LIFTING EUROPE'S DARK CLOUD

HOW CUTTING COAL SAVES LIVES

EUROPEAN ENVIRONMENTAL BUREAU
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The content of this report was researched and written by Christian Schaible and Anton Lazarus of the European Environmental Bureau (EEB), Dave Jones from Sandbag, Joanna Flisowska from Climate Action Network (CAN) Europe, Julia Gogolewska from Health and Environment Alliance (HEAL) and Darek Urbaniak from WWF European Policy Office.

The modelling used in this report was developed by Lauri Myllyvirta and Rosa Gierens from Greenpeace. The health impact methodology is based on that of the earlier report 'Europe's Dark Cloud: How coal-burning countries are making their neighbours sick' published in June 2016 by WWF European Policy Office, Sandbag, CAN Europe and HEAL in Brussels, Belgium. This methodology was guided by recommendations from the World Health Organization Europe's 'Health risks of air pollution in Europe' (HRAPIE) project on health impact assessments for air pollution. It includes atmospheric modelling with the European Monitoring and Evaluation Programme Meteorological Synthesizing Centre - West (EMEP MSC-W) computer model, which is also used by the European Environment Agency for assessments of health impacts from air pollution in Europe. The methodology of the first report has been peer reviewed by Dr Mike Holland, Ecometrics Research and Consulting. The estimates are based on publicly available, relevant data known of by the authors; this data may not be exhaustive and there may exist further or updated information they were not aware of at the time of writing.

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This report is dedicated to Lesley James (Friends of the Earth England, Wales and Northern Ireland) for her tireless dedication to raising the ambition level of environmental performance standards for Large Combustion Plants in Europe.

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CONTACTS

EUROPEAN ENVIRONMENTAL BUREAU (EEB)

Christian Schaible, Policy Manager
Email: christian.schaible@eeb.org
Website: www.eeb.org
Twitter: @Green_Europe

Anton Lazarus, Communications Officer
Email: anton.lazarus@eeb.org

SANDBAG

Dave Jones, Coal Analyst
Email: dave@sandbag.org.uk
Website: www.sandbag.org.uk
Twitter: @sandbagorguk

CLIMATE ACTION NETWORK (CAN) EUROPE

Joanna Flisowska, Coal Policy Coordinator
Email: joanna@caneurope.org
Website: www.caneurope.org
Twitter: @CANEurope

HEALTH AND ENVIRONMENT ALLIANCE (HEAL)

Julia Huscher, Senior Policy Officer
Email: julia@env-health.org
Website: www.env-health.org
Twitter: @HealthandEnv

WWF EUROPEAN POLICY OFFICE

Darek Urbaniak, Energy Policy Officer
Email: durbaniak@wwf.eu
Website: www.wwf.eu
Twitter: @WWFEU

"COAL IS THE SINGLE GREATEST THREAT TO CIVILISATION AND ALL LIFE ON OUR PLANET"

Climate scientist **James Hansen**

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PREFACE

Air pollution kills. Worldwide, it is now the top environmental cause of premature mortality, as shown by the Global Burden of Disease, Injuries, and Risk Factor Study. In 2012 alone, the World Health Organization (WHO) reported that 7 million people died as a result of exposure to air pollution.

Despite improvements in air quality in the EU, air pollution remains an important health risk factor responsible for over 400,000 premature deaths in 2011.

Looking at specific sources of exposure, the evidence is also there. Published in July 2016, "Europe's Dark Cloud: How coal-burning countries are making their neighbours sick" exposed the substantial health impacts of Europe's coal-fired power stations. It found that European coal plants are responsible for around 23,000 premature deaths per year. This new report, "Lifting Europe's Dark Cloud" shows how specific policy choices can impact positively on our health.

The European Respiratory Society is committed to promoting lung health. We are proud to work together with other organisations on this vital issue and we congratulate EEB, HEAL, CAN Europe, WWF European Policy Office and Sandbag on this new report. Policymakers and the public are aware that air pollution damages people's health and we hope that "Lifting Europe's Dark Cloud," will serve as the stimulus needed to secure an achievable aim for the health of Europeans.

Improving the EU's poor air quality will require stricter regulation and significant investment. But the long term health benefits easily outweigh the necessary financial investments. As a medical society, we notice over and over again the disconnect between an acknowledgement of the dangers of air pollution and the willingness of policymakers to take concrete steps to reduce emissions and clean up our air.

Introducing and fully enforcing Best Available Techniques standards through the EU's Industrial Emissions Directive offers a clear means of protecting our health and reducing the level of harmful pollutants and gases in the atmosphere. Applying these standards will also contribute to reducing greenhouse gas emissions responsible for climate change.

The time for action is now. The longer we wait, the bigger the challenge will become.

Professor Bert Brunekreef
The European Respiratory Society
Environment and Health Committee Chair



The European Respiratory Society (ERS) *is an international organisation that brings together physicians, healthcare professionals, scientists and other experts working in respiratory medicine. We are one of the leading medical organisations in the respiratory field, with a growing membership representing over 140 countries worldwide. Our mission is to promote lung health in order to alleviate suffering from disease and drive standards for respiratory medicine globally. Science, education and advocacy are at the core of everything we do.*

EXECUTIVE SUMMARY

This study, 'Lifting Europe's Dark Cloud', sets out how improved environmental performance standards and stricter limits for pollution from coal power plants could help to tackle dangerous and costly air pollution. It also reveals how more than half of European coal power plants have been granted special 'permission to pollute' beyond the levels set in laws designed to control emissions.

New proposed standards, to be voted on later this year, have the potential to significantly reduce the burden of coal on European citizens.

A revision of the EU's 'LCP BREF', a technical document outlining best practices for industry, would lead to tougher new pollution limits and has the potential to reduce the number of premature deaths caused by coal power plants from 22,900 to 2,600 deaths per year. The 'Best Available Techniques' (BAT) outlined in this document are all tried-and-tested methods, already in use in European coal plants. Emissions produced using these techniques are in many cases higher than the limits demanded by authorities in the USA, Japan and even coal-hungry China.[1]

While new limits are necessary to protect public health, this report also finds that crucial European legislation already in place is failing to ensure that coal plants meet 'safety net' limits. The Industrial Emissions Directive (IED) imposed minimum binding limits for three pollutants: nitrogen oxides (NO_x), sulphur dioxide (SO_2) and dust, which had to be met for existing plants by 1 January 2016. However, the widespread use of so-called 'derogations' allows more than half of European coal power plants, responsible for 13,600 deaths in 2013, to exceed these limits.

Emissions from burning coal are carried through the air and breathed in by people all over Europe and beyond. 'Lifting Europe's Dark Cloud' models emissions scenarios based on different pollution levels and compares them to the results of a previous report: *'Europe's Dark Cloud: How Coal-burning countries are making their neighbours sick'*.[2] This earlier report revealed the cross-border impacts of coal pollution and found that in 2013 European coal plants, which are still operating today, were responsible for around 22,900 premature deaths, 11,800 new cases of chronic bronchitis in adults, 538,300 days of children suffering from asthma symptoms and 6.6 million lost working days. Burning coal was shown to have an annual total health bill of between 33.3 and 63.2 billion euros.[3]

This new report introduces the law that governs industrial pollution in the EU – the Industrial Emissions Directive (Chapter 1). It assesses the impact of reduced emissions based on three scenarios (Chapter 2) and demonstrates how 'derogations' provide loopholes in current laws that allow existing limits to be ignored (Chapter 3).

The report concludes by presenting concrete actions that can be taken at both the EU and national levels in order to reduce the terrible impact of coal on the health of people across the continent and to finally begin 'lifting Europe's dark cloud' (Chapter 4).

However, while less pollution means fewer deaths, no techniques exist which completely eliminate emissions of any of the major pollutants from coal power plants. Furthermore, in addition to the damage caused to human health, coal power plants produce 18 percent of all of Europe's greenhouse gases, contributing to climate change with potentially devastating worldwide effects.

Truly lifting Europe's Dark Cloud will require the complete phase-out of coal power in favour of sustainable renewable energy sources and reduced energy consumption.

1 Smoke and Mirrors: How Europe's biggest polluters became their own regulators, Greenpeace, 2015: http://www.greenpeace.org/eu-unit/en/Publications/2015/Smoke-and-Mirrors-How-Europes-biggest-polluters-became-their-own-regulators

2 Europe's Dark Cloud: How Coal-Burning Countries are Making their Neighbours Sick', HEAL, CAN, WWF EU, Sandbag, 2016, https://wwf.fi/mediabank/8633.pdf.

3 This figure is based on 2013 emissions data, adjusted to reflect plants still operational in 2016. See: 'Europe's Dark Cloud: How Coal-Burning Countries are Making their Neighbours Sick', HEAL, CAN, WWF EU, Sandbag, 2016, https://wwf.fi/mediabank/8633.pdf.

4 Calculations are based on the 2013 emissions situation. At the date of the launch of this report 44,515 premature deaths and a health bill of between 64.9 and 123.2 billion euros could have been avoided. Figures correct on 10 October 2016: http://www.eeb.org/index.cfm/death-ticker/ For further information see the report 'Health and economic implications of alternative emission limits for coal-fired power plants in the EU', EEB and Greenpeace, 2015: http://www.eeb.org/index.cfm/library/eu-health-impacts-technical-report/

KEY FINDINGS

- **Cutting coal saves lives.** Currently proposed emissions limits, in the revised 'LCP BREF' document, would reduce the number of premature deaths caused by coal from 22,900 to 8,900 deaths per year by mid-2021 (see Chapter 2). This would also mean 7,300 fewer new cases of chronic bronchitis, 336,500 fewer days of children suffering from asthma symptoms, more than 4 million fewer working days lost through sickness and an overall reduction in Europe's annual health bill from 63.2 billion to 24.3 billion euros.
- **Coal power's 'permission to pollute' is harming human health.** More than half of Europe's coal power plants currently enjoy exemptions, or 'derogations', that allow them to pollute over the agreed 'safety net' limits set out in the Industrial Emissions Directive (see Chapter 3). These plants were responsible for 13,700 deaths in 2013, which was 60 percent of all coal-related deaths in Europe.
- **Deadly delays are costing lives across Europe.** New BREF limits should have been adopted in August 2014. They have already been delayed by more than two years. The modelling in this report shows proposed BREF limits should save 2,500 lives each year compared to existing 2016 IED limits. Instead, delays have already caused 5,600 unnecessary deaths - equivalent to seven lives each day - and led to a total health bill of more than 15.6 billion euros.
- **Stronger limits will save even more lives.** If all EU were to set limits based on what proven Best Available Techniques (BAT) can achieve, the total number of premature deaths could be reduced further from 8,900 to 2,600 deaths, new cases of chronic bronchitis from 4,500 to 1,200, days of children suffering from asthma symptoms from 201,800 to 54,900, an additional 1.9 million lost working days saved and annual health costs slashed from 24.3 billion to 7.1 billion euros (see Chapter 2). The EEB's 'Death Ticker 2.0' shows how many lives would have been saved had countries already introduced these 'BAT levels' in 2014, when they were first due to be published.[4]

DEMANDS (SEE CHAPTER 4)

EU DEMANDS:

1. **Close loopholes in the new proposed standards.** Simple changes to the latest draft of the 'LCP BREF' (see Chapter 1), like removing footnote exceptions and providing a fairer definition of "new" plants, would reduce dangerous pollution across Europe.
2. **Publish the revised standards without delay.** A new LCP BREF must be adopted this year. Every day of delay costs lives.
3. **Strengthen the Industrial Emissions Directive (IED).** The 'IED safety net' should be updated, the 'desulphurisation rate derogation' scrapped and BAT benchmarks on energy efficiency made obligatory. Emissions limits and monitoring requirements should reflect what is now technically possible to ensure European legislation serves as a driver towards improved environmental performance across the EU.

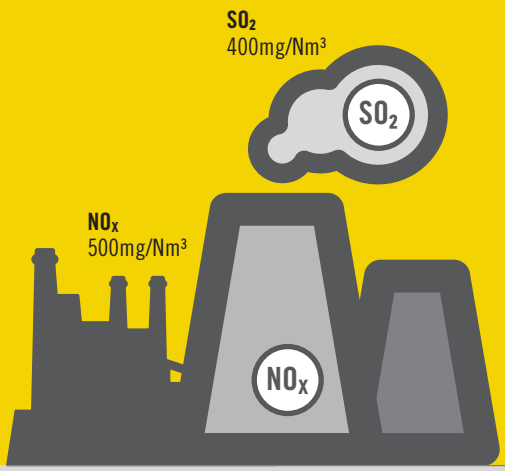
NATIONAL DEMANDS:

1. **Set emissions levels in line with what Best Available Techniques can already achieve.** In the interests of the health of their citizens, Governments should set more stringent limits than the minimum standards set at the EU level. No derogations should be granted.
2. **Implement new pollution limits now.** Governments should pre-empt deadlines to improve the health of their citizens and save costs to their health services faster. Investment in pollution-reducing techniques should lead to significant drops in net emissions and not be used as justification to extend plant life.
3. **Commit to a 100% coal phase-out and a speedy transition to renewable sources of energy.** Finland and the United Kingdom have pledged to phase out coal completely. Belgium became coal-free this year and Austria will be by 2025 or earlier. Almost half of US coal is committed to close. Other countries must now catch up.

