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# Public export credits and coal: what options to mitigate climate change?

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## Summary: What is the best climate mitigation option?

In this briefing, WWF explores seven specific options on the issue of OECD Export Credit Agencies (ECAs) and coal power plants, with the aim to mitigate climate change.

The seven options are summarized in the two tables below, with the likely climate mitigation impact and the WWF recommendation.

Type of technology	Emissions at combustion (g Co <sub>2</sub> /kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 1: Less favourable support for subcritical coal plants	Option 2: More favourable support for USC coal plants	Option 3: More favourable support for USC coal plants, less for SC	Option 4: ECA incentive for energy solutions aligned with their carbon intensity
Renewable energies	0	18 years	18 years	18 years	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years	15 years	15 years	15 years
Carbon Capture and Storage (CCS)	45-180	18 years	18 years	18 years	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	12 years	12 years	12 years	12 years
Fossil fuel power plants (oil)	550	12 years	12 years	12 years	12 years	10 years
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	12 years	15 years	15 years	8 years
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	12 years	12 years	8-10 years	5 years
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	Banned or 1-2 years	12 years	8-10 years	Banned or 1 year
Likely climate mitigation impact			No impact	Counter-productive	Counter-productive	Insufficient
WWF recommendation			Discard	Reject	Reject	Strengthen

(1) See Annex

USC: Ultrasupercritical

SC: Supercritical

Type of technology	Option 5: Very high EPS of 750 g CO2/kWh	Option 6: High EPS of 500 g CO2/kWh	Option 7: Low EPS of 200 g CO2/kWh
Renewable energies	18 years	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	15 years	15 years	15 years
Carbon Capture and Storage (CCS)	18 years	18 years	18 years
Fossil fuel power plants (gas)	12 years	12 years	<i>Ruled out</i>
Fossil fuel power plants (oil)	12 years	<i>Ruled out</i>	<i>Ruled out</i>
Ultrasupercritical coal plants (> 40% energy efficiency)	12 years	<i>Ruled out</i>	<i>Ruled out</i>
Supercritical coal plants (35-40% energy efficiency)	<i>Ruled out</i>	<i>Ruled out</i>	<i>Ruled out</i>
Subcritical coal plants (< 35% energy efficiency)	<i>Ruled out</i>	<i>Ruled out</i>	<i>Ruled out</i>
<b>Likely climate mitigation impact</b>	<b>Insufficient</b>	<b>Positive</b>	<b>Very positive</b>
<b>WWF recommendation</b>	<b>Strengthen</b>	<b>Support</b>	<b>Support</b>

EPS: Emission Performance Standard

### The analysis of the seven options finds that:

- Providing more generous support for some types of coal plant technologies (Options 2 and 3) would risk having counterproductive effects for climate mitigation and must be rejected;
- Aligning ECA incentives for energy solutions with their carbon intensity (Option 4, as already started by the OECD in the Annex IV of the OECD Arrangement) would be interesting but likely insufficient to comply with the +2°C agreed international climate limit for global warming (more precisely the IEA 450 Scenario). This option should therefore be strengthened;
- Options introducing an Emission Performance Standard (Options 5, 6, 7) would very likely be the most effective;
- In order to strengthen them, it would be possible to combine two options that are interesting but likely insufficient alone: a very high EPS (Option 5) with the alignment of ECA incentives for all energy solutions (Option 4).

### As a result, WWF recommends:

- Option 7;
- Option 6;
- Options 4 and 5 combined.

## Reminder. The existing ECA repayment terms for energy technology exports

Type of technology	Emissions at combustion (g Co2/kWh) (1)	Existing situation: maximum repayment term for ECA support	Source
Renewable energies	0	18 years (the most favourable)	Annex IV of OECD Arrangement: Art 4 + Appendix I
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	Annex IV of OECD Arrangement: Art 4 + Appendix II
Carbon Capture and Storage (CCS) assuming a 75%-95% efficiency	45-180	18 years (the most favourable)	Annex IV of OECD Arrangement: Art 4 + Appendix II
Fossil fuel power plants (gas)	350	12 years	Art 13 OECD Arrangement
Fossil fuel power plants (oil)	550	12 years	Art 13 OECD Arrangement
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	Art 13 OECD Arrangement
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	Art 13 OECD Arrangement
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	Art 13 OECD Arrangement

(1) See Annex

Today, according to the OECD Arrangement, all types of fossil fuel fired power plants<sup>1</sup> benefit from a 12 year repayment term.

