2017 auction for 3 reasons –
 - It gives another year for battery technology to develop (to fall in price and to store more hours of electricity). Battery is [developing extraordinarily quickly](#), and is arguably the best technology to complement the government's plans for substantial growth in wind.
 - It gives a chance for some coal to pull out of the 2017 T-4 auction so to avoid unnecessarily forcing all infrastructure into one auction.
 - It gives time for developers to prepare bids for a “mega auction” in December 2018.

- *Have you any views on how a constraint might be implemented, including on whether a constraint should be applied uniformly to each plant or across the fleet of generators, and any supporting evidence?*
 - **If we assume we want coal off by October 2023, but it can operate until 2025 if needed for security of supply, we propose two ways to implement this:**
 - **“2023 Phase-out”** - Apply the coal phase-out from 1-October 2023, instead of 2025, and then grant a derogation only if coal needs to run up to 2025.
 - **“No coal in capacity mechanism from 2023”** – keep the phase-out as 2025, but take coal out of the T-4 capacity auction from 1 October 2023.

Whilst both the proposals achieve the same aim, we prefer Proposal #1 because it is simpler, is likely to gather more international acclaim, and does not involve changes to the capacity market.

- **Proposal #1: “2023 Phase-out”**

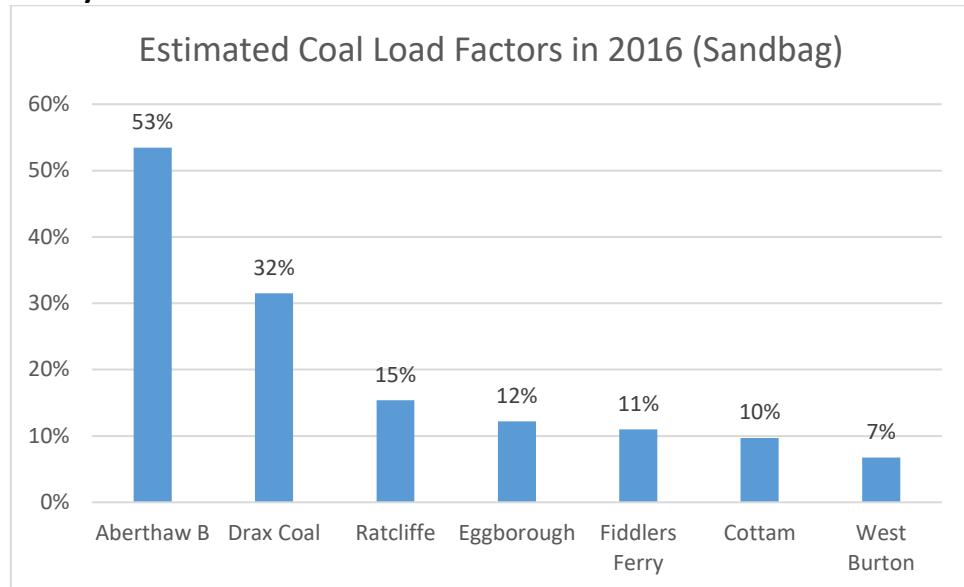
Apply the coal phase-out from 1-October 2023, instead of 2025, and then grant a derogation if coal needs to run up to 2025. The derogation could be given to run, if the coal plant was successful in getting a 1-year contract in the auctions for from October-2023 and October-2024. Since all coal replacement capacity should have been procured in the T-4 auction, coal will only succeed in getting a 1-year contract if it is genuinely needed to keep the lights on. This proposal does not require a change to the capacity mechanism. This derogation should come with a severe limit on running hours (500 hours, as used in Germany peak-load derogation), so it is available only in the peak hours needed to keep the lights on.

- **Proposal #2: “No coal in capacity mechanism from 2023”**

Keep the phase-out as 2025, but take coal out of the T-4 capacity auction from 1 October 2023. Currently, all capacity to meet UK electricity demand is contracted four years in advance in the so-called T-4 auction, so preventing coal from bidding in the T-4 would trigger new infrastructure to replace coal. Coal would still be able to bid into the T-1 auction, if any of the new infrastructure had delays in commissioning. As in proposal #1, if coal plant does run with a T-1 contract, it should be constrained to 500 hours per year. The changes to the capacity mechanism are small, and are consistent with the European Commission “Winter Package” plans to forbid coal getting capacity payments, so this change should not, in our opinion, trigger a resubmission to the EC.