FIGURE 1.

IMPACT OF STRICTER LIMITS ON COAL POLLUTION IN EUROPE

MODELLED ANNUAL PREMATURE DEATHS FROM SO_2 / NO_x

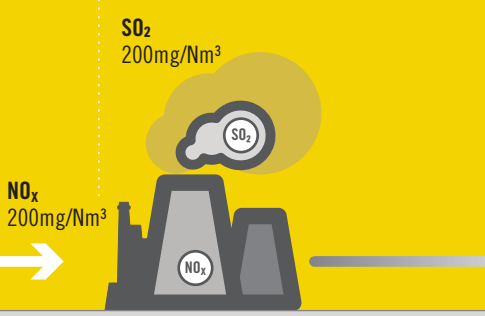


2013 EMISSIONS FROM CURRENTLY OPERATING PLANTS

22,900
PREMATURE DEATHS CAUSED BY COAL

DUST
50mg/Nm³

11,500
LIVES SAVED



2016 IED LIMITS

11,400
PREMATURE DEATHS CAUSED BY COAL

60%
ACTUAL 2016 LEVELS WILL BE MUCH HIGHER AS **MORE THAN HALF OF COAL POWER PLANTS, RESPONSIBLE FOR 60% OF DEATHS, HAVE PERMISSION TO POLLUTE ABOVE IED LEVELS.**
SEE CHAPTER 3: DEADLY DEROGATIONS.

DUST
20mg/Nm³

STRICTER AIR POLLUTION LIMITS

14,000
LIVES SAVED

20,300
LIVES SAVED

22,900
LIVES SAVED

NO_x
150mg/Nm³

SO_2
130mg/Nm³

SO_2
10mg/Nm³

NO_x
<85 (LIGNITE)
65 (HARD COAL) mg/Nm³



PROPOSED BREF LIMITS

8,900
PREMATURE DEATHS CAUSED BY COAL

DUST
8mg/Nm³

BEST AVAILABLE TECHNIQUES (BAT)

2,600
PREMATURE DEATHS CAUSED BY COAL

POSSIBLE TO IMPLEMENT EVEN TIGHTER LIMITS

DUST
2mg/Nm³

RENEWABLE ENERGY

0
PREMATURE DEATHS CAUSED BY COAL

DUST
0mg/Nm³

CHAPTER 1.

KNOW YOUR LIMITS

AN INTRODUCTION TO EUROPEAN LAW ON COAL POLLUTION

1.

INTRODUCTION

The Industrial Emissions Directive (IED) is a crucial European law that regulates pollution caused by industry across the 28 Member States of the EU, including all coal power stations. It set minimum binding limits for three pollutants: nitrogen oxides (NO_x), sulphur dioxide (SO_2) and dust, which had to be met for existing plants by 1 January 2016.

Installations covered by the IED are required to hold permits issued by national or local responsible authorities. The directive provides guidelines to permit-issuing authorities based on agreed Best Available Techniques (BAT) and contained in a reference document, called a 'BREF' (see infobox 'LCP BREF'), which must be consulted whenever a permit is issued or renewed.

THE 'LCP BREF'

The IED sets environmental performance standards for European Large Combustion Plants (LCPs) in a document detailing the Best Available Techniques (BAT) for managing and reducing emissions. This document is referred to as a 'Best Available Techniques Reference Document' (or 'BREF'). The first BREF for LCPs was adopted in July 2006 and a revised version will be presented on 20 October 2016 ahead of a vote by Member States planned for later in the year.

The final 'LCP BREF' will set emissions ranges that can be achieved through the use of Best Available Techniques (BAT). The range is expressed as a concentration of pollutants in flue gas volume as emitted at the stack, for example '<85-175mg/Nm^3 for NO_x'. The higher number of this range is referred to as the "upper range" and forms the basis of the 'proposed BREF limits' scenario in Chapter 2; the lower number is referred to as the "lower range" and is used to calculate the 'BAT scenario' in Chapter 2. The permit-issuing authority may choose to set an emissions limit within this range.

Following publication in the Official Journal of the European Union, permit-issuing authorities and plant operators will have up to four years to implement, meaning the revised BREF standards should be complied with by mid-2021. However, Member States retain considerable flexibility in setting the emissions limits when updating permits and may choose to go beyond the European minimum standards by insisting on stricter national limits.

The revised LCP BREF therefore has significant potential to assist environmental authorities across Europe in setting limits for pollution from coal-fired power plants, thereby providing protection for human health and the environment and helping to begin to lift 'Europe's Dark Cloud'.

WHY FOCUS ON COAL-BURNING POWER PLANTS?

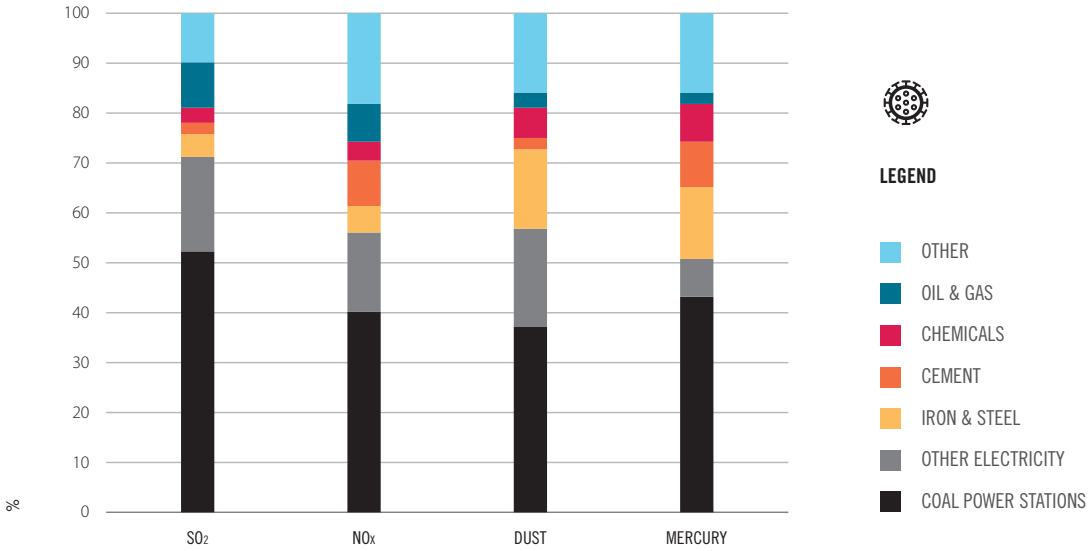
The IED covers the activities of about 55,000 industrial installations. The LCP BREF will regulate 2,841 of these facilities. However, this report focuses exclusively on the impact of the coal-burning power plants.

Despite accounting for just 0.5 percent of IED-regulated installations, in 2013 Europe's coal power plants were responsible for 52 percent of all reported SO_2 emissions, 40 percent of all reported NO_x and 37 percent of all reported dust emissions from industry in the EU,[5] see Figure 2.

FIGURE 2.

COAL AND OTHER INDUSTRIAL EMISSIONS

E-PRTR 2013



SOURCE E-PRTR 2013.

5 As well as 43% of mercury and 42% of all CO_2 emissions.

BREFS AND BAT-BASED LIMITS:

Table 1 compares the past, current and future potential air pollution limits that will form the basis of the modelling in the following chapter. The latest proposed limits show the potential for a significant reduction of SO_2, NO_x and dust emissions. Dedicated limits and monitoring requirements for mercury have been proposed for the first time.

However, while the upper limits of the ranges set out in the proposed BREF do represent progress, (see 'proposed BREF limits' in Chapter 2), they fall well short of what is actually already technically possible through the use of Best Available Techniques (BAT).

TABLE 1. EMISSION LEVELS APPLICABLE TO EXISTING COAL POWER PLANTS >1000 MW THERMAL

All units are in mg per cubic meter of flue gas except for mercury (microgram)	Before 2016 (2001 LCP Directive)	2016 IED limits	Proposed BREF limits	Best Available Techniques (BAT)
SO_2	400	200	130	10
	or DeSO$_2$ rate >94% for HC+L or 'peak load derogation' up to 800	or DeSO$_2$ rate >96% for HC+L or 'peak load derogation' up to 800	or for L DeSO$_2$ rate >97% and max 320 (existing FGD) or >99% DeSO$_2$ rate and max 200 (new FGD) or 'peak load derogation' up to 220	(when using low sulphur coal with wet FGD)
NO_x	500	200	150 HC; 175mg L	<85 L;
	or 'peak load derogation' up to 600 for solid fuel of low volatile content up to 1200	or 'peak load derogation' up to 450	or 'peak load derogation' up to 340	65 HC
Dust	50	20	8	2
	up to 100 in case of old plants burning unfavourable solid fuels		or 'peak load derogation' up to 14	
Mercury	-	-	4µg HC, 7µg L	<1µg
Net electrical efficiency **Net total fuel utilisation (CHP)**	none	optional due to ETS	45-46% HC ("new" units) 42-44% L ("new" units) 75-97%	45-46% HC ("new" units) 42-44% L ("new" units) 75-97%

NOTES HC=Hard coal; L=Lignite; FGD= Flue Gas Desulphurisation; DeSO$_2$= desulphurisation rate; peak load = operated less than 1,500 hours/year.

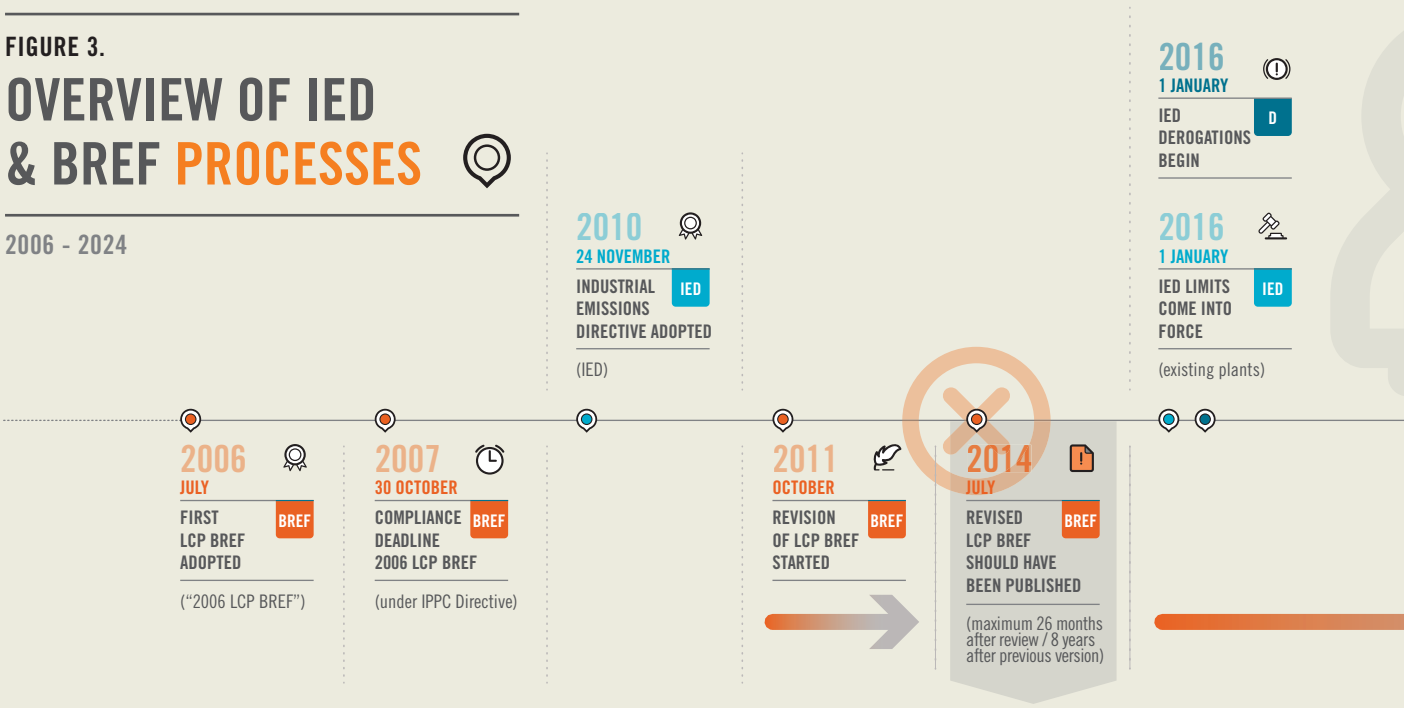


RATCLIFFE-ON-SOAR A MASSIVE COAL POWERED POWER STATION IN NOTTINGHAMSHIRE UK.
© Global Warming Images / WWF-Canon

FIGURE 3.

OVERVIEW OF IED & BREF PROCESSES

2006 - 2024



HOW ARE THE BAT LEVELS DEFINED AND WHO DEFINES THEM?