**The 12 year repayment term for fossil fuel fired power plants is already more favourable than the general conditions of the OECD Arrangement, which are 5 years for high income OECD countries and 10 years for all other countries (Article 12)<sup>2</sup>.**

The Annex IV of the OECD Arrangement<sup>3</sup> is providing more generous repayment terms to encourage projects “significantly contributing to climate change mitigation”<sup>4</sup>:

- Renewable energies and Carbon Capture and Storage (CCS) have already been granted a 18 year repayment term (the most favourable one allowed by the OECD Arrangement);
- Waste to energy, hybrid power plants, combined Heat and Power (CHP), district heating and/or cooling benefit a 15 year repayment term.

**It should be noted that hybrid power plants with a mix of coal and biomass, coal-fired CHP plants and coal-fired district heating and/or cooling do therefore currently benefit very generous and attractive repayment terms.**

<sup>1</sup> ‘Non nuclear power plants’ in Article 13

<sup>2</sup> Article 11 defines the two categories of countries

<sup>3</sup> Annex IV: Sector understanding on export credits for renewable energy, climate change mitigation and water projects

<sup>4</sup> Annex IV, introduction

## Option 1. Less favourable support for subcritical coal plants, no other change

With this option, the OECD ECA support for subcritical coal plants is banned or reduced, with no other change.

Type of technology	Emissions at combustion (g Co2/kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 1: maximum repayment term for ECA support
Renewable energies	0	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years
Carbon Capture and Storage (CCS)	45-180	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	12 years
Fossil fuel power plants (oil)	550	12 years	12 years
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	12 years
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	12 years
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	<i>Banned or 1-2 years</i>

(1) See Annex

### What would be the climate mitigation impact of this option?

Today, coal plant manufacturers from OECD countries build supercritical and ultra-supercritical coal plants; they do not build subcritical coal plants anymore. This was confirmed by Alstom in a meeting in October 2014 with Les Amis de la Terre.

In addition, many public and private financial institutions would not agree to support a subcritical coal plant. For example, in its Coal-fired Power Generation policy from September 2011<sup>5</sup>, BNP-Paribas states: “*BNP Paribas will only provide financing to new CFPP projects using super-critical technology with a net energy efficiency of at least 43% for projects located in High Income countries and of at least 38% in other countries.*”

➔ **As a result, the impact of this option for climate mitigation would be nul.**

### WWF recommendation

This option would not have any positive impact: it must be discarded.

<sup>5</sup> BNP Paribas, CSR Sector Policy – Coal-fired Power Generation, <http://www.bnpparibas.com/sites/default/files/ckeditor-upload/files/PDF/RSE/CSR%20-%20Sector%20Policy%20-%20Coal%20Fired%20Power%20Generation.pdf>

## Option 2. More favourable support for ultra-supercritical coal plants, no other change

With this option, the OECD ECA support for ultra-supercritical coal plants is increased (to e.g. 15 years), with no other change.

Type of technology	Emissions at combustion (g Co2/kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 2: maximum repayment term for ECA support
Renewable energies	0	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years
Carbon Capture and Storage (CCS)	45-180	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	12 years
Fossil fuel power plants (oil)	550	12 years	12 years
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	15 years
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	12 years
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	12 years

(1) See Annex

### What would be the climate mitigation impact of this option?

As seen in Option 1 above, today coal plant manufacturers from OECD countries do not build subcritical coal plants anymore: supercritical coal plants are already a *business as usual* technology. The option that has been suggested by some countries is to provide more generous support for ultra-supercritical coal plants. It would represent extra support for specific coal plants rather than limiting coal support from OECD ECAs.

