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## UK COAL PHASE OUT THE INTERNATIONAL CONTEXT

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### Summary

- > The **UK** was the first country to commit to a coal phase out, and has now set out policy proposals to deliver on this by 2025.
- > Six of the G7 countries have ceased the development of new coal power plants and are advancing the retirement of existing coal generation, albeit at different speeds. Only Japan is currently seeking to build new coal power plants.
- > Following coal phase out actions by the Provinces of Ontario and Alberta, **Canada** is ideally placed to implement a national coal phase out approach.
- > Over 109GW of coal power plant capacity has already been scheduled for retirement in the **USA**. Coal power plant closures to date have been driven by market forces and pollution control standards impacting on an ageing and uneconomic coal power plant fleet.
- > **France** and **Italy** have both recognised the need for action, but have yet to introduce national policies. The coal phase out debate is similarly gathering pace in **Germany**, where a more substantial policy will be required to supplement the existing retirement programme for the oldest lignite power plants.
- > An increasing number of OECD countries could complete a coal phase out over the next few years. **Belgium** became coal free in 2016. **Austria, Ireland, Israel, New Zealand, Portugal** and **Sweden** all have just one or two coal power plants left in operation. **Finland** has announced it will end coal use by 2030, as has **Denmark**. The **Netherlands** and **Spain** are shutting some older coal power plants, but are yet to set out a comprehensive retirement plan.
- > The need for action on coal is increasingly being recognised internationally. In **Australia**, unions and civil society groups are calling for a Just Transition for workers and a framework for the closure of coal power plants.
- > The UK's commitment to a coal phase out provides a proactive approach that other governments can seek to emulate as a means of providing a managed transition. Governments will need to ensure that energy security is maintained and affected workers and regions are supported as these structural shifts accelerate. By working together, governments can share best practice and insights into the transition from coal to clean energy.



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## The UK Coal Phase Out Commitment

In November 2015, the UK government announced<sup>1</sup> a commitment to phase out the use of unabated<sup>2</sup> coal by 2025. This was the first such commitment by a national government. The Secretary of State for Energy and Climate Change Amber Rudd set out the nature of this shift, stating:

*“It cannot be satisfactory for an advanced economy like the UK to be relying on polluting, carbon intensive 50-year-old coal-fired power stations. Let me be clear: this is not the future. We need to build a new energy infrastructure, fit for the 21st century.”<sup>3</sup>*

The UK commitment had strong international significance ahead of the Paris climate change negotiations, particularly in light of the UK’s history as a cradle of the industrial revolution. Now, almost one year on, the UK has reconfirmed its commitment to phase out unabated coal, and has published policy proposals for how this objective will be delivered.<sup>4</sup> This recommitment follows a momentous past year, in which coal use has fallen to historic lows;<sup>5</sup> the UK has seen three major coal plants close;<sup>6</sup> the first coal-free periods of electricity generation since the Victorian era;<sup>7</sup> and greater electricity generation for solar than from coal across the summer months.<sup>8</sup>

While the UK was the first country to announce a time-limited coal phase out objective, it is far from alone in facing the challenge of ending the use of coal and increasing investment into clean energy sources. A structural shift away from coal is already underway across the majority of OECD members and this is set to accelerate. National and regional governments are looking to develop phase out policies as a means of providing a managed transition that ensures energy security and a positive pathway for workers and communities.

This briefing paper firstly considers the situation among the UK’s peers in the G7. It then provides an overview of prospects for coal phase out in other OECD member countries. It draws on E3G’s analysis of G7 countries and coal phase out dynamics.<sup>9</sup>

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<sup>1</sup> <https://www.gov.uk/government/news/government-announces-plans-to-close-coal-power-stations-by-2025>, <https://www.gov.uk/government/speeches/amber-rudds-speech-on-a-new-direction-for-uk-energy-policy>

<sup>2</sup> ‘Unabated’ coal refers to coal-fired electricity generation without the application of carbon capture and storage technology to directly ‘abate’ (reduce) CO<sub>2</sub> emissions. The UK has had a policy of ‘no new unabated coal’ since 2009, meaning that CCS would be required on any new coal plant to be developed in the UK. The commitment to phase out the use of unabated coal therefore represents an extension of this approach to also cover existing coal power plants. This is similar to the policy framework in Canada, supplemented by the incorporation of a fixed end date for final closure of all coal power plants.