The BAT and BREFs are agreed upon following an information exchange between Member States, the European Commission, industry and representatives from NGOs. Meetings take place in Seville, Spain and the exchange is therefore referred to as the 'Sevilla Process'.

Data gathered from currently operating plants is used to set the levels considered as 'BAT', which is expressed as an emission range. In order to be judged as BAT, the technique must have been successfully implemented at an operational power station. BAT levels, even at the lower (least polluting) end of the ranges, are therefore demonstrated as economically and technically achievable and the result of tried-and-tested techniques.

The data used for the latest revision of the LCP BREF is from 2010, the Best Available Techniques (BAT) required to reduce emissions to the lowest levels have therefore already been proven effective for at least six years.

In the following chapter the second scenario modelled, 'proposed BREF limits', is based on the upper, most polluting, end of the BAT range. The third scenario, 'Best Available Techniques', is based on the achievable techniques at the lower, least polluting, end of the range.

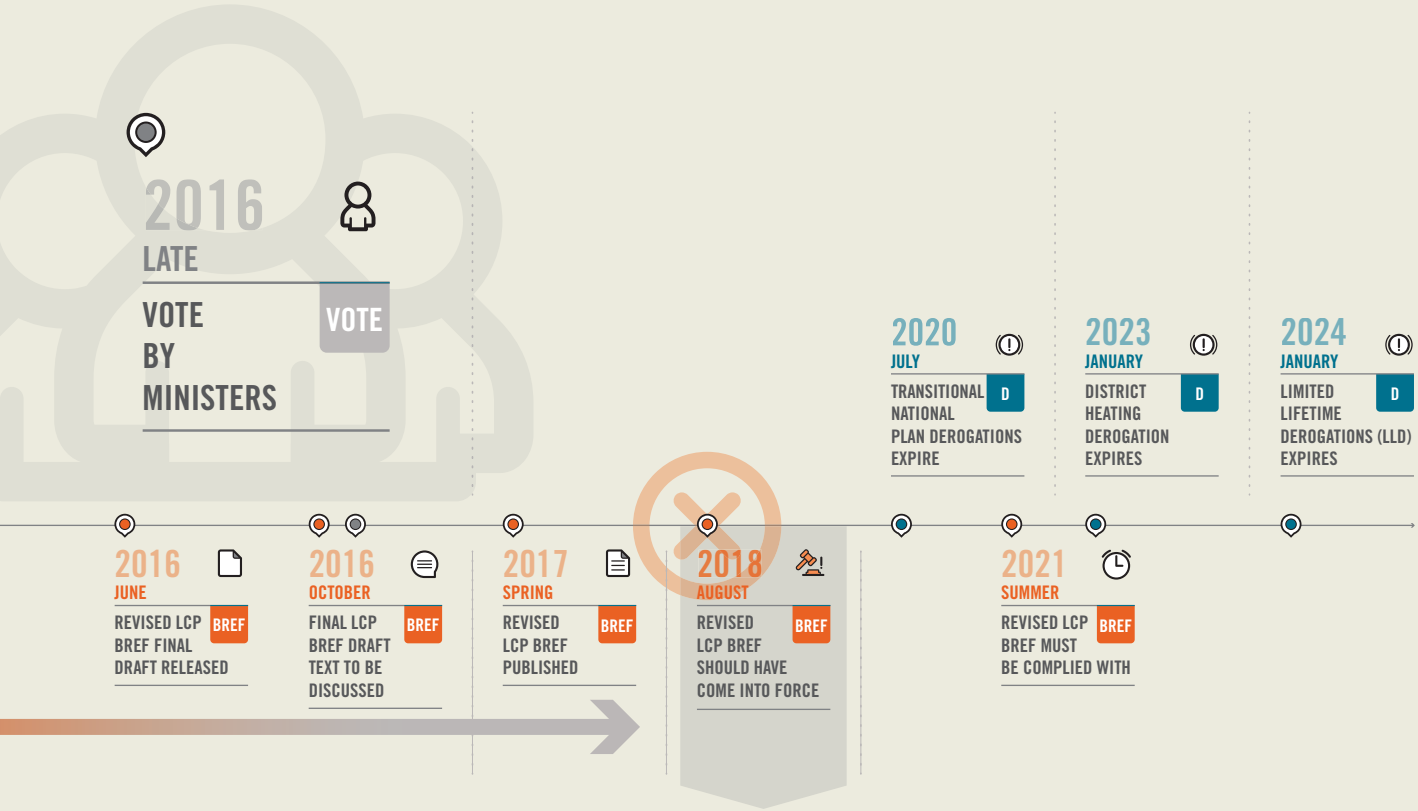
While the Sevilla Process is designed to achieve a consensus based on an objective analysis of the scientific data, it remains highly subjective and arbitrary in particular for existing plants' standards.

In 2015 it was revealed how industry lobbyists had infiltrated the Sevilla Process with 46 Member State representatives exposed as direct employees of plant operators.[6]

Stricter standards are opposed due to higher costs for the operators taking part in this process and there are no clear rules on where to set the right BAT levels. **It should therefore not be surprising that the proposed BAT benchmarks often fall short of environmental standards expected and already met in the USA, Japan and even coal-hungry China.[7]**

6 Smoke and Mirrors: How Europe's biggest polluters became their own regulators, Greenpeace, 2015: http://www.greenpeace.org/eu-unit/en/Publications/2015/Smoke-and-Mirrors-How-Europes-biggest-polluters-became-their-own-regulators

7 ibid



TIMELINE

BREFs were originally introduced as part of the Integrated Pollution Prevention and Control (IPPC) Directive in 2001. The first LCP BREF was adopted in July 2006 but was not considered as legally binding within the IPPC framework by the majority of Member States. As a result, the environmental standards contained in the 2006 LCP BREF were only fully implemented by a few Member States (Austria, Belgium, Denmark, Germany, Italy, the Netherlands and Sweden).

The IED combined the IPPC and various other directives into a single piece of legislation. Within this new legal framework the BREFs became legally binding.

According to the IED, the European Commission should update BREFs at least every eight years. The process to revise the 2006 LCP BREF should have been finalised in August 2014 so that revised standards would need to be met by summer 2018.

Due to various delays being pushed by both industry and Member States seeking to resist tougher standards, the revised LCP BREF is still awaiting approval. The review started in October 2011, the most recent draft was published in June 2016 and the next major decision is expected on 20 October 2016, when Member States will express their opinions ahead of a final vote. Even if approved this year, it seems unlikely that the revised LCP BREF will be published before the first quarter of 2017 meaning that **new BREF standards will not have to be met until mid-2021, 15 years after the original LCP BREF was adopted, and three years after the original schedule in the IED.**

CHAPTER 2.

A BREATH OF FRESH AIR?

THE HEALTH BENEFITS OF CUTTING COAL

2.

METHODOLOGY

The original 'Europe's Dark Cloud' report documented the basic methodology for calculating health impacts caused by coal power stations. It took SO_2 and NO_x emissions in 2013 for each EU coal power plant from the European Pollutant Release and Transfer Registry (E-PRTR) and ran these emissions through a model using weather data and population density to estimate health impacts across the continent.[8]

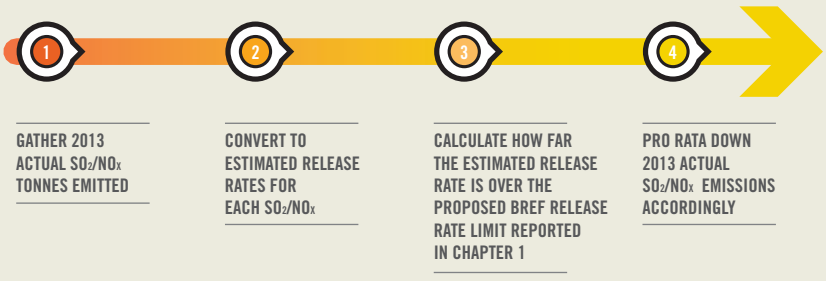
The health impacts of the various emissions levels are calculated and expressed as premature deaths, new cases of chronic bronchitis, days of children suffering from asthma symptoms, lost working days, and overall health bill in euros.

As in the previous report, coal plants no longer operational were removed.

For this report, an additional step was required in order to calculate what the 2013 emission rates were for each coal power plant.[9] The modelling process to calculate the emissions for each coal power plant for each scenario is shown in Figure 4.

FIGURE 4.

METHODOLOGY



8 See 'Europe's Dark Cloud: How Coal-Burning Countries are Making their Neighbours Sick' for more information on the original methodology: https://wwf.fi/mediabank/8633.pdf

9 To estimate the 2013 release rates, CO_2 emissions are used as a proxy for flue gas emissions using the formula: [NO_x/SO_2 emissions in tonnes] / ([CO_2 emissions in tonnes] * 3563.4) x 1,000,000,000. This formula has been tested against actual reported emissions and shown to be effective. The same emission factors are used by the European Environmental Agency and this ratio is applied to both lignite and hard coal.

10 A similar approach was used in the report: 'Health and Economic Implications of Alternative Emission Limits for coal-fired power plants in the EU', EEB and Greenpeace EEB, May 2015: http://www.eeb.org/index.cfm/library/eu-health-impacts-technical-report/

SCENARIOS

This methodology has been used to produce emissions models for sulphur dioxide (SO_2), nitrogen oxides (NO_x) and primary particulate matter (PM_{10}) in the following scenarios:

- The **'2016 IED limits'** scenario is based on maximum emissions limits for the three air pollutants (SO_2, NO_x and PM) under the Industrial Emissions Directive (IED) that came into force on 1 January 2016 - the so-called 'EU safety net'.
- The **'Proposed BREF limits'** scenario is based on the upper limit of the emission range that will apply from four years after publications of the revised 'Best Available Techniques Reference Document' (BREF) for LCP plants (the 'LCP BREF').
- The **'Best Available Techniques (BAT)'** scenario shows what could be achieved if the most effective techniques described in the revised LCP BREF, which will be standard for any "new" plants, were applied to existing installations. This corresponds to the lower level of the emission range set for existing plants in the 'LCP BREF'.

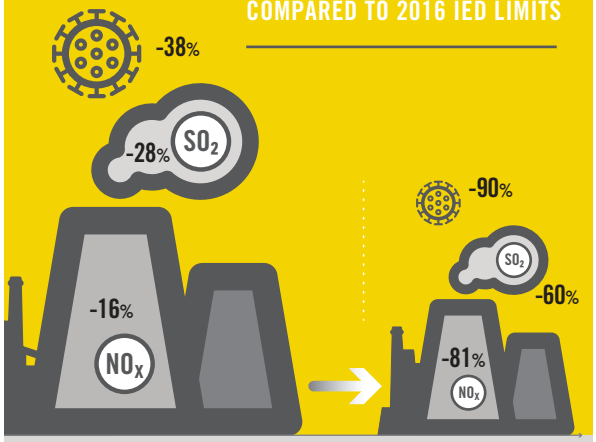
The methodology takes the lowest emissions rate, ignoring higher limits for coal power plants under the Desulphurisation Rate Derogation for SO_2 and 'peak load' derogations, and therefore it probably over-forecasts the upcoming reduction in pollution as a result of the 2016 IED limits. It also takes no account of the considerable transitional loopholes that are applied to allow for pollution over IED limits until 2024 (see Chapter 3).[10]

RESULTS

The proposed BREF limits would lead to a reduction of emissions, compared to the 2016 IED limits. In total, SO_2 emissions should be cut by 28 percent and NO_x emissions by 16 percent.

However, these reductions are still a long way off what could be achieved by implementing pollution limits based on the established, tried-and-tested Best Available Techniques set out in the stricter BAT range.

FIGURE 5. TOTAL POTENTIAL EMISSIONS REDUCTIONS COMPARED TO 2016 IED LIMITS



PROPOSED BREF LIMITS

DUST -38% (-8,623 tonnes)
SO_2 -28% (-133,845 tonnes)
NO_x -16% (-85,851 tonnes)

BEST AVAILABLE TECHNIQUES (BAT)

DUST -90% (-421,272 tonnes)
SO_2 -60% (-323,336 tonnes)
NO_x -81% (-18,159 tonnes)

TABLE 2. ANNUAL HEALTH IMPACTS OF COAL BURNING POWER PLANTS

Annual damage caused (EU21) (See Annex I)	2013 emissions (operational coal plants only)	2016 IED limits	Proposed BREF limits	Best Available Techniques (BAT)	100% coal phase out, replaced by clean energy
Premature deaths	22,900	11,400	8,900	2,600	0
New cases of chronic bronchitis in adults	11,800	5,800	4,500	1,200	0
Days of children suffering from asthma symptoms	538,300	261,800	201,800	54,900	0
Lost working days	6,575,800	3,306,400	2,542,700	600,300	0
Total associated health costs (VSL, median/ high value, 2013 prices)	€ 33.3 bn / € 63.2 bn	€ 16.5 bn / € 31.4 bn	€ 12.8 bn / € 24.3 bn	€ 3.7 bn / € 7.1 bn	€ 0

HEALTH BENEFITS OF 2016 IED LIMITS

The benefits under this scenario should already be guaranteed as part of the IED's 'safety net' that came into force at the start of 2016. The associated reductions in pollution would halve the number of premature deaths compared to the 2013 figures, from 22,900 to 11,400 deaths. Associated annual health costs would also halve to between 16.5 and 31.4 billion euros.