As seen in the table above, this option would:

- **Provide more generous support for ultra-supercritical coal plants than for gas and oil plants**, which are far less carbon intensive (respectively 350 g or 550 g CO<sub>2</sub>/kWh vs 750 g for ultra-supercritical coal plants);
- **Provide as generous support for ultra-supercritical coal plants as for waste/ hybrid /CHP plants**, which are less carbon intensive;
- **Reduce the relative ECA incentive provided to renewable energies and CCS solutions**, which are truly low carbon energy solutions (below 200 g CO<sub>2</sub>/kWh).

It must be noted that power markets in emerging countries are complex and dynamic:

- **In the last years, in all key emerging countries building coal plants, renewable energies have been quickly and ambitiously developed as well.** The WWF literature review 2013-2014<sup>6</sup> finds that quick renewable developments are taking place in **China** (12 GW of new solar capacity added in 2013

<sup>6</sup> WWF (2014), *Global coal : the market has shifted – Literature review 2013-2014*

and wind alone outpacing new coal plant investment in 2012); in **India** (2,2 GW of new solar added in 2013, wind sector benefitting the second fastest global clean energy investment growth in 2011); in **Indonesia** (geothermal generation and biofuels are rapidly increasing); in the **Philippines** (1 GW of solar projects pipeline); in **Thailand** (solar); in **South Africa** (clean energy investment increased from \$100m in 2011 to \$5.5 bn in 2012). In addition governments set increasingly aggressive renewable energy targets.

- **In addition gas plants are also being currently built or planned in most emerging countries building coal plants.** This notably includes (not exhaustive list): **India** (according to IEA report<sup>7</sup> and recent articles<sup>8</sup>, gas represents around 22 GW or 9% of electricity production at the end of 2013); **Indonesia, Vietnam, Thailand, Malaysia, the Philippines, South Africa, Chile, Mozambique; Turkey** (natural gas made more than 40% of thermal power generation in 2013).<sup>9</sup>

In such complex and dynamic contexts, it is increasingly wrong to assume that only coal plants can be built. **More generous OECD ECA support for ultrasupercritical coal plants would weaken the relative incentive ECAs are providing for renewable energies and waste/hybrid/CHP plants, and make gas and oil plants support less generous in relative terms – weakening the attractiveness and competitiveness of all these energy solutions although they are much lower carbon than ultra-supercritical coal plants.**

- ➔ **As a result, this option would risk displacing some OECD exports of renewable, waste/hybrid/CHP plants and gas and oil plant technologies towards ultra-supercritical coal plant technology. This option risks therefore having counterproductive effects for climate mitigation.**

### WWF recommendation

This option risks having counterproductive effects for climate mitigation: it must be rejected.

<sup>7</sup> International Energy Agency, *Gas-fired power generation in India: Challenges and opportunities*, October 2005

<sup>8</sup> The Economic Times, 29 November 2013, *Wartsila sees good market for gas-fired plants in India*

<sup>9</sup> Source: Platts UDI World Electric Power Plants database, June 2014: countries with "planned" or "construction" categories of gas plants

## Option 3. More favourable support for ultra-supercritical coal plants, less favourable support for supercritical coal plants, less favourable support for subcritical coal plants

This option combines more generous OECD ECA support for ultra-supercritical coal plants (e.g. 15 years) and less generous support to supercritical local plants - and logically subcritical coal plants - (to e.g. 8-10 years).

Type of technology	Emissions at combustion (g Co2/kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 3: maximum repayment term for ECA support
Renewable energies	0	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years
Carbon Capture and Storage (CCS)	45-180	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	12 years
Fossil fuel power plants (oil)	550	12 years	12 years
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	15 years
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	8-10 years
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	8-10 years