- *We would welcome views and supporting evidence on the level of constraint and time from which might it apply, including the impact on Capacity Market commitments.*

- In 2016, we estimate the operational coal plants ran at an average 19% load factor (see chart). Any constraint by the time we are in the 2020's, should therefore look to constrain generation way below this level.



- *Have you any views on the extent to which a constraint might affect coal plants' ability to participate in the Capacity Market?*
 - There is a real risk that BEIS modelling proves wrong, and that capacity market payments pay coal to stay open until 2025. This would delay all replacement capacity to be built in 2025, creating a real risk to grid security if there were delays in commissioning replacement capacity. That is why it is so essential that coal capacity payments are stopped – unless they are accompanied by a limit on running hours. Here we give evidence on this:

So far, seven coal plants have been paid £453m in capacity payments across just 4 years. It is perhaps, therefore, no surprise that coal plants would be in a hurry to close.

		Coal capacity payments £m				
Plant	Owner	2017/18	2018/19	2019/20	2020/21	TOTAL
Drax	Drax	£8	£24	£22	£25	£78
Ratcliffe	Uniper	£6	£35	£32	£41	£114
West Burton	EDF	£12	£26	£0	£29	£67
Cottam	EDF	£12	£34	£0	£0	£46
Aberthaw	RWE	£10	£29	£27	£33	£99
Fiddlers ferry	SSE	£9	£26	£0	£0	£35
Eggborough	EPH	£13	£0	£0	£0	£13
TOTAL COAL		£70	£173	£81	£128	£453

Coal plants can make a profit even with low capacity market prices, as we saw on Friday 3rd February, where coal was contracted at £6.95/kW. Cornwall Energy estimate fixed costs of UK coal plants at £23-26/KW (see graph). But coal plants already get significant revenues from the wholesale market, ancillary service contracts, and balancing actions by National Grid, so they need far less than £23-26/KW in CM revenues to break even.



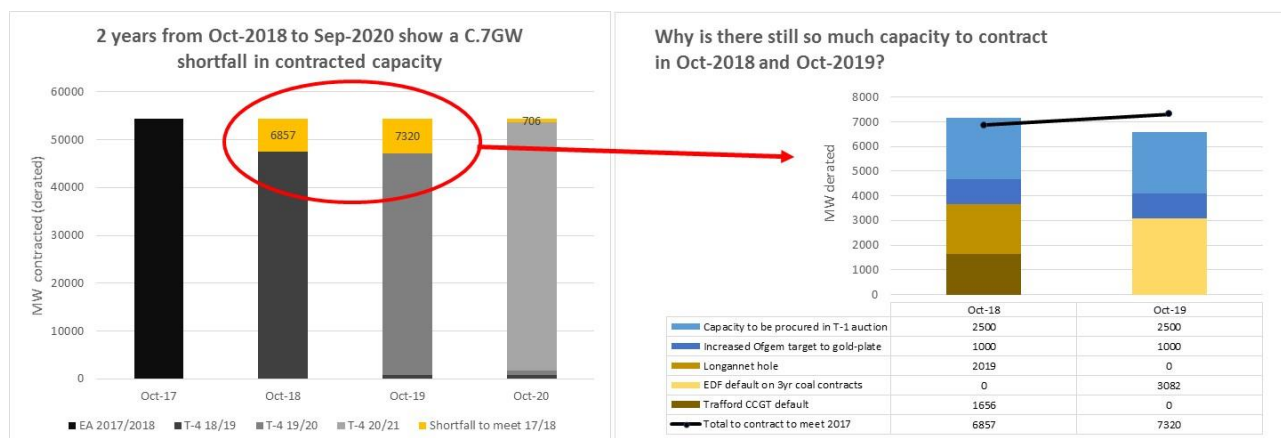
Coal is finding it easy to undercut new gas. With the price of a new CCGT often quote at £30-£35/KW, it is no surprise that no new large CCGT's have yet to be contracted.

The capacity mechanism falsely makes a 1-year coal extension look cheaper than a 15-year contract for replacement capacity.

- First, the CM doesn't account for reliability and flexibility. Replacement capacity for coal will be new, and therefore will be far more reliable and flexible than existing coal plants. Reliability for coal is a major problem – the last time there was a system emergency, in 2015, it was predominately caused by coal outages, when 35% of the coal fleet was offline². Flexibility is also increasingly a problem, with some units requiring warming 12 hours in advance of coming online.
- Second, coal keeps the CM price high year-after-year. If all coal was replaced in the next auction, the auction prices in subsequent years should be very low, pricing only to keep gas, which is cheaper to operate. We showed this in the modelling we did for IPPR's "Scuttling Coal" report.