In other words, coal power plants were twice as polluting in 2013 as they would be under the IED limits. What is alarming is how far certain countries were away from these IED limits in 2013. Figure 6 shows how many more premature deaths were caused by coal plants in 2013 compared to the number expected to result from operating at IED limits.

The number of premature deaths caused by Slovakian coal plants was 824 percent higher in 2013 than it would have been if they were emitting at IED limits, for Romania the figure is 684 percent, for Bulgaria 369 percent, and for Spain 187 percent. It is worth noting that due to the fact that coal pollution is carried through the air, these deaths will not only occur in the countries where the plants are located.[11]

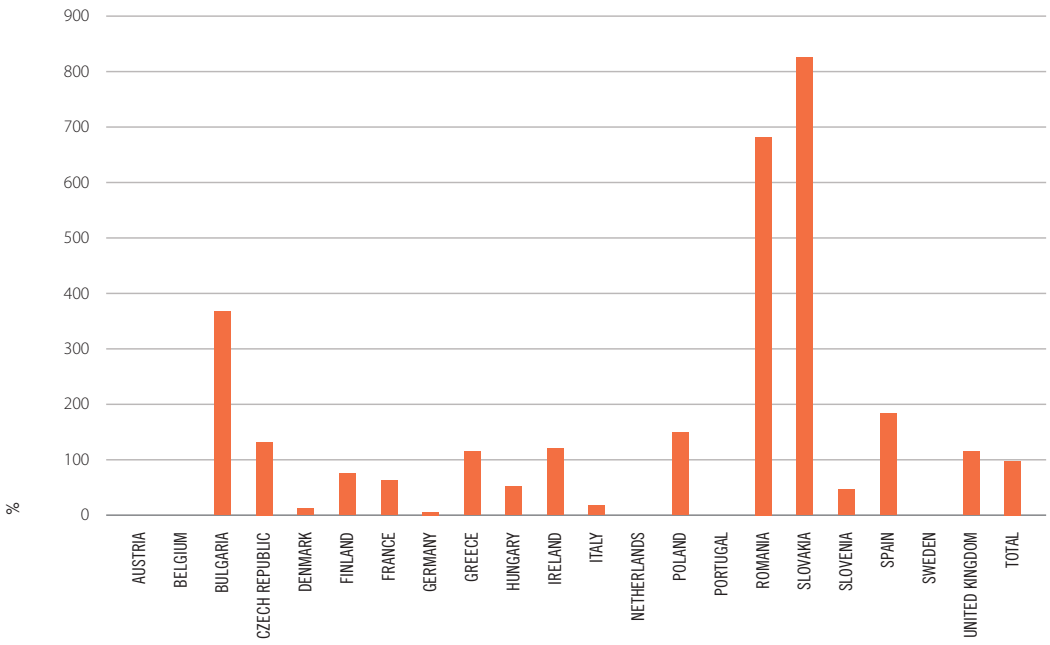
However, despite officially coming into force in 2016, the majority of European coal plants, in various countries, are unlikely to meet the IED levels any time soon. Plants in all of the countries listed above, as well as others, enjoy special exceptions to the usual limits called 'derogations'.

The next chapter analyses the extent to which these 'derogations' allow coal power plants to pollute above the IED limits.

FIGURE 6.

EXCESS DEATHS IN 2013

AS A PERCENTAGE OF WHAT COULD HAVE BEEN ACHIEVED UNDER IED LIMITS



11 For more information about the cross-border impact of coal pollution see the original report: 'Europe's Dark Cloud: How coal-burning countries are making their neighbours sick'. https://wwf.fi/mediabank/8633.pdf

HEALTH BENEFITS OF PROPOSED BREF LIMITS

The proposed BREF limits could further reduce annual Europe-wide premature deaths from 11,400 to 8,900 deaths compared to the 2016 IED limits. Achieving these levels across Europe would yield annual health-cost related savings of between 3.7 and 7.1 billion euros.

This saving of 22 percent fewer premature deaths is quite evenly spread across all countries, see Figure 7. This is because by the time the IED limits are implemented properly, the high emitters of today will have got back into line. The lowest benefit is in countries where national legislation already exists with lower limits.

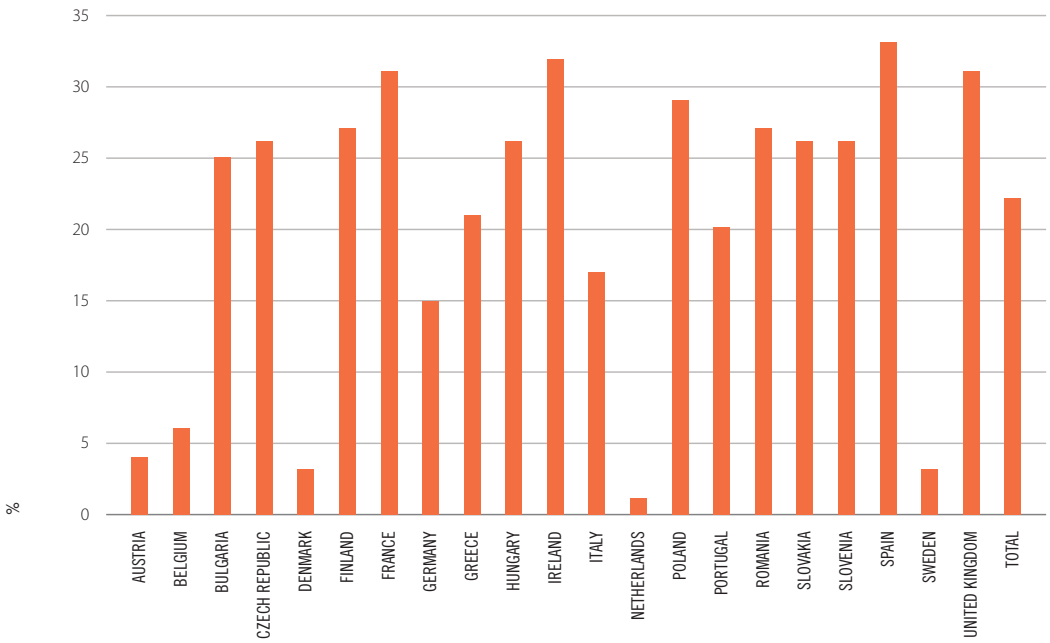
In 2013, coal plants in Austria, Belgium, Denmark, the Netherlands and Sweden were already near BREF levels.

Interestingly, implementing the proposed BREF limits across Europe significantly narrows the gap between all countries, changing the percentage of the total European coal pollution for which each country is responsible, see Figure 9. Countries which were once leaders in keeping emissions rates low, now begin to stand out. Germany was responsible for 19 percent of all premature deaths in 2013, but once all coal plants are BREF compliant, that will rise to 39 percent.

FIGURE 7

SAVINGS OF PREMATURE DEATHS

FROM PROPOSED BREF LIMITS, AS COMPARED TO IED LIMITS



HEALTH BENEFITS OF BEST AVAILABLE TECHNIQUES (BAT)

The strictest scenario, modelled on Member States setting limits based on the lower end of the BAT emissions range, demonstrates genuinely significant potential for reductions in health costs and premature deaths. Under this scenario the annual premature death rate could be reduced by 71 percent, compared to the proposed BREF limits, from 8,900 to 2,600 deaths.

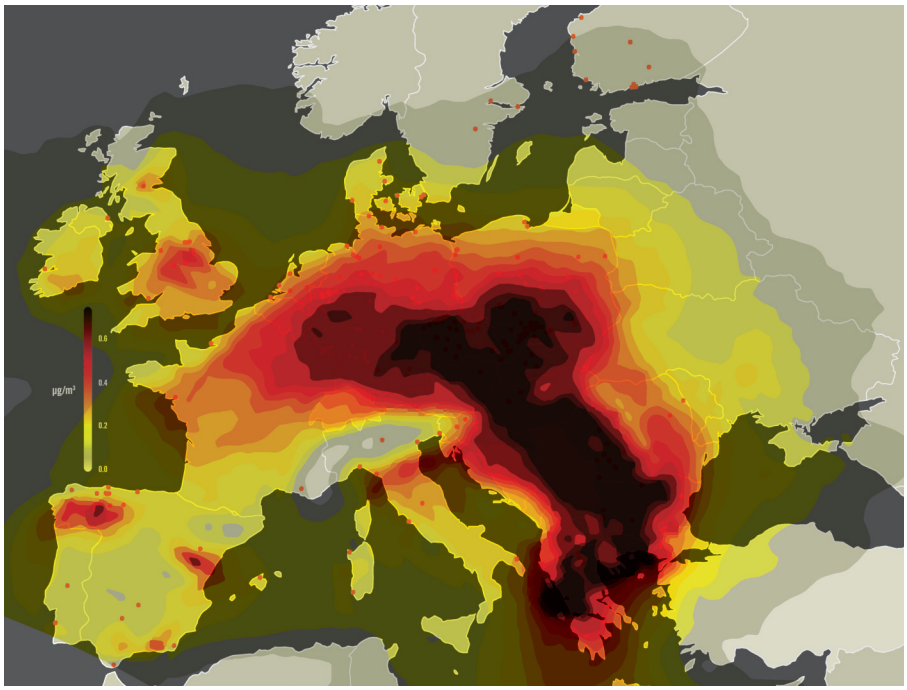
The BAT emission levels are already achieved by some existing coal power plants in the EU under economically and technically viable conditions. Achieving these reductions would therefore only require the rolling out of existing techniques to further plants and operating abatement performance to BAT levels. One of the biggest savings is achieved by installing Selective Catalytic Reduction (SCR) on lignite coal plants, see infobox on page 22.

The enormous public health savings and huge economic impact of lost working days must lead responsible authorities to demonstrate a commitment to protect the public interest first when they set permit limits.

FIGURE 8A-D.

$PM_{2.5}$ POLLUTION FROM EU COAL POWER PLANTS

2013 EMISSIONS FROM CURRENTLY OPERATING PLANTS



2016 IED LIMITS

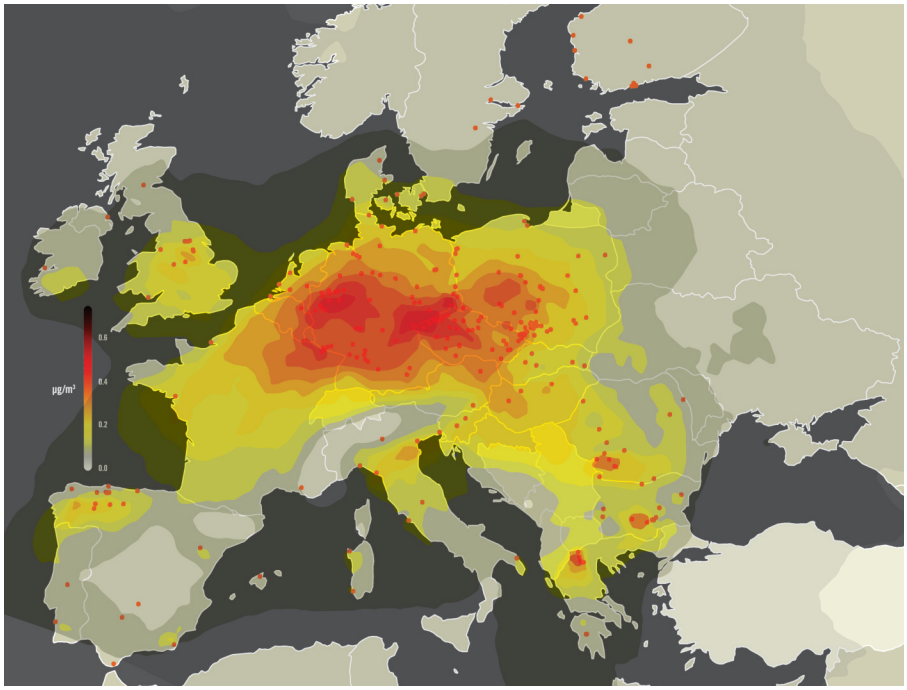
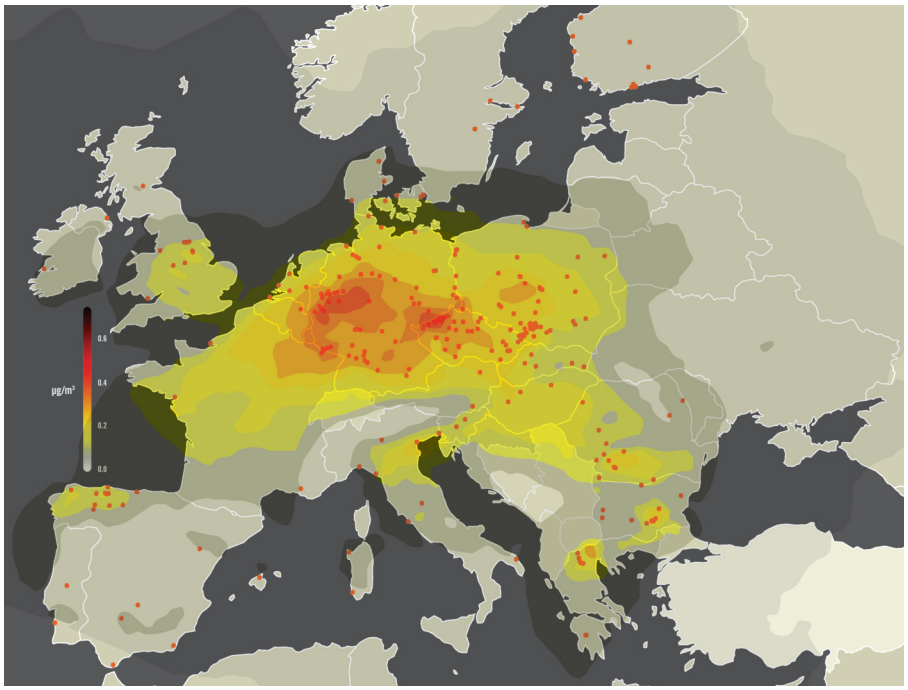