### What would be the climate mitigation impact of this option?

- The change for **subcritical** coal plants is useless as they are not built anymore by coal plant manufacturers from OECD countries (see Option 1);
  - Providing less generous repayment terms for **supercritical** coal plants would increase the relative incentive of both ultrasupercritical coal plants (incentivizing coal plant manufacturers to focus more on ultra-supercritical coal plants) and lower carbon solutions (renewables, CCS, waste to energy and gas and oil plants);
  - But simultaneously, the more generous repayment terms for **ultra-supercritical** coal plants would **weaken the relative incentive OECD ECAs are providing for renewable energies, and make gas and oil plants support less generous in relative terms – weakening the attractiveness and competitiveness of all these energy solutions although they are much lower carbon than ultra-supercritical coal plants (same as Option 2).**
- ➔ **As a result, this option would still risk displacing some OECD exports of renewable, waste/hybrid/CHP plants and gas and oil plant technologies towards ultra-supercritical coal plant technology. This option risks therefore having counterproductive effects for climate mitigation.**

### WWF recommendation

This option risks having counterproductive effects for climate mitigation: it must be rejected.

## Option 4. ECA support for energy solutions aligned with their carbon intensity

This option would **align the level of the OECD ECA support to the carbon intensity of each given energy solution**: the less carbon intensive, the more favourable repayment terms. This would require to lower the repayments terms for the most carbon intensive technologies - for example to 10 years for oil plants (less than gas plants), 8 years for ultra-supercritical coal plants (less than oil plants), 5 years for supercritical coal plants and a ban or 1 year for subcritical coal plants.

Type of technology	Emissions at combustion (g Co2/kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 4: maximum repayment term for ECA support
Renewable energies	0	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years (2)
Carbon Capture and Storage (CCS)	45-180	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	12 years
Fossil fuel power plants (oil)	550	12 years	10 years
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	8 years
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	5 years
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	Banned or 1 year

(1) See Annex

(2) It should be noted that Waste to energy, hybrid power plants, combined heat and power (CHP) and district heating and/or cooling can have very different levels of carbon intensity. In this option it would be necessary to distinguish several sub-categories to align the maximum repayment terms with the carbon intensity.

### What would be the climate mitigation impact of this option?

This option would ensure conceptual alignment of OECD ECA level of support with carbon intensity of energy solutions; it would complement the OECD efforts already started with the creation of the Annex IV of the OECD Arrangement that provide the maximum repayment terms (18 years) to renewable energy solutions and CCS, followed by waste/hybrid/CHP plants (15 years).

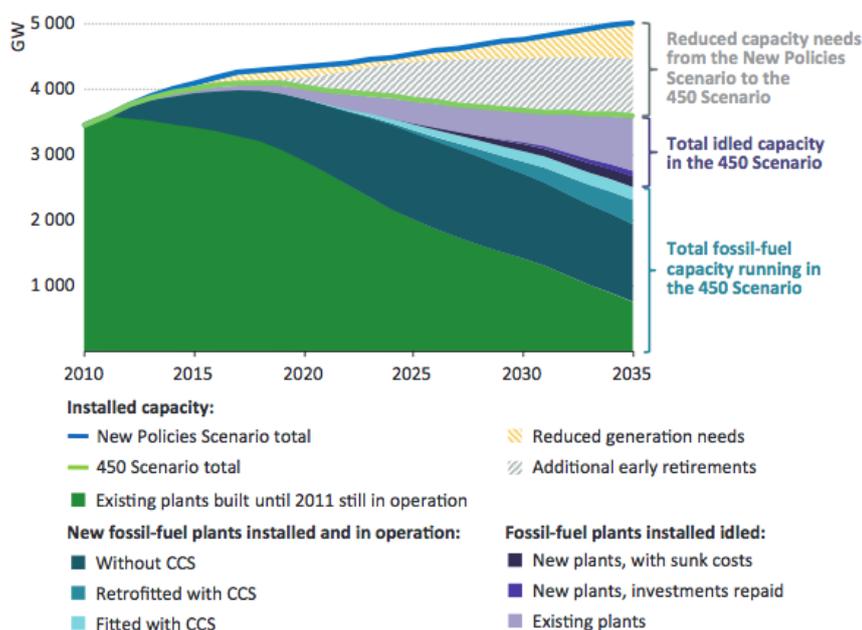
### Would this option be compatible with the agreed international climate limit of +2°C? Several IEA reports answer the question:

- In its World Energy Outlook 2011, the International Energy Agency stated that to have about a 50% chance of staying within a 2°C global temperature rise, **only zero-carbon utilities and infrastructure should be developed beyond 2017 since 80% of cumulative emissions allowable between 2010 and 2035 are already locked** in through existing power plants, factories, buildings and services,

unless existing infrastructure is scrapped before the end of its economic lifespan, which would be very costly and uneconomic.