Eggborough's close date has already been postponed by 2½ years, but could easily be postponed to 2020. There is still lots of capacity that needs to be contracted in 2018 and 2019 – as explained in the two charts below. Eggborough and Fiddler's Ferry were both announced to close in March 2016. But both are still open, and have capacity contracts to September 2018 and September 2019 respectively. Given the capacity yet to be procured in 2018 and 2019, it is more than possible they get 1-year contracts to extend until September 2020. That would be 4½ years past when they were expected to close. This shows the very real risk that capacity payments will keep coal open for longer than anyone imagined.

² See <https://sandbag.org.uk/2015/11/05/coal-is-too-old-to-be-useful/>



There are still 4 large coal plants contracted until September 2021 (see below). For how many years will these plants block new infrastructure investment? Could these be postponed until 2025?

		Coal Contracted (all 1-yr contracts, MW)				Coal Without contracts (MW)... so far...			
Plant	Owner	2017/18	2018/19	2019/20	2020/21	2017/18	2018/19	2019/20	2020/21
Drax	Drax	1114	1220	1220	1114	610	610	610	610
Ratcliffe	Uniper	911	1805	1805	1807	894	0	0	0
West Burton	EDF	1738	1322	0	1303	0	441	1763	441
Cottam	EDF	1760	1760	0	0	0	0	1760	1760
Aberthaw	RWE	1486	1486	1486	1475	0	0	0	0
Fiddlers ferry	SSE	1312	1325	0	0	425	425	1750	1750
Eggborough	EPH	1820	0	0	0	0	1840	1840	1840
TOTAL COAL		10141	8918	4511	5699	1929	3316	7723	6401

This closure of large amounts of coal in 2025 would force all replacement capacity to be built in 2025, creating a real risk to grid security if there were delays in commissioning replacement capacity, and risk undermining the entire coal phase-out. Commissioning new capacity is notoriously unpredictable. For example, the only big CCGT so far to get a 15-year capacity contract is no longer being built (at Trafford), creating a shortfall in the capacity market.

- *Are there alternative ways of delivering the objective of phasing out coal generation by 2025 without negative impacts on the security of supply?*
 - **It is essential that the carbon price support is kept in place until at least the last coal plant is closed** The Carbon Price Support is keeping coal generation low, and the removal of Carbon Price Support would not only make coal profitable and keep it open, it would make coal cheaper than gas, resulting in significantly higher emissions. The CPS is essential to keeping coal generation low, and creating a gradual transition away from coal plants. **If the CPS is removed, an alternative strict constraint needs to be immediately introduced.** Sandbag's [report](#): "Why does the Carbon Price Support matter?", gives more detail on the CPS impact on coal, and other benefits including raising around £1.5 billion for HM Treasury in 2016.
 - **The capacity market must be changed to help transition from coal to clean.**
 - **The capacity market is keeping coal alive.** Payments worth £453m have already been signed for seven coal plants over four years. These payments are already keeping coal from closing now, they risk that all coal will not close in 2023 as BEIS anticipate, and they enable coal to run high loads instead of just contributing to keeping the lights on. Evidence above is given for this. One option is to only permit

coal capacity contracts if there was constraint on running hours – perhaps 500 hours, as proposed above, to be consistent with German peak load derogation.