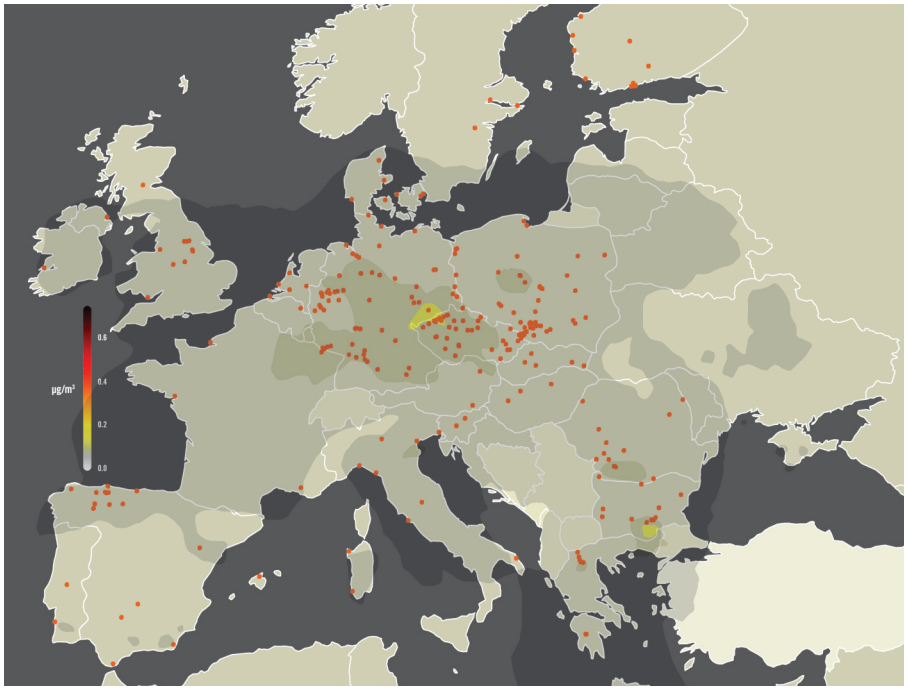
TABLE 3. POLLUTION LIMITS

All units in mg per cubic meter	Before 2016	2016 IED* LIMITS	PROPOSED BREF LIMITS	BEST AVAILABLE TECHNIQUES (BAT)
SO_2	400	200	130	10
NO_X	500	200	150	<85 (Lignite) / 65 (Hard Coal)
Dust	50	20	8	2

* IED limits are currently evaded by more than half of European coal power plants - see Chapter 3.



PROPOSED BREF LIMITS

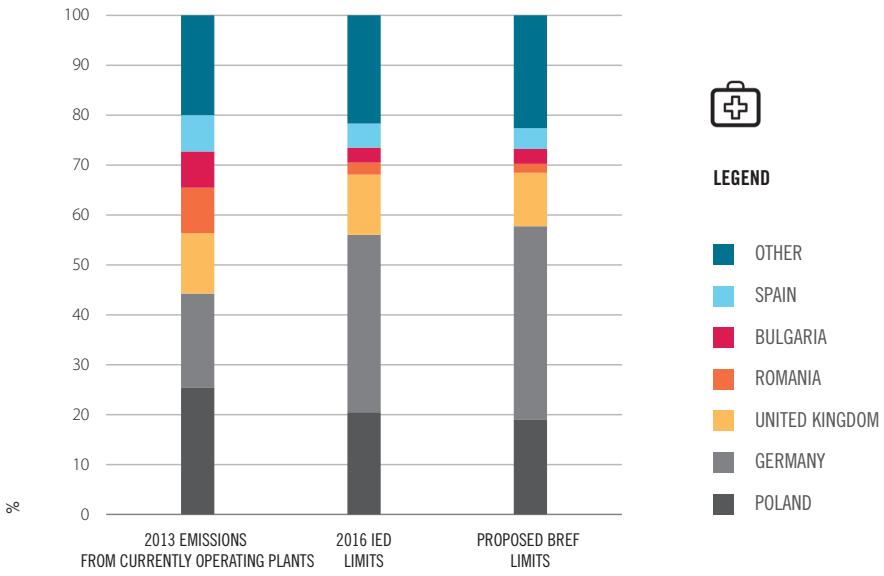


BEST AVAILABLE TECHNIQUES (BAT)

FIGURE 9.

WHICH COUNTRY'S PLANTS ARE RESPONSIBLE FOR THE PREMATURE DEATHS?

AS A PERCENTAGE WITHIN EUROPE



SELECTIVE CATALYTIC REDUCTION FOR LIGNITE PLANTS

Lignite, or 'brown coal', is one of the worst-polluting fuels currently in use. Meeting the stricter NO_x limits at the lower level of the BAT range would require lignite plants to implement a technique called Selective Catalytic Reduction (SCR).

SCR enables dangerous NO_x pollution to be cut by a further 85-95 percent beyond reductions already achieved through boiler tuning. It is a standard technique for EU hard coal plants and has been successfully implemented for lignite at Oak Grove in Texas, USA. The technology is also widely used in heavy duty trucks in order to meet EURO VI NO_x pollution standards.

The currently proposed BREF limit for NO_x for lignite is 175mg/Nm^3, with a lower BAT range of <85mg/Nm^3. In fact, SCR can reduce NO_x emissions even further to 40mg/Nm^3, which is less than an eighth of the current EU average of 330mg/Nm^3.

Only one lignite plant in the EU, Sostanj 6 in Slovenia, currently has SCR operational. However, all existing hard coal plants in Austria, Germany, Italy, the Netherlands, and France already have SCR in place that could reduce NO_x emissions to less than 60mg/Nm^3 if operators were obliged to operate it to its full potential.

National decision makers can demonstrate a commitment to the health of their citizens by ensuring that emissions levels are set in line with BAT.

CHAPTER 3.

DEADLY DEROGATIONS

COAL'S PERMISSION TO POLLUTE

3.

HOW COAL PLANTS ARE CURRENTLY EVADING IED LIMITS

The model results from the previous chapter show that the IED limits, which came into force from January 2016, should have already yielded huge health benefits across Europe. However, **this report finds that with more than half of European coal power plants enjoying permission to pollute above IED limits, the exception has become the rule for coal power.**

IED binding emissions limits on the three main air pollutants NO_x, SO_2 and dust were based on the upper range (more polluting) limits set in the first LCP BREF published in 2006. The IED legislation adopted in 2010 ensured that the limits would apply for existing plants as from 1 January 2016.[12]

However, while the IED was being negotiated many Member States, in particular eastern European countries and Greece, Finland and the UK, lobbied to create loopholes for their plants.[13] As a result the directive contains numerous 'derogations', built-in exceptions to the usual rules that include relaxations and time extensions allowing existing plant operators to avoid the IED limits until as late as 2024.[14]

Derogations have significantly undermined efforts to reduce harmful emissions across Europe, granting coal power plants permission to exceed limits for up to eight years. By 2024, many plants will have spent 18 years polluting at levels above those agreed as technically and economically feasible in the 2006 LCP BREF.

This study highlights seven derogations which European coal power plants are currently using in order to evade IED limits. EU and national lists were compared to identify which coal plants are taking advantage of each derogation.

The grounds for granting these derogations is extensive and includes plants that intend to close within eight years, that are operating for a limited number of hours, that are in EU accession countries, that provide heating to the local area, that burn indigenous fuel or that are located on small islands. A full list of these derogations can be found in Table 4.

The results are startling. **At the time of writing in October 2016, 56 percent of all European coal plants do not have to comply with the 2016 IED limits.** These coal plants were responsible for 60 percent of the 22,900 premature deaths caused by coal power plants and exposed in the original Europe's Dark Cloud report.

This is a huge wake up call for decision makers about how derogations are currently impacting the health of European citizens and undermining efforts to strengthen emissions limits. A review of ongoing derogations should be conducted and no further derogations should be granted.

12 The emission limit values referred to in Annex V of the IED, the so-called 'EU Safety net': http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN

13 See political agreement 10998/09 LIMITE of 15 June 2009 obtained by the EEB: http://www.eeb.org/EEB/assets/File/10998-09%20LIMITE.pdf. BG, EE, EL, CY, PL, PT, RO, SI, UK were responsible for watering down on all counts. IT, LT also supported the others to extend the TNP up to 2023. ES and IE wanted to introduce a different reference period in order to calculate higher emissions ceilings. EL fought for 32,000 hours LLD version. PL and SK wanted weaker district heating derogation; ES, PL, RO, SK, UK wanted to have even more relaxation for indigenous solid fuels derogation.

14 See the EEB briefing for more information on the main changes brought by the IED and derogations: http://www.eeb.org/?LinkServID=290B7936-ADF0-4AD8-D16350AB49EE7DFC&showMeta=0&aa

TABLE 4. DEROGATIONS TO IED LIMITS

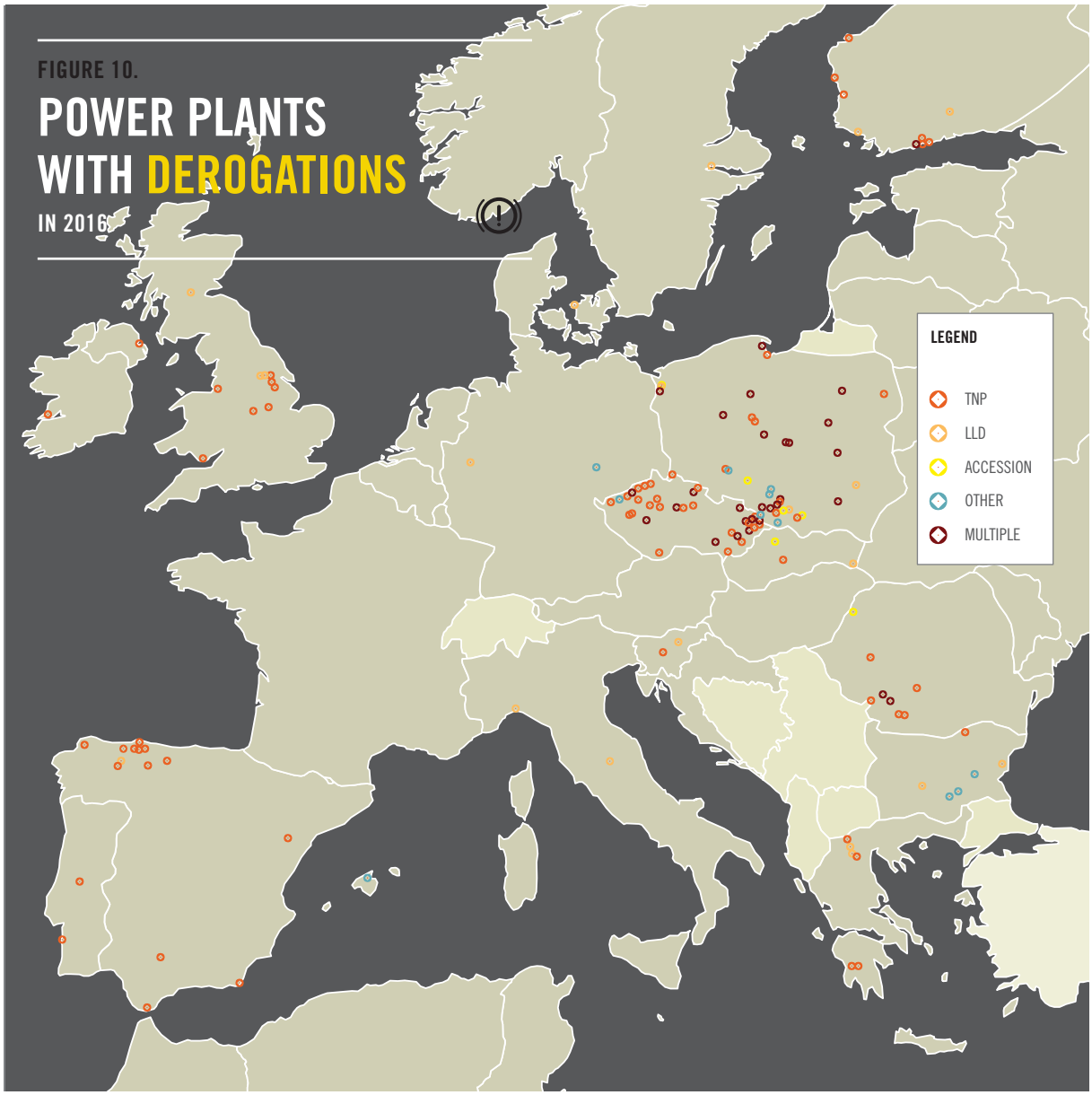
Name of derogation (see annex ii)	What does it mean?	Who gets it?	Number of coal plants identified with derogation[15]	2013 premature deaths from the coal plants identified
Transitional National Plan (TNP)	Postpones full compliance with IED limits by 4.5 years from Jan-2016 to Jul-2020 Operators can trade pollution allowances and limit values do not apply at the plant level. The pollution bubble decreases from 2016-2020.	National governments had to make an application to the EU on behalf of their plants.	99	9,170
Limited Lifetime Derogation (LLD)	IED limits do not apply for coal plants operating up to 17,500 hours until 2024 when they must either be closed or reopened as a "new" plant.	Any plants meeting the criteria. National governments informed EU.	30	3,380
Peak load	Less strict IED limits if the coal plant runs less than 1,500hours/year. (450mg/Nm^3 NO_x and 800mg/Nm^3 SO_2 instead of 200mg/Nm^3) This derogation is not set to expire and can be used indefinitely until new rules are imposed.	Any coal plant declaring it will limit running to 1,500 hours.	n/a	n/a
Accession Treaty	Postpones full IED compliance until 2018.	Some coal plants in Poland and Romania.	24	3,940
District Heating (CHP)	IED limits do not apply for coal-burning district heating power plants for 7 years to 2023.	Coal plants with district heating (<200MWth, >50% of waste heat used).	19	420
Burning of indigenous solid fuels ('Desulphurisation Rate Derogation')	More generous IED levels for SO_2 for plants burning indigenous coal.	Some lignite plants, such as Lippendorf in Germany. Andorra in Spain, Brikel & Maritsa 3 in Bulgaria.	at least 4	660
Small isolated systems	IED limits do not apply for coal plants on small islands until 2020.	Alcudia II (Spain), Bois Rouge (France).	2	83
TOTAL (note: is not a straight sum of each derogation, because some coal plants have more than one derogation)			**143 out of 257 (56%)**	**13,560 out of 22,900 (60%)**