- More recently, Maria van der Hoeven, executive director of the International Energy Agency (IEA), said in a foreword to its Medium-Term Coal Market Report on 16 December 2013<sup>10</sup> that **coal in its current form is “unsustainable,” even assuming that more efficient heat and power plants will be built**, as it will contribute to pushing global temperatures above the agreed target of a long-term increase of by 2°C degrees.
- The IEA report *Redrawing the energy-climate map*<sup>11</sup> from June 2013 already made this clear, as shown by the figure below:

**Figure 3.10** ▷ World installed fossil-fuel power generation capacity in the 450 Scenario relative to the New Policies Scenario



Note: In the IEA World Energy Outlook:

- The *New Policies Scenario* is a scenario that takes account of broad policy commitments and plans that have been announced by countries, including national pledges to reduce greenhouse gas emissions and plans to phase out fossil energy subsidies, even if the measures to implement these commitments have yet to be identified or announced. This broadly serves as the IEA *baseline* scenario;
- The *450 Scenario* is a scenario that sets out an energy pathway consistent with the goal of limiting the global increase in temperature to 2°C by limiting concentration of greenhouse gases in the atmosphere to around 450 parts per million of CO<sub>2</sub><sup>12</sup>.

Source: IEA (2013), *Redrawing the energy-climate map*

What the figure above shows is that it is not possible to stay within 2°C without very rapid closure of existing fossil fuel plants from about 3600 GW in 2010 to about 800 GW in 2035. Meantime new fossil fuel plants (including gas) could comprise about 1000 GW maximum in the IEA 450 Scenario<sup>13</sup>: schematically the IEA scenario means

<sup>10</sup> <http://www.bloomberg.com/news/2013-12-16/coal-demand-growth-to-slow-in-next-five-years-on-china-ia-says.html>

<sup>11</sup> <http://www.worldenergyoutlook.org/media/weowebiste/2013/energyclimatemap/RedrawingEnergyClimateMap.pdf>

<sup>12</sup> <http://www.iea.org/publications/scenariosandprojections/>

<sup>13</sup> It should be added that new coal power plants would be running for at least 40 years but not limited (empirically coal plants can run much longer)

that **every new GW that comes on line *must* be accompanied by about 3 GW of closure. If it is not, it is not compatible with the IEA scenario.**

Consequently, the only way to accommodate any further new fossil fuel plant would be to dramatically accelerate the closure of existing plants, and/or to idle even more new capacity. But for OECD ECAs there is no credible and verifiable way to ensure that backing 1 GW of new coal plant capacity is directly related to 3 GW of existing capacity being closed.

Refurbishment/life extension also appears to be a highly risky option given how quickly coal plants must be shut down in the IEA scenario.

**IEA reports show that there is only an extremely limited window within which new coal plants would be possible at all in the IEA 450 Scenario.**

**In addition, ECAs do not have the capacity to ensure that 3 GW of coal plants are closed when they back 1 GW of new coal plant.**

**→ As a result, this option would ensure consistency of OECD ECA level of support with the carbon intensity of energy solutions, but would bear a high risk not to be compatible with the IEA scenario – that requires a more stringent option.**

#### **WWF recommendation**

This option would ensure consistency with the approach of Annex IV of the OECD Arrangement, but would very likely be insufficient to match the agreed international commitment of maximum +2°C global warming. A more ambitious option is required (or combination with another option).

## Option 5. Very high Emission Performance Standard

This option introduces a very high Emission Performance Standard (EPS) of 750 g CO<sub>2</sub>/kWh.