<sup>3</sup> <https://www.gov.uk/government/news/government-announces-plans-to-close-coal-power-stations-by-2025>

<sup>4</sup> <https://www.gov.uk/government/consultations/coal-generation-in-great-britain-the-pathway-to-a-low-carbon-future>

Note: The original intention had been for policy measures to be set out for consultation in spring 2016. This was delayed due to the EU referendum and subsequent changes to UK political leadership and the machinery of government.

<sup>5</sup> See <http://www.carbonbrief.org/uk-coal-use-to-fall-to-lowest-level-since-industrial-revolution>

<sup>6</sup> See <https://www.carbonbrief.org/countdown-to-2025-tracking-the-uk-coal-phase-out>

<sup>7</sup> See <https://www.theguardian.com/environment/2016/may/13/uk-energy-from-coal-hits-zero-for-first-time-in-over-100-years>

<sup>8</sup> See <https://www.carbonbrief.org/analysis-uk-solar-beats-coal-over-half-year>

<sup>9</sup> For more of E3G’s analysis of coal phase out see: <https://www.e3g.org/showcase/coal-phase-out>



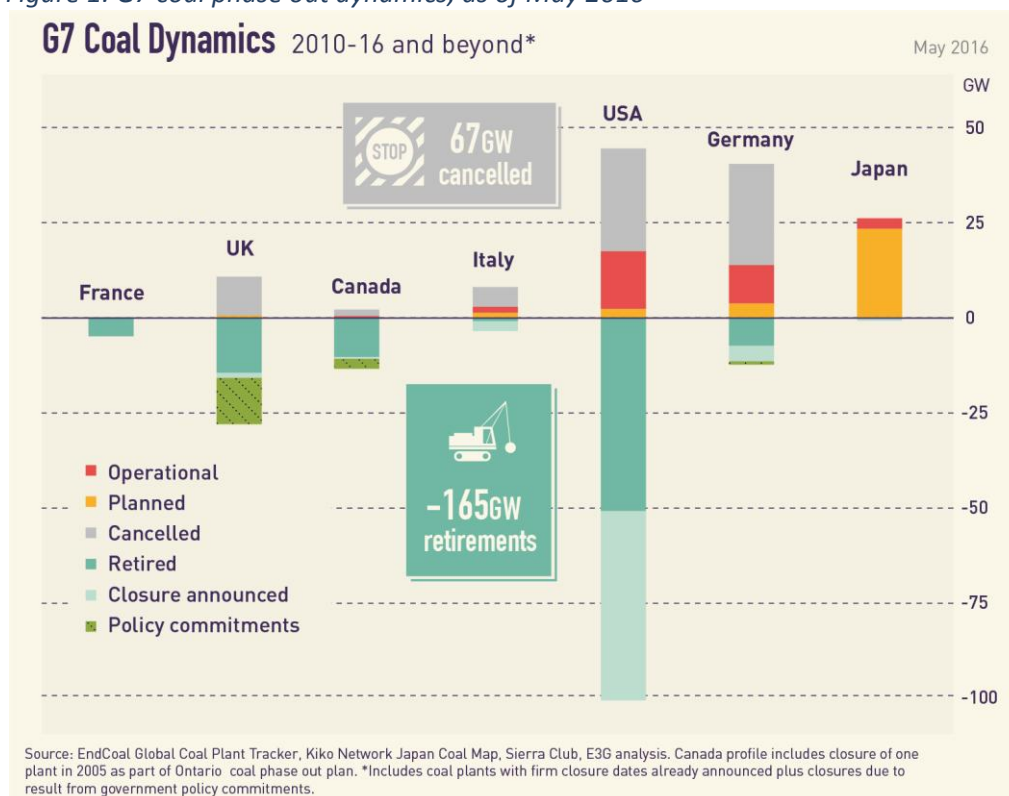
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## G7 dynamics

Figure 1 below provides a snapshot of G7 coal dynamics since 2010. There are two dominant trends, both of which are firmly in favour of coal phase out transitions:

- > During the past 6 years, over 67GW of proposed new coal power plant capacity has been cancelled. There are now no new coal power plant projects entering construction in six of the G7 countries: only Japan is seeking to build new coal. A few legacy plants in Germany have recently entered operation at significant financial loss, meaning that these mistakes will not be repeated by utilities. This means that coal power plants are not being replaced on a like-for-like basis when they retire.
- > Over the same period, over 165GW of existing coal power plant capacity has completed or begun the retirement process. Figure 1 details power plant retirements that have already been completed, together with any announcements of firm closure dates, typically as part of a regulatory agreement. The UK's coal phase out objective is incorporated into the 'Policy commitments' category alongside similar measures already undertaken in Canada and Germany.