15 Sources: Derogations on LLD, CHP and Small isolated systems based on list from European Commission obtained by the EEB. TNP: CIRCA-B website and Official Journal of the EU. Accession Treaty, Burning of indigenous solid fuels: Own assumptions. Official Data: Andorra and Lippendorf.

FIGURE 10.

POWER PLANTS WITH DEROGATIONS

IN 2016



UK COAL: ABERTHAW HIT FOR SIX TIMES THE LEGAL LIMITS

While the UK government's pledge to phase out coal is to be welcomed, its decision to allow UK operators to use the TNP derogation will mean many coal plants are actually allowed to increase their emissions in the years before they close.

For a single plant, RWE Aberthaw in Wales, an emissions ceiling was set for NO_x at an incredible 27,843 tonnes. This figure was based on emissions of 1,200mg/Nm^3 - *six times* the 200mg/Nm^3 limit set in the IED.

Just weeks before this report was published, and following advice from the EEB and its member Friends of the Earth England, Wales and Northern Ireland, the European Court of Justice ruled[16] that the emissions ceiling granted to Aberthaw was illegal under European law. Yet in the first half of 2016 the plant had already emitted 11,003 tonnes of NO_x, almost four times the 4,800 tonnes permitted under IED limits. In light of the ruling, Aberthaw should be removed from the TNP and moved to the peak load derogation until closure.

But Aberthaw is not an exception. Across the UK the TNP derogation has led to 2016 emissions ceilings for eight plants being set significantly higher than their actual reported emissions for 2013. For SO_2 this was 25 percent higher (104Kt versus 83Kt) and for dust 300 percent higher (13Kt versus 3Kt). For NO_x, although the total 2016 allowance was less than the 2013 reported emissions, it was still significantly more than the eight TNP plants would emit. Actual emissions for the first six months of 2016 for these plants were 28Kt, just over a third of the 75Kt annual ceiling, demonstrating the significant over-allocation in the TNP scheme.

Sky-high emissions ceilings well beyond what is actually being emitted are clearly not an effective means to reduce pollution and benefit the health of people breathing in coal's 'dark cloud'.



ABERTHAW POWER STATION, WALES, UK.
© cliff hellis

16 Judgment of the Court of 21 September 2016 in Case C-304/15 http://curia.europa.eu/juris/document/document.jsf?text=&docid=183607&pageIndex=0&doclang=EN&mode=req&dir=&occ=first&part=1&cid=1023588

17 For more information on what the TNP is about, please check the EEB Briefing http://www.eeb.org/EEB/?LinkServID=8520E4D5-A967-566A-8BC46FC1EEDDD956

DEROGATIONS TO IED LIMITS

The Transitional National Plan (TNP) is the most deadly derogation by far. The TNP delays the full impact of IED by four and a half years to July 2020. Thirteen national governments applied for and obtained the TNP derogation for their coal plants: Bulgaria, the Czech Republic, Finland, Greece, Hungary Ireland, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and the United Kingdom.

Although the TNP 'phases-in' IED limits, it uses a tradable emissions bubble system, which means in practice coal power plants can pollute at much higher levels. The TNP's 'allowance bubbles' are based on the the generous maximum emission levels set in the 2001 Large Combustion Plants Directive, even if real emissions are lower. Less-polluting plants can trade their allowances with other operators participating in the TNP derogation. The trading system means that the highest levels of pollution are reached at the national level.[17]

In general it is national authorities that unilaterally decided to grant the optional TNP derogations without any public participation. The EEB, in collaboration with HEAL, initiated challenges against the European Commission for granting the TNP without proper public participation. However, these challenges were dismissed because of the EU's incomplete implementation of the Aarhus Convention.[18] Further legal challenges initiated by EEB members (e.g. Frank Bold Society in the Czech Republic, IIDMA in Spain) are ongoing in order to prevent certain plants from being granted extra pollution rights under the TNP.

This study found that 99 out of 257 coal power plants are using the TNP derogation. The 99 plants were responsible for 40 percent of all premature deaths caused by the reported 2013 emissions (9,170 of the 22,900 deaths).[19]

Although the TNP derogation will end in July 2020, it is likely many of the coal plants using it will then swap into the 'peak load' derogation, where they can continue avoiding the full IED limits indefinitely.

The next two most-used derogations are:

- The **Limited Lifetime derogation (LLD)**, which means coal plants due for closure can ignore IED limits for a further 8 years, until 2024.
- The **Accession Treaty derogation**, where 24 very polluting coal power plants in Poland and Romania are still able to evade lower IED NO_x and SO_2 limits.

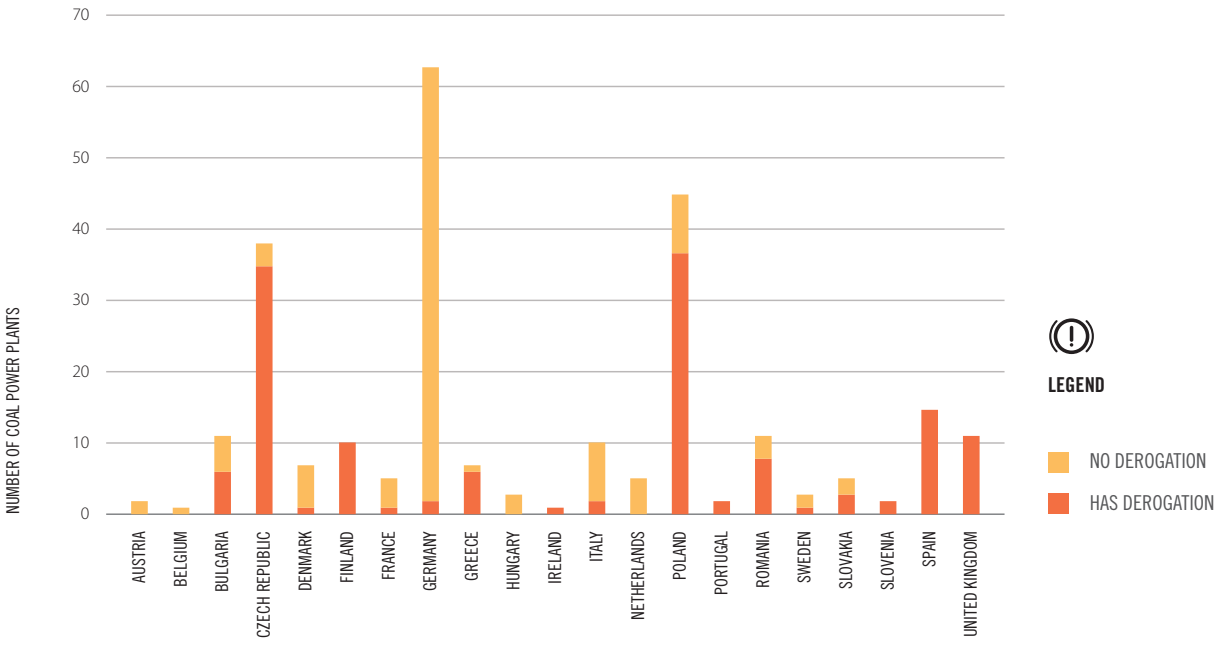
The countries with the most derogations in total are mostly those which also applied for TNP derogations for their plants – see Figure 11. Six countries have 100 percent of their coal fleet under derogation. **This means there are no coal power plants in Finland, Ireland, Portugal, Slovenia, Spain or the UK which are currently required to meet the IED limits.**

18 Requests for internal reviews are available here: http://ec.europa.eu/environment/aarhus/requests.htm
19 Based on an analysis of all 257 coal power plants operating in October 2015, for which 2013 emission data was available.
20 For Poland see: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12003TN12/13/D

FIGURE 11.

COAL POWER PLANTS WITH IED DEROGATIONS

SEPTEMBER 2016



DEROGATIONS: POLAND'S POLLUTION PICK AND MIX

Certain Member States combine several derogations to permit coal plants to pollute at astonishing levels. In Poland derogations to the emissions limits set in the 2001 LCP Directive negotiated in the Accession Treaty[20] are combined with the 17,500 hours LLD or the TNP.

All five boilers of the Adamow plant (each 351MWth) are allowed to apply an emission limit of 996/500/100mg/Nm^3 for SO_2, NO_x and dust until 2024, whilst the outdated 2001 LCP Directive limits applicable from 2016 would apply 400/200/50mg/Nm^3. Under the IED, each of those boilers would have to comply with limits of 200/200/20mg/Nm^3. The Adamow plant is ranked 5th among the Polish and 19th out of EU plants that caused the most premature deaths in 2013.[21]

START-UP / SHUT-DOWN EXCEPTION

It is also worth highlighting a further derogation: **no coal power plants need to comply with full IED limits while starting up or shutting down**. In fact, while pollution permits should contain measures relating to start-up and shut-down, such as the use of cleaner fuels, the common national practice is to simply discard measurements obtained during these phases when assessing compliance.

Coal power plants emit much higher levels during start-up periods, and therefore even coal plants which have not been granted a derogation are still not required to comply with the IED limits all of the time.[22] The impact of this exception is not modelled in this report.

BREF DEROGATION - IED ARTICLE 15(4)

The IED provides one final derogation that can be used to give permission to pollute beyond the levels set in the BREF. This exception can be found in Article 15(4). of the IED and, unlike other derogations, will never expire unless the law is changed.

While the IED was being drafted many Member States opposed moves to make it more difficult to achieve this derogation.[23] Even so, plant operators prefer to avoid resorting to this loophole because it requires a public consultation to be held before being granted.

It must also be shown that implementing the BREF levels would lead to "disproportionately higher costs compared to the environmental benefits".

However, no criteria have been issued on how to judge whether costs are disproportionate and as a result decisions are likely to be highly subjective.

The damage caused by existing loopholes in the IED and exposed in this chapter should warn against opening the door to any future derogations from the BREF standards and Member States should refuse to grant any Article 15(4) derogations.

To make up for unduly high levels of pollution caused by the delay in the BREF revision and extensive derogations to IED limits, BAT emissions levels should be imposed much earlier than 2021 and consistently for all coal plants.

Polluters, with the support of some Member States, have lobbied for new loopholes in the revised BREF, which should be removed before the document is adopted (see recommendations in Chapter 4).

21 'Europe's Dark Cloud: How Coal-Burning Countries are Making their Neighbours Sick', HEAL, CAN, WWF EU, Sandbag, 2016, https://wwf.fi/mediabank/8633.pdf.