Type of technology	Emissions at combustion (g Co <sub>2</sub> /kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 5: EPS of 750 g CO <sub>2</sub> /kWh
Renewable energies		18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years
Carbon Capture and Storage (CCS)	45-180	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	12 years
Fossil fuel power plants (oil)	550	12 years	12 years
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	12 years
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	<i>Ruled out</i>
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	<i>Ruled out</i>

(1) See Annex

### What would be the climate mitigation impact of this option?

Subcritical and supercritical coal plants would be ruled out by the EPS, strongly incentivizing coal plant manufacturers from OECD countries to refocus on ultra-supercritical coal plants (not affected by such a very high EPS) or lower carbon energy solutions.

### Would this option be compatible with the agreed international climate limit of +2°C? Several IEA reports answer the question: see Option 4.

The same way as with the Option 4, this option is interesting but still bears a high risk not to be compatible with the IEA 2°C scenario (as this would require to ensure that 3 GW of coal plants are closed when OECD ECAs back 1 GW of new coal plant – which is beyond their capacity).

**→ As a result, this option would bear a high risk not to be compatible with the IEA scenario – that requires a more stringent option.**

#### WWF recommendation

This option would not be sufficient to match the agreed international commitment of maximum +2°C global warming. A more ambitious option is required (or combination with another option).

## Option 6. High Emission Performance Standard

This option introduces a high Emission Performance Standard (EPS) of 500 g CO<sub>2</sub>/kWh.

Type of technology	Emissions at combustion (g Co <sub>2</sub> /kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 6: EPS of 500g CO <sub>2</sub> /kWh
Renewable energies	0	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years
Carbon Capture and Storage (CCS)	45-180	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	12 years
Fossil fuel power plants (oil)	550	12 years	<i>Ruled out</i>
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	<i>Ruled out</i>
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	<i>Ruled out</i>
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	<i>Ruled out</i>

(1) See Annex

### What would be the climate mitigation impact of this option?

Coal and oil plants (if the approach is not focused solely on coal) would be ruled out by the EPS, strongly incentivizing coal plant manufacturers from OECD countries to refocus on lower carbon energy solutions.

It should be noted that **virtually all coal plant manufacturers from OECD countries do have the capacity to refocus on lower carbon energy solutions as they are *already* exporting renewable technologies and other alternatives** – for example Japanese Hitachi (wind, solar, storage batteries and cogeneration, gas plants)<sup>14</sup>, German Siemens (wind, solar, hydro, biomass and gas plants)<sup>15</sup>, French Alstom (wind, solar, hydro, geothermal, biomass and cogeneration, gas plants)<sup>16</sup> or American General Electric (wind, solar, hydro, biogas and gas plants)<sup>17</sup>. In addition they all are *already* present in key emerging countries like India with the range of all their technologies (see for example Hitachi<sup>18</sup>, Siemens<sup>19</sup>, Alstom<sup>20</sup> and General Electric<sup>21</sup>).

### Would this option be compatible with the agreed international climate limit of +2°C? Several IEA reports answer the question: see Option 4.

The IEA 450 Scenario (figure provided in Option 4) concerns all fossil fuel plants, not only coal plants, putting a requirement to close gas plants as well. Still, given the much lower

<sup>14</sup> [http://www.hitachi.com/environment/showcase/solution/energy/renewable\\_energy.html](http://www.hitachi.com/environment/showcase/solution/energy/renewable_energy.html)

<sup>15</sup> <http://www.energy.siemens.com/hq/en/renewable-energy/?stc=wwecc120516>

<sup>16</sup> <http://www.alstom.com/microsites/power/products-services/renewables/>

<sup>17</sup> <http://www.ge-renewable-energy.com/en/home/>

<sup>18</sup> <http://www.hitachi.co.in/products/industry/power/>

<sup>19</sup> <http://www.siemens.co.in/sustainable-development-in-india/power-supply.html>

<sup>20</sup> <http://www.alstom.com/countries/india/>

<sup>21</sup> <http://www.ge.com/in/wind-energy>

carbon intensity of modern gas plants compared to coal plants (350 g vs 750 g or more) and the much shorter lifespan of gas plants, the compatibility of this option with the IEA 2°C scenario is higher (although not fully guaranteed).