Figure 1: G7 coal phase out dynamics, as of May 2016



The UK is currently unique among the G7 in that its coal phase out policy would encompass all remaining coal power plants currently in operation. The completion of the phase out by 2025 would see a total of 25GW of coal power plant capacity close over the 15 years from 2010. There is a strong structural rationale for this: the UK's remaining power plants are ripe for retirement as most of them originally entered



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operation in the late 1960s and early 1970s. Indeed, 12GW of ageing power plants have already closed since 2010 in the face of higher pollution control standards.

Currently, just over 13GW of coal power plant capacity remains in the UK. The youngest coal power plant in operation was commissioned in 1986, and will therefore complete 40 years of service in 2025. The completion of the UK coal phase out therefore represents the continuation of a multi-decade trend away from coal. New electricity generation capacity was firstly added via investments in gas-fired power plants, and then in renewables. In recent years the UK left open the possibility of new investment in coal in association with carbon capture and storage (CCS) technology, but no CCS plants have been built.<sup>10 11</sup>

While the UK's coal phase out policy has signalled a firm end date for coal power generation, moves in this direction are already present in other G7 members. We now briefly consider them in turn.

**Canada** has had a federal Greenhouse Gas Performance Standard for coal-fired electricity units since 2012. This regulation limits the life of existing coal power plants to 50 years, but allows units to continue operating beyond that point should they meet or exceed an emissions standard of 420 tonnes of CO<sub>2</sub>e per GWh. To achieve this standard, unit can be retrofit with CCS. Current timelines would see most plants close around 2030, however its 50 year end-of-life schedule allows for ten units to operate well past 2030 — some as late as 2061.

More recently, the Province of **Ontario** has already completed a full coal phase out (of 9GW of capacity) in 2014. Ontario was thereby the first regional government to set and complete an explicit coal phase out approach, which in its case was motivated by air pollution impacts. Additionally, and similarly to the UK, the Province of **Alberta** announced in November 2015 that it will phase out emissions from coal-fired power plants by 2030. As home to half of Canada's remaining coal plants this was a significant step forward. Expectations are therefore growing that the Trudeau administration will strengthen Canada's existing federal regulation to require a 40 year end-of-life for existing units or a 2030 deadline, whichever comes first for individual units. This would provide a nearer-term timeline for the reduction of CO<sub>2</sub> from Canada's remaining 10GW of coal power capacity.<sup>12</sup>

Following the recent closure of 4GW of capacity, **France** now has just five coal-fired units at four power plant locations, totalling close to 3GW of capacity. France had been intending to introduce a carbon tax measure in its 2017 budget that would have

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<sup>10</sup> Two successive CCS competition processes were undertaken by UK government, but both suffered from poor administration and the withdrawal of funding support by UK Treasury. Prior to its cancellation in late 2015, the most likely outcome of the second competition process was that an existing gas power plant would have been fitted with CCS, rather than the alternative of a new dedicated coal-fired CCS power plant being built. In the context of a coal phase out commitment and substantial existing gas plant capacity, any future CCS programme in the UK is likely to be focused on industrial CO<sub>2</sub> emissions and gas power generation rather than coal.

<sup>11</sup> For more detail on UK see: [https://www.e3g.org/docs/UK\\_G7\\_Analysis\\_October\\_2015\\_Final.pdf](https://www.e3g.org/docs/UK_G7_Analysis_October_2015_Final.pdf)

<sup>12</sup> For more detail on Canada see: [https://www.e3g.org/docs/Canada\\_G7\\_Analysis\\_September\\_2015\\_final.pdf](https://www.e3g.org/docs/Canada_G7_Analysis_September_2015_final.pdf)



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secured the closure of these coal power plants by around 2023. However this measure has been postponed ahead of the 2017 Presidential election and efforts to secure improved carbon pricing at European level.<sup>13</sup>

In **Italy**, the major utility company Enel has committed to a transition out of coal and towards carbon neutrality. This will impact on 75% of Italy's remaining coal plants, which in total are close to 9GW of capacity. Enel has recognized that its most recent coal plants must close by ~2030. Italian stakeholders are pushing for a national coal policy, in follow up to PM Renzi's recognition that 'coal is the enemy'. Alongside Canada, France and the UK, Italy has a great opportunity to implement a structured transition approach to drive investment in renewables while progressively retiring coal power plants.<sup>14</sup>