22 Due to lobbying by certain Member States, especially the UK and Poland, start-up and shut-down periods are not even counted towards the 17,500 hours when a plant is using the LLD.

23 These were BG, IT, LT, LV, MT, PL, and the usual suspect: UK. France also did not support the stronger text by European Parliament.

CHAPTER 4.

CONCLUSIONS

LIFTING EUROPE'S DARK CLOUD

4.

Decision makers must put the public interest ahead of short-sighted industry demands and act to cut emissions at their source. When limits are set they must demonstrate a real commitment to protecting human health and not amount to permissions to pollute for Europe's dirtiest fuel.



BEŁCHATÓW POWER STATION, POLAND.
© Jacek

The enormous benefits of cutting pollution from coal-fired plants was demonstrated in Chapter 2. This chapter lays out some of the concrete steps that must be taken in order to ensure the greatest possible health benefits for European citizens, and to reduce the external costs to society from air pollution.

In the run up to, and following, the adoption of the revised LCP BREF in late 2016, specific measures should be taken at both the European and national levels.



EU ACTIONS

REMOVE LOOPHOLES IN THE LCP BREF (BAT CONCLUSIONS)

There is still time to remove loopholes from the latest draft of the revised LCP BREF. The following measures would lead to a significantly more effective final document:[24]

a. A fair definition of what constitutes a "new" plant

Emissions range levels depend on whether plants are classified as "new" or "existing". The distinction is made based on the permit issue date and whether or not the plant's boiler has been completely replaced. Many plants that could be fairly considered "new", either because they already performed relatively well, or because they have been significantly retrofitted, including with the latest pollution control equipment, would nevertheless be considered as "existing plants", and therefore subject to more lenient pollution limts.

b. Delete footnote exceptions for "plants put into operation no later than 7 January 2014"

A number of footnotes in the current draft explicitly provide for higher levels of pollution for "plants put into operation no later than 7 January 2014". This exception, based on an arbitrary date and without a technical basis, would relax the daily upper emission level for 98 percent of coal and lignite LCPs in Europe and should therefore be removed. These relaxations would effectively align new daily averaged pollution levels with the already binding levels in the IED, thereby failing to achieve any improvement or move towards the reduced pollution limits possible with BAT.

c. Remove explicit relaxations for pre-1987 'peak load' plants

Special exceptions have been made for the oldest plants operating below a certain number of hours each year.[25] These plants are used on occasion to meet peak demand and are often particularly polluting. The 'Article 15(4)' derogation already exists to allow these plants to operate.[26] However, by offering an explicit relaxation here the need for public consultation and approval by authorities is circumvented. Because this exception has been extended to lignite and fluidized bed coal LCPs, it could effectively double the concentrations of NO_x emitted from these plants in Bulgaria, Czech Republic, Poland, Romania, Slovenia and Slovakia[27] and, as these plants are often used to meet winter demand, exacerbate air quality when it is already at its worse due to smog formation.

d. Delete or amend the derogation for high-sulphur lignite combustion

Burning high-sulphur lignite leads to very high levels of SO_x emissions. Yet a derogation currently in the text will allow a handful of badly-performing plants to emit almost three times more than the upper BAT range level.[28]

e. Provide clarity about average emissions periods

At present it is not clear whether emission levels will have to be met based on annual or daily averages, or whether both will apply. Dangerous daily peaks should not be able to be disguised in acceptable annual averages.

SPEED UP THE ADOPTION AND PUBLICATION OF THE REVISED LCP BREF

Despite the many loopholes and derogations contained in the current draft of the document, it is essential that a revised LCP BREF be adopted this year.

The current LCP BREF review process started at the end of October 2011 and should have been completed by August 2014. As of October 2016 that has yet to happen.[29] Industry interventions have successfully delayed the process by more than two years, with serious consequences for human health.

At the time of publication (10 October 2016) 44,515 premature deaths and a health bill of between 64.9 and 123.2 billion euros could have been avoided if coal operators had been required to meet demonstrated BAT since the time the revised BREF had been due to be published in August 2014.[30]

24 For more information on these recommendations, see EEB input provided to Member States' experts: http://www.eeb.org/EEB/assets/File/EEB%20Comments%20Forum_LCP%20BREFD1.pdf

25 The main one being a derogation allowing NO_x emissions up to 340mg/Nm^3 instead of 150mg/Nm3, which has been pushed for by the UK to prevent expensive retrofits for NO_x pollution control (SCR) to their pulverised hard coal boilers. The European Commission has now even extended this relaxation to other type of existing hard coal boilers and to lignite plants.

26 See Chapter 3

27 Calculated from 2015 EU -ETS emissions data this could benefit to about 11GWel of low load (<40%) lignite plants which currently exceed the IED minimum binding 200mg/NO_x limit

28 These are most likely the following plants: 5 Bulgarian Maristsa East 2 (BG-8), East 3 (BG-9), Marisa 3(BG-3), Bobov Dol (BG-4) and Brikel (BG-14); 2 in Czech Republic Prunerov (CZ-12) and Opatovice (CZ-33); 2 Greek Megapoli A (EL-7) and B (EL-8), the Spanish Teruel/Andorra (ES-6), the Slovakian Novaky (SK- 14) and the German Lippendorf (DE-28) totalling 2,750 premature deaths

29 The IED says every 8 years, the current LCP BREF was adopted in July 2006

30 EEB 'death ticker' data as of 10 October 2016: http://www.eeb.org/index.cfm/death-ticker/

It should not be forgotten that these BAT levels were set on the basis of 2010 emissions data from plants operating under economically and technically viable conditions at that time. BAT levels have therefore been demonstrated by certain plants for at least six years.

In the face of this evidence further delays are clearly no longer acceptable. **The final revised LCP BREF must be agreed and voted on in late 2016 and published early in 2017 to ensure the minimum standards are met by 2021.**

IMPROVE THE IED

a. Review the 'IED 2016 limits' (IED minimum binding limits) to reflect the updated levels set in the revised LCP BREF

The European Commission should revise the outdated minimum binding emission limit requirements on NO_x, SO_2 and dust, which were set in 2010 when the IED was adopted.[31] These should be updated to match the best performing BAT levels recognised in the revised BREF.

Article 73 of the IED requires the European Commission to review the 'EU safety net' if there is a need for Union action to prevent or reduce the impact of large combustion plants on the environment or in order to ensure consistent implementation of Best Available Techniques.

This report shows there are significant impacts and potential gains from stricter limits. A compliance deadline for the new limits should be set for 2024 at the latest. This would not only promote a level playing field for industry (currently demonstrated as uneven by the large number of derogations implemented by various Member States) but also deliver the significant benefits to public health and environmental protection demonstrated in Chapter 2, thus reducing existing health inequalities linked to the uneven levels of pollution across Europe.

Current limits for mercury emissions should also be included[32] and further pollutants should be added, including fluorides and hydrochloric acid. New pollution levels should be continuously monitored in order to ensure compliance.

Further, **emissions limits in line with BAT shall also apply during start-up or shut-down periods** which can last many hours. These periods are likely to occur more often in future as coal is increasingly used as a backup energy source to meet peak demands, meaning plants are brought on and off line more frequently.

While renewables are flexible and clean, coal power plants are currently allowed to operate under special conditions and pollute more when responding to changes in energy demand. This is not acceptable. As emissions are very high during start-up, operators should be required to use cleaner gaseous fuels at this time and to make sure associated emissions are abated.

b. Scrap the desulphurisation rate derogation

A review of the desulphurisation rate derogation is due before 2020. The Commission should act sooner to scrap it entirely. This exception has no technical basis and constitutes an indirect subsidy for burning the worst lignite fuels. The derogation currently allows operators to reduce desulphurisation unit operation costs. Because high-sulphur lignite is so polluting, even after having removed 97 percent of the sulphur, burning the fuel under this derogation still results in higher levels of pollution (in particular SO_x, dust and mercury) compared to the standard BREF level.

c. Make BAT benchmarks on energy efficiency obligatory

In order to fully implement the potential energy efficiency improvements set under the revised LCP BREF, the IED provision should be amended in order to require those BAT benchmarks to be obligatory.[33]

d. Publish emissions monitoring data online

Raw data of Continuous Emissions Monitoring (CEM) devices should be made publicly available for all facilities, this could be considered as a requirement for a future review of the European Pollutants Release and Transfer Register (E-PRTR).

31 These are the minimum binding limits that came into effect on 1 January 2016 and were used to create the '2016 IED limits' scenario in Chapter 2.

32 The European Commission and Member States should support proposals of the European Parliament under the Minamata Convention implementation on mercury emissions limits in line with the lower end of the BAT range as well as maximum mercury content in fuels.

33 With the European Emissions Trading Scheme (EU-ETS), it is left to the discretion of Member States on whether they want to impose energy efficiency performance requirements set in BAT on their operators.

NATIONAL ACTIONS

QUICKER AND STRICTER NATIONAL IMPLEMENTATION (BAT STANDARDS)

EU legislation on environmental protection sets minimum standards and maximum deadlines. Considering the major health benefits demonstrated in this report, Member States should take advantage of the opportunity to do more than European minimum standards in the interests of protecting their citizens.

The responsible authorities in each Member State should set pollution limits based on BAT and implement them well in advance of the four year deadline. Investments in pollution reduction techniques should never be used to justify extending plant life.

Responsible authorities should take note of the potential to reduce premature deaths and total health costs laid out in this report. They should act quickly to implement pollution limits based on the established, tried-and-tested Best Available Techniques set out in the stricter BAT range of the BREF. They can do so by revising national laws where they exist[34] and by updating operating permits.

Member States should refuse to grant any Article 15.4 derogations.

100% COAL PHASE OUT

A commitment to phase out coal entirely and speed-up the transition to renewable sources of energy and reduced energy consumption must be made by governments to demonstrate their commitment to the well-being of citizens and the environment. Finland and the United Kingdom have pledged to phase out coal completely. Belgium became coal-free this year and Austria will by 2025 or earlier. Other countries must now catch up.

CUTTING COAL TO MEET NATIONAL EMISSIONS CEILINGS

By 2019 Member States will have to have set out how they plan on meeting new annual national emissions ceilings set in the National Emissions Ceilings Directive (NEC-D)[35] to be achieved by 2030 for five pollutants including SO_2, NO_x and $PM_{2.5}$. From a preliminary analysis,[36] applying the 'BAT scenario' would mean that 14 out of 21 coal-burning countries would immediately meet their SO_2 NEC commitments, a further four (Austria, Denmark, France and Poland) could bring the SO_2 levels to less of 7 percent of the total country allowance for 2030.

Applying the 'BAT scenario' for NO_x emissions would mean that five countries (Belgium, Bulgaria, Czech Republic, Greece and Poland) would immediately be able to bring the share of their coal NO_x emissions of the total country NO_x allowance to below 10 percent of the total country NO_x allowance.

Belgium, Finland, Ireland, the Netherlands, Portugal, Romania, Sweden, Slovakia, Slovenia and Spain could all meet their 2030 NEC Directive SO_2 commitments entirely and immediately, if they choose to phase out coal. For Bulgaria and the Czech Republic, a total coal phase-out would be enough to meet their total NEC commitments for both SO_2 and NO_x.

34 So-called 'General Binding Rules' which shall be updated to take into account developments in BAT (Article 17 of the IED).

35 New Directive on the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC, not yet published.

36 A full assessment on the role of coal emissions and the new NEC-Directive will be made in an upcoming EEB publication later in 2016.

POTENTIAL BENEFITS OF QUICKER AND STRICTER NATIONAL IMPLEMENTATION

The benefits of implementing the lower, stricter limits are particularly clear for NO_x emissions from lignite power plants. If the stricter BAT range set at <85mg/Nm^3 were implemented. Retrofits of secondary NO_x abatement with catalysts (SCR) can reduce NO_x emissions by 85-95 percent down to 40 mg/Nm^3, compared to the 2013 EU average of 330mg/Nm^3. The IED limit is 200mg/Nm^3 and the proposed BREF upper limit 175mg/Nm^3.

Implementing the stricter BAT level would cut the death toll from the EU's 83 lignite plants from 4,100 to 1,400 with the associated health bill reduced from 11.2 to 3.9 billion euros. This represents an annual saving of 7.3 billion euros.

In Germany, the emissions limit for NO_x on lignite plants was set at 200mg/Nm^3, already matching the 2016 IED limits (under national law 13. BImSchV of 20 July 2004). This has led to average emissions of around 170-195mg/Nm^3 for NO_x at German lignite plants. Proposed BREF scenario limits would only lead to marginal improvements and, more importantly, would enable operators to circumvent applying the more effective NO_x abatement (SCR).

For plants that went into operation after 2014 the maximum level in German law (13. BImSchV of 2 Mai 2013) is set at 100mg/Nm^3, which normally requires SCR for lignite plants as well. The German authorities will need to decide whether their revised law will truly reflect BAT performance for existing plants or side with polluters which are concerned about cost implications and profit margins, whilst ignoring the wider externalised public costs of operating at sub-standards.