### **What would be the risk that Chinese coal plants replace the potential OECD ones?**

Some conservative OECD countries assume that each coal plant not benefitting from OECD ECA support will be systematically replaced by a Chinese coal plant of lower efficiency and thus more polluting. This assessment is based on five assumptions that can each be challenged:

- *That it is inevitable that every coal plant project will happen.* This assumption is strongly flawed: the CoalSwarm database<sup>22</sup> shows that in the period 2010–June 2014, globally 105 GW of new coal plants have become operational while 244 GW of new coal plant projects have been cancelled – a ratio of **30% coal plant projects built and 70% cancelled**<sup>23</sup>. The bearish trend of the coal market in all key coal countries globally<sup>24</sup>, the eroding competitiveness of coal plants facing increasingly competing renewable energy solutions<sup>25</sup> make it very likely that this cancellation rate will increase further;
- *That it is only the availability of the OECD ECA guarantee that ensures the coal plant technology export to be achieved.* In reality it very likely depends on many other factors: the credit risk of the given emerging country, the access of the manufacturer and/or the project promoter to private financing, etc.
- *That the project sponsor is not tendering for an ultra-supercritical coal plant, just for a coal plant of any standard.* In reality it depends a lot on the country and cannot be assumed bluntly<sup>26</sup>: for example in India subcritical coal plants are not built anymore since 2013;
- *That China is building coal plants of lesser efficiency than manufacturers from OECD countries.* This has been proven wrong in China that now builds among the most efficient coal plants in the world<sup>27</sup>. It is now sometimes pretended that China does not export these most efficient technologies abroad – a claim that should be evidenced with facts not rumours<sup>28</sup>. China is getting more stringent about coal extremely quickly – quicker than all analysts imagined<sup>29</sup> – and it could be considered realistic or even likely that China will refocus its exports on ultra-supercritical coal plants in the near future – may be a couple of years from now;
- *That China will systematically support any coal plant project.* This is contradicted by recent evidence that China refused to support an integrated coal mine and plant project in Pakistan, the Thar coal project<sup>30</sup>: the company struggled to get Chinese funding for developing the coal plant because the Chinese ECA Sinosure refused the conditions proposed and China Exim Bank was very reluctant to offer loans, both considering the project as a high-risk one.

### **Power markets in emerging countries are evolving very quickly, with an increasingly hostile environment for new coal plants and growingly competitive**

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<sup>22</sup> [https://docs.google.com/a/wwf.panda.org/spreadsheets/d/1e9ZUAFxxnU9qP-nR42bhNidrN-SnqvLi6hqJV59c5zg/edit?usp=sharing\\_eid](https://docs.google.com/a/wwf.panda.org/spreadsheets/d/1e9ZUAFxxnU9qP-nR42bhNidrN-SnqvLi6hqJV59c5zg/edit?usp=sharing_eid)

<sup>23</sup> Not including China where OECD ECA do not back coal plants

<sup>24</sup> WWF (2014), *Global coal : the market has shifted – Literature review 2013-2014*

<sup>25</sup> Ibid

<sup>26</sup> See WWF (2014), *Debunking the myths of ECA support for coal, Myth 2*

<sup>27</sup> Citigroup (2013), *The unimaginable - peak coal in China*; see also WWF (2014), *Debunking the myths of ECA support for coal, Myth 2*

<sup>28</sup> WWF did not find evidence that supports that claim

<sup>29</sup> For Bernstein Research, China moved ahead “perhaps a decade ahead of schedule”, notably with its ‘Action Plan for Air Pollution Prevention and Control’ in April 2014. See WWF (2014), *Global coal : the market has shifted – Literature review 2013-2014*

<sup>30</sup> <http://tribune.com.pk/story/780748/thar-project-chinese-lenders-refuse-to-accept-sovereign-guarantees/>, 25 October 2014

**renewable energy solutions**<sup>31</sup>. As a consequence, it is quite simplistic to claim that any potential OECD coal plant export would be automatically replaced by a Chinese one. It would seem more likely that only a few potential OECD coal plants are at risk of being replaced by Chinese ones, with the cancelation of new coal plant projects and the shift to competitive renewable (or sometimes gas) energy solutions being likely (and increasingly likely year after year) – leading to effective climate mitigation.