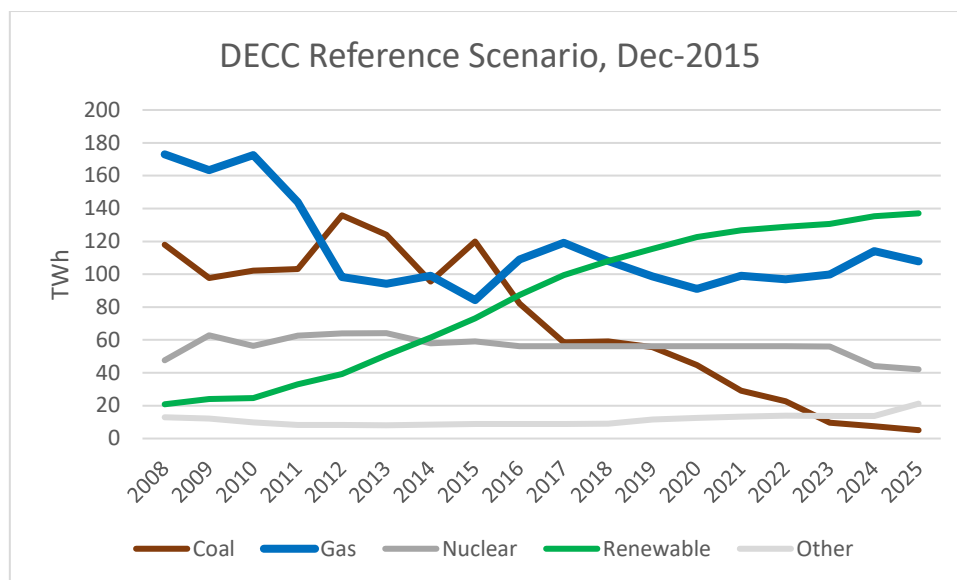
- **However, the CM changes are not just about taking out coal.** To transition from old coal to building one-for-one new large gas plants with a big lifetime carbon lock-in is not acceptable.
- **The capacity market needs changes to better encourage storage and demand response.** The capacity market was designed for new large centralised power plants with a 4-year build time. Storage and demand response, by comparison, are as small as 1KW, embedded, and with short deployment times. For example, 3 of the largest lithium battery projects have just commissioned in California with a build-time of just 6 months. Also, putting a clearer value on the flexibility and reliability would more fairly value storage and demand response.

Question 3: “Ensuring security of supply”

- *We would welcome comment on our proposals. What are the positive and negative aspects of the Secretary of State retaining powers to be able to temporarily suspend the closure date or constraint in previous years if he believes this is justified?*
 - **If coal replacement capacity was planned to be in place by October 2023 – then there would be a 2-year safety blanket to a total 2025 phase-out, and this would be sufficient to ensure security of supply, and these measures are not required.**
- *If such a measure were introduced how might it be best designed to minimise the impact on the investment climate for new capacity?*
- *Does the assessment of future build rates summarised above and in the Impact Assessment published alongside this consultation represent a reasonable benchmark against which the closure of coal can be assessed?*
- *With reference to the analysis set out in the Impact Assessment, what additional factors and evidence might we need to take account of to measure the impact on investment in replacement capacity?*

Question 4: “Wider Impacts of Coal Closure”

- *We would welcome views and supporting evidence on the wider impacts of regulating the closure of unabated coal by 2025, particularly where these are additional to what might be expected without this measure.*
 - **The move away from coal should not lead to an increased reliance on gas. The coal phase-out increases, rather than reduces, the need for more energy efficiency, new renewables and new nuclear.** BEIS’s own annual “Emissions and Projections” document shows that as coal generation phases to zero, it is replaced with renewable generation, and that gas generation stays constant – see graph below. BEIS’s aim should be to contract sufficient renewables capacity to phase-out coal, whilst leaving gas generation at 2015 levels. Since the CCC say that unabated gas needs to be phased out by the mid-2030’s, funding new gas end up being costly for the electricity customer.



- **There should be no compensation for coal plants to close.** This would be a bad international precedent to set, and would encourage coal plants outside the UK to stay open, hoping for money.
- **Getting the right replacement for coal: no diesel (dirty air), no big CCGT (30-year carbon lock-in), no biomass (questionable CO2 impact).** This will mean a substantial reliance on batteries and demand side response.
- **More needs to be done to encourage these technologies, as the capacity mechanism was designed for big centralised generators, and needs more adapting to encourage batteries and demand side response.** The construction time for new batteries are extraordinarily short – 3 of the world’s largest grid battery plants have just been built in California in just six months³. Currently it’s only possible to get a new-build contract in the capacity auction four years in advance.

³ <https://www.bloomberg.com/news/articles/2017-01-30/tesla-s-battery-revolution-just-reached-critical-mass>

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About Sandbag

Sandbag is a London and Brussels-based not-for-profit think tank conducting research and campaigning for cost-effective climate policies.

Our research focus includes reforming the EU Emissions Trading System and the Effort Sharing Regulation; accelerating the phase-out of old coal in Europe; and deep decarbonisation of industry through technologies including Carbon Capture & Storage.

For more information, visit sandbag.org.uk or email us at info@sandbag.org.uk