In **Germany**, the debate on coal phase out is a contentious political issue. A strategic reserve has been introduced to provide a closure pathway for the oldest lignite plants. There is also increasing recognition from utilities, unions and civil society groups that a coal phase out is required – but as yet no clear timetable has been proposed by policy makers amid opposition from some regional governments and mining interest groups. A national Commission is under consideration to provide advice to the federal government, but has not yet been formally created. With 49GW of coal power plants currently in operation, the coal phase out challenge for Germany is obviously far more stretching than for many other countries. Nevertheless, Germany is committed to climate action at both International and EU levels. This necessitates an accelerated coal phase out over the next decade, and will require efforts at both federal and regional levels to secure a just transition for mining communities.<sup>15</sup>

The coal retirement dynamic has continued to accelerate in the **USA** over recent years. Over 109GW of plants already have a retirement date, with more than 85GW of plants scheduled for retirement before 2020, larger than the combined size of the coal fleets of UK and Germany. The USA is home to 60% of OECD coal capacity, so this rapid dynamic provides a benchmark for efforts in other leading economies. Coal power plant closures to date have been driven by market forces and pollution control standards impacting on an ageing and uneconomic coal power plant fleet. The Clean Power Plan was designed by the Obama administration to supplement this by providing a pathway toward emissions reductions for each of the states, but has not yet been fully implemented. As in the UK, however, the ageing coal power plant fleet in the USA is increasingly uneconomic to operate or upgrade in the face of competition from gas and renewables.<sup>16</sup>

Lastly among the G7, the initial challenge for **Japan** will be for it to pivot away from its plans to add new unabated coal generation capacity. Despite Japan's strong technology leadership in renewables, the incumbent utilities are seeking to entrench

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<sup>13</sup> For more detail on France see: [https://www.e3g.org/docs/France\\_G7\\_Analysis\\_September\\_2015.pdf](https://www.e3g.org/docs/France_G7_Analysis_September_2015.pdf)

<sup>14</sup> For more detail on Italy see: [https://www.e3g.org/docs/Italy\\_G7\\_analysis\\_September\\_2015.pdf](https://www.e3g.org/docs/Italy_G7_analysis_September_2015.pdf)

<sup>15</sup> For more detail on Germany see: [https://www.e3g.org/docs/Italy\\_G7\\_analysis\\_September\\_2015.pdf](https://www.e3g.org/docs/Italy_G7_analysis_September_2015.pdf)

<sup>16</sup> For more detail on USA see: [https://www.e3g.org/docs/USA\\_G7\\_Analysis\\_September\\_2015.pdf](https://www.e3g.org/docs/USA_G7_Analysis_September_2015.pdf)



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their market dominance ahead of market liberalisation by investing in coal. This is being done without any substantial consideration of the application of CCS technology to new coal plants, increasing the likelihood that they will become stranded assets. Any investments in new coal power plants in the coming years will make the subsequent phase out of coal generation more difficult and expensive than it need be.<sup>17</sup>

Looking across the G7, both Canada and Germany have existing policies that could be extended to respectively complete or advance their domestic coal phase outs. France and Italy similarly are beginning to consider policy options that can complement actions that are already being taken by their leading utility companies. In the USA, market dynamics and pollution regulations have set in motion the most rapid and substantial retirement of coal power plants of all the G7. Only Japan is an outlier at present given its counterproductive investment in new coal.<sup>18</sup>

## OECD Coal Phase Out Overview

Before turning to the prospects for coal phase out in other OECD countries it is important to highlight that **Belgium** has already completed a coal phase out in early 2016. This was not an announced government policy objective, but resulted from the progressive closure of ageing power plants over successive cycles of EU pollution control regulations.

Table 1 below provides brief details of the situation in OECD countries beyond the G7. The majority these countries have strong potential to complete a domestic coal phase out significantly before 2030.