→ **As a result, this option would be a step forward with a higher probability of being compatible with the IEA +2°C scenario (although it is not fully guaranteed).**

#### WWF recommendation

This option would have a positive effect. WWF supports this option.

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<sup>31</sup> WWF (2014), *Global coal : the market has shifted – Literature review 2013-2014*

## Option 7. Low Emission Performance Standard

This option introduces a high Emission Performance Standard (EPS) of 200 g CO<sub>2</sub>/kWh.

Type of technology	Emissions at combustion (g Co <sub>2</sub> /kWh) (1)	Existing situation: maximum repayment term for ECA support	Option 7: EPS of 200 g CO <sub>2</sub> /kWh
Renewable energies	0	18 years	18 years
Waste to energy, hybrid power plants, combined heat and power (CHP), district heating and/or cooling	Various	15 years	15 years
Carbon Capture and Storage (CCS)	45-180	18 years	18 years
Fossil fuel power plants (gas)	350	12 years	<i>Ruled out</i>
Fossil fuel power plants (oil)	550	12 years	<i>Ruled out</i>
Ultrasupercritical coal plants (> 40% energy efficiency)	750	12 years	<i>Ruled out</i>
Supercritical coal plants (35-40% energy efficiency)	>750	12 years	<i>Ruled out</i>
Subcritical coal plants (< 35% energy efficiency)	>750	12 years	<i>Ruled out</i>

(1) See Annex

### What would be the climate mitigation impact of this option?

This option would refocus OECD ECA support on *low carbon* energy solutions only (lower than 200 g CO<sub>2</sub>/kWh). It would bring the double benefit of:

- Putting a strong emphasis on renewable energy;
- For CCS proponents, putting a requirement of Carbon Capture and Storage (CCS) for any new fossil fuel plant (if the approach is not applied solely to coal), with a range of 75%-95% efficiency (the range of efficiency required for coal plants to go below 200g CO<sub>2</sub>/kWh).

It would be logical that CCS proponents strongly support a stringent plant-based EPS, that would provide clear signals on needed technology and investment, foster low carbon innovation, rule out unabated coal plant technology and bring certainty for investors in new power plant or plant refurbishment projects on which to base their investment decisions. Indeed, **CCS proponents should come to the fact that *incentivizing* CCS has been a failure: *requiring* it through a stringent EPS likely remains its last chance<sup>32</sup>.**

➔ **As a result, this option would ensure support to low carbon energy solutions only.**

### WWF recommendation

This option would have a positive effect. WWF supports this option.

<sup>32</sup> See WWF (2014), *Debunking the myths of ECA support for coal*, Myth 6

## Annex. Emissions factors for power stations globally

	Emissions factor at combustion (g CO <sub>2</sub> / kWh)	Technology deployment
<b>Low carbon</b>	0	Wind, solar, hydropower
	40-70	Gas-fired plants with CCS
	45-180	Various coal-fired plants with CCS (assumption: carbon capture efficiency of 95% - 75%)
< 200		
<b>High carbon</b>	> 200	
	300	New (most efficient) gas-fired plants fitted with CHP (Combined Heat and Power)
	320-380	New (most efficient) gas-fired plants
	350-550	Existing gas-fired plants
	550	New (most efficient) oil-fired plants
	620-670	Existing oil-fired plants
	730	New (most efficient) hard coal-fired plants with powder coal injection
	760	New (most efficient) hard coal-fired plants with gasification
	800	New (most efficient) lignite-fired plants with gasification
	850	Existing hard coal-fired plants
1000	Existing lignite-fired plants	

**Note:** All numbers are average for technology globally

### Sources:

IEA (2013), CO<sub>2</sub> emissions from fossil fuels

ECOFYS (2011), International comparison of fossil power efficiency and CO<sub>2</sub> intensity

IPCC Special Report (2008), Carbon dioxide capture and storage SPM

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To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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