*Table 1: OECD Coal Phase Out Overview*

Country	Coal Capacity	Status	Notes
<b>Austria</b>	<1GW	<b>Positive</b>	Last 2 coal power plants have already announced closure dates of 2020 & 2025. Could be brought forward.
<b>Australia</b>	~27GW	<b>Challenging</b>	Closure of Hazelwood power plant scheduled for March 2017. Unions and Civil Society groups calling for Just Transition for workers and policy framework for coal plant retirements. Government strongly in favour of continuing reliance on coal.
<b>Chile</b>	~5GW	<b>Contested</b>	Increasing civil society campaigning against coal.
<b>Czech Republic</b>	~9GW	<b>Contested</b>	Significant pollution control challenges for ageing power plants. Lignite region transition needs becoming recognised.

<sup>17</sup> For more detail on Japan see: [https://www.e3g.org/docs/Japan\\_G7\\_Analysis\\_September\\_2015.pdf](https://www.e3g.org/docs/Japan_G7_Analysis_September_2015.pdf)

<sup>18</sup> For more detail on the G7 see: [https://www.e3g.org/docs/G7\\_Scorecard\\_update\\_May\\_2016.pdf](https://www.e3g.org/docs/G7_Scorecard_update_May_2016.pdf)



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Denmark	<3GW	Contested	Has previously committed to being fossil free by 2050 and ending coal use by 2030. Needs a policy framework and solutions for heat demand.
Finland	~2GW	Positive	Government has committed to phase out by 2030 and is expected to bring forward policies shortly. <sup>19</sup>
Greece	<5GW	Challenging	Has ageing power plants that should shut under EU pollution control regulation, but looking to invest in new lignite power plants.
Hungary	~1GW	Contested	Has a relatively small amount of coal power plant capacity. Could be an early mover in Eastern Europe.
Ireland	<1GW	Contested	The last remaining coal power plant at Moneypoint is responsible for ~6% of national CO2 emissions. (Also: Kilroot power plant in Northern Ireland on all-Ireland electricity grid and not subject to UK phase out policy framework.)
Israel	<5GW	Positive	Has recently moved to close the ageing and polluting Hadera power plant rather than upgrade it to meet air pollution standards.
Netherlands	<6GW	Contested	Has started to accelerate closure of older coal power plants, but three new ones recently entered operation. Increasing political discussion of coal phase out in light of Urgenda court case requiring increased climate protection efforts by 2020.
New Zealand	<1GW	Positive	New Zealand's last coal-fired units will close after contracts end in 2017.
Poland	~28GW	Challenging	Ageing coal power plants facing big challenge of meeting air pollution requirements. A handful of new plants under construction. Polish mining sector facing significant economic pressures. Government backing coal but market forces shifting. EU 2030 climate goals and energy market framework may help accelerate transition.
Portugal	<2GW	Contested	Has 2 coal power plants left,

<sup>19</sup> See <http://www.reuters.com/article/us-finland-energy-coal-idUSKBN12X26Y>





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			responsible for 16% of GHGs. Permits end in 2017 / 2021. Needs to decide on retrofit or closure. Utility looking at closure options. Government modelling assumes no coal before 2030 but hasn't fixed a firm closure date as yet.
<b>Slovakia</b>	~1GW	<b>Contested</b>	Has a relatively small amount of coal power plant capacity. Could be an early mover in Eastern Europe.
<b>South Korea</b>	~30GW	<b>Challenging</b>	Has seen significant recent increases in new coal plant capacity. Has begun to move to require the retirement of older plants and slow the growth in new additions.
<b>Spain</b>	<12GW	<b>Contested</b>	Has massive overcapacity and could retire coal plants without impacting energy security. Many old coal plants should retire under Industrial Emissions Directive. State support for domestic coal production, but mines are due to close by 2018. Iberdrola utility has already announced closure plans. Similar moves expected from Endesa in near future.
<b>Sweden</b>	<0.5GW	<b>Positive</b>	Has a fossil free commitment.
<b>Turkey</b>	~16GW	<b>Challenging</b>	Has over 70GW of new coal capacity in the development pipeline, the third largest new coal risk globally.

Political positions vary across the OECD in respect to the level of support for coal, but there are clear structural shifts gaining pace. The costs of renewables have significantly decreased in recent years, opening up new opportunities for smart, clean electricity generation. At the same time, ageing coal plants are increasingly heading towards retirement given the age structure of past investments.

It is in the interests of governments to provide a policy framework for this inevitable closure pathway. Coal phase out policies can help provide a more orderly transition that attends to the needs of workers and regions while ensuring energy security is maintained.





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## About E3G

E3G is an independent, non-profit European organisation operating in the public interest to accelerate the global transition to sustainable development. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere. [www.e3g.org](http://www.e3g.org)

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