The 16 German lignite plants currently operating within the IED limit are responsible for 2,400 premature deaths and externalised economic costs of 6.4 billion euros evey year. By implementing BAT limits almost 2,000 premature deaths could be prevented and public health savings of 4.5 billion euro achieved each year in Germany alone.

ANNEX I
HEALTH IMPACTS OF NEW LIMITS

ANNEX I TABLE 1. DEATHS BY COUNTRY

Country	2013	2016 IED limits	Proposed BREF limits	Best Available Techniques (BAT)
Austria	20	20	20	10
Belgium	40	40	40	10
Bulgaria	1,570	340	250	160
Czech Republic	1,410	600	440	190
Denmark	50	40	40	20
Finland	100	50	40	10
France	390	230	160	40
Germany	4,350	4,070	3,440	1,050
Greece	550	250	200	70
Hungary	200	130	100	30
Ireland	110	50	30	10
Italy	620	510	420	120
Netherlands	290	290	280	90
Poland	5,820	2,330	1,660	430
Portugal	110	110	90	10
Romania	2,160	280	200	60
Slovakia	530	60	40	10
Slovenia	200	140	100	30
Spain	1,530	530	360	60
Sweden	0	0	0	0
United Kingdom	2,860	1,340	930	210
TOTAL	**22,900**	**11,400**	**8,900**	**2,590**

ANNEX I TABLE 2. NEW CASES OF CHRONIC BRONCHITIS IN ADULTS

Country	2013	2016 IED limits	Proposed BREF limits	Best Available Techniques (BAT)
Austria	10	10	10	0
Belgium	20	20	20	0
Bulgaria	800	170	130	80
Czech Republic	730	310	220	90
Denmark	20	20	20	10
Finland	40	20	20	0
France	200	120	80	20
Germany	2,020	1,870	1,570	410
Greece	340	160	130	50
Hungary	100	70	50	10
Ireland	60	20	20	0
Italy	370	310	260	70
Netherlands	130	130	130	30
Poland	2,910	1,160	830	210
Portugal	80	80	60	10
Romania	1,100	140	100	30
Slovakia	270	30	20	10
Slovenia	120	80	60	20
Spain	1,050	370	250	50
Sweden	0	0	0	0
United Kingdom	1,430	690	480	90
TOTAL	**11,800**	**5,800**	**4,500**	**1,200**

ANNEX I TABLE 3. DAYS OF CHILDREN SUFFERING FROM ASTHMA SYMPTOMS

Country	2013	2016 IED limits	Proposed BREF limits	Best Available Techniques (BAT)
Austria	390	390	380	140
Belgium	740	740	710	140
Bulgaria	39,160	8,150	6,080	3,800
Czech Republic	30,700	12,860	9,440	3,960
Denmark	1,020	920	890	390
Finland	1,630	920	670	140
France	9,300	5,570	3,770	730
Germany	87,650	81,410	68,410	17,820
Greece	18,820	9,420	7670	2,730
Hungary	4,530	2,960	2,210	640
Ireland	2,790	1,200	810	150
Italy	16,580	13,810	11,630	3,260
Netherlands	5,940	5,940	5,890	1,360
Poland	127,580	51,720	37,190	10,050
Portugal	3,560	3,550	2,840	540
Romania	53,720	6,670	4,860	1,370
Slovakia	11,190	1,290	970	280
Slovenia	5,130	3,570	2,630	650
Spain	48,430	16,940	11,640	2,350
Sweden	40	40	40	20
United Kingdom	69,370	33,700	23,110	4,350
TOTAL	**538,300**	**261,800**	**201,800**	**54,880**

ANNEX I TABLE 4. LOST WORKING DAYS

Country	2013	2016 IED limits	Proposed BREF limits	Best Available Techniques (BAT)
Austria	4,470	4,470	4,400	1,540
Belgium	11,240	11,240	10,910	1,890
Bulgaria	410,960	78,320	56,950	36,980
Czech Republic	469,110	190,100	138,580	58,190
Denmark	14,690	13,450	13,110	5,200
Finland	23,780	13,650	9,950	1,830
France	115,650	68,340	45,780	7,170
Germany	1,337,490	1,232,840	1,026,510	235,580
Greece	149,020	70,790	55,660	16,140
Hungary	56,060	37,110	26,980	6,890
Ireland	29,150	11,850	7,880	1,080
Italy	190,660	156,040	128,970	30,900
Netherlands	92,450	92,450	91,620	17,610
Poland	1,671,530	654,320	462,730	108,770
Portugal	37,540	37,500	29,940	3,600
Romania	553,510	62,460	45,040	10,960
Slovakia	157,450	16,210	11,830	3,010
Slovenia	60,230	43,860	31,610	6,790
Spain	532,570	180,560	120,070	14,970
Sweden	440	440	430	240
United Kingdom	657,770	330,350	223,800	31,010
TOTAL	**6,575,790**	**3,306,400**	**2,542,700**	**600,340**

ANNEX I TABLE 5. TOTAL HEALTH COSTS (BILLION EUROS)

Country	2013		2016 IED limits		Proposed BREF limits		Best Available Techniques (BAT)	
	Low	High	Low	High	Low	High	Low	High
Austria	30	50	30	50	20	50	10	20
Belgium	50	100	50	100	50	100	10	20
Bulgaria	2,330	4,380	500	930	370	700	230	430
Czech Republic	2,050	3,880	870	1,650	640	1,220	270	510
Denmark	70	130	60	110	60	110	30	50
Finland	140	260	80	150	60	110	10	20
France	570	1,080	340	640	230	440	50	100
Germany	6,190	11,860	5,790	11,090	4,890	9,370	1,460	2,830
Greece	840	1,560	390	720	310	570	100	190
Hungary	290	560	190	370	140	270	40	70
Ireland	150	290	70	130	50	90	10	20
Italy	920	1,720	760	1,420	630	1,190	180	340
Netherlands	410	780	410	780	400	770	120	230
Poland	8,440	16,030	3,380	6,420	2,410	4,580	620	1,170
Portugal	170	310	170	310	130	250	20	40
Romania	3,210	6,030	410	770	300	560	90	160
Slovakia	780	1,470	80	160	60	120	20	30
Slovenia	300	560	210	390	150	290	40	70
Spain	2,330	4,330	810	1,510	550	1,020	100	180
Sweden	0	10	0	10	0	10	0	0
United Kingdom	4,050	7,770	1,920	3,660	1,330	2,540	290	570
TOTAL	**33,300**	**63,200**	**16,500**	**31,400**	**12,800**	**24,300**	**3,680**	**7,060**

ANNEX II
PLANTS WITH DEROGATIONS

2013 Currently operating plants
IED 2016 IED limits
BREF Proposed BREF limits
BAT Best Available Techniques

AT Accession Treaty
DH District Heating
DR Desulphurisation Rate
LLD Limited Lifetime
SIS Small isolated systems
TNP Transitional National Plan

ANNEX II TABLE 6. DEROGATIONS OVERVIEW

COUNTRY / Plant name	Coal type	MW	PREMATURE DEATHS				Derogation
			2013	IED	BREF	BAT	
BULGARIA							
Ruse Iztok	Hard coal	368	18	8	6	1	**TNP**
Brikel	Lignite	184	17	14	11	9	**DR**
Plovdiv North	Lignite	46	1	1	1	0	**LLD**
Sliven	Lignite	28	17	3	2	1	**DH**
Deven	Hard coal	791	48	24	16	4	**LLD**
Maritsa 3	Lignite	100	19	10	8	6	**DR**
CZECH REPUBLIC							
Melnik II / III	Lignite	662	98	35	25	6	**TNP**
Prunerov	Lignite	1371	145	74	53	41	**TNP**
Ceskoslovenske Armady (CSA)	Hard coal	24	14	3	2	1	**DH / TNP**
Karvina	Hard coal	28	18	6	4	1	**TNP**
Kladno	Lignite	406	50	25	18	5	**TNP**
Kolin	Lignite	15	17	3	2	0	**DH / TNP**
Ledvice	Lignite	405	109	26	19	5	**TNP**
Olomouc	Hard coal	38	13	6	4	1	**TNP**
Trebovice	Hard coal	155	77	21	15	3	**DH / TNP**
Vitkovice	Hard coal	73	17	5	3	1	**TNP**
Opatovice	Lignite	334	101	34	24	19	**TNP**
Plzen	Lignite	128	52	15	11	3	**TNP**
Pocerady	Lignite	920	158	82	59	15	**TNP**
Brno Spitalka	Lignite	63	1	1	1	1	**LLD / TNP**
Chomutov	Lignite	24	13	2	2	0	**DH / TNP**
Malesice	Hard coal	101	4	2	1	0	**TNP**
Prerov	Hard coal	56	27	7	5	1	**DH / TNP**
Pribram	Lignite	41	15	3	2	1	**DH / TNP**
Tisova	Lignite	253	63	23	16	4	**TNP**
Budejovice	Lignite	49	27	5	4	1	**TNP**

ANNEX II TABLE 6. DEROGATIONS OVERVIEW - CONTINUED

COUNTRY / Plant name	Coal type	MW	PREMATURE DEATHS				Derogation
			2013	IED	BREF	BAT	
Usti nad Labem	Lignite	23	8	2	1	0	TNP
Porici II	Lignite	152	17	9	7	2	TNP
Dvur Kralove	Lignite	17	5	5	5	5	DH / TNP
Zlin	Lignite	61	9	4	3	1	TNP
Chvaletice	Lignite	736	59	46	33	8	TNP
Plzenska	Lignite	83	20	5	3	1	TNP
Frydek-Mistek	Lignite	88	4	2	2	0	TNP
Koprivnice	Lignite	165	3	1	1	0	TNP
Krnov	Hard coal	43	5	2	1	0	DH / TNP
Detmarovice	Hard coal	736	51	36	25	6	TNP
Ostrov	Lignite	32	5	5	5	5	DH
Privoz	Hard coal	14	8	3	2	0	DH / TNP
Trmice	Lignite	231	30	8	6	1	TNP
Hodonin	Lignite	92	14	6	5	1	TNP
Melnik I	Lignite	324	45	29	21	5	TNP
GERMANY							
Marl	Hard coal	175	44	41	36	8	LLD
Lippendorf	Lignite	1750	223	174	131	100	DR
DENMARK							
Asnaes	Hard coal	1015	10	5	4	2	LLD
GREECE							
Agios Dimitrios	Lignite	1456	270	106	77	18	TNP
Amintaio	Lignite	546	78	34	25	6	LLD
Melitis (Florina)	Lignite	289	7	7	7	2	TNP
Kardia	Lignite	1110	94	55	50	12	LLD
Megalopoli A	Lignite	481	10	10	10	11	TNP
Megalopoli B	Lignite	256	16	16	16	13	TNP
SPAIN							
Litoral	Hard coal	1012	177	71	47	8	TNP
Abono	Hard coal	848	140	92	61	10	TNP
Puente Nuevo	Hard coal	298	16	8	5	1	TNP
Lada	Hard coal	472	32	18	12	2	TNP

2013	Currently operating plants	**AT**	Accession Treaty
IED	2016 IED limits	**DH**	District Heating
BREF	Proposed BREF limits	**DR**	Desulphurisation Rate
BAT	Best Available Techniques	**LLD**	Limited Lifetime
		SIS	Small isolated systems
		TNP	Transitional National Plan

COUNTRY / Plant name	Coal type	MW	PREMATURE DEATHS				Derogation
			2013	IED	BREF	BAT	
La Robla	Hard coal	570	57	21	14	2	**TNP**
Los Barrios	Hard coal	570	51	34	23	4	**TNP**
Meirama	Lignite	509	90	34	24	5	**TNP**
Soto de Ribera	Hard coal	628	46	14	10	2	**TNP**
Anllares	Hard coal	336	110	11	7	1	**LLD**
Compostilla II	Hard coal	1098	131	32	22	4	**TNP**
Alcudia II	Hard coal	469	83	34	23	4	**SIS**
Narcea	Hard coal	547	27	12	8	1	**TNP**
Velilla	Hard coal	458	38	13	9	1	**TNP**
Andorra	Lignite	966	398	49	34	6	**TNP / DR**
As Pontes	Lignite	1403	134	89	61	12	**TNP**
FINLAND							
Kristiina	Hard coal	244	5	4	4	1	**TNP**
Kymijarvi	Hard coal	127	12	4	3	1	**LLD**
Naantali-1	Hard coal	345	15	9	6	1	**LLD**
Suomenoja	Hard coal	147	16	6	4	1	**DH / TNP**
Meri-Pori	Hard coal	515	8	8	6	1	**TNP**
Tahkoluoto (Pori)	Hard coal	232	3	2	2	1	**TNP**
Vaskiluoto	Hard coal	219	8	6	5	1	**TNP**
Martinlaakso	Hard coal	74	9	5	3	1	**TNP**
Hanasaari B	Hard coal	210	12	6	4	1	**TNP**
Salmissari	Hard coal	156	9	5	3	1	**TNP**
FRANCE							
Bois-Rouge	Hard coal	92	0	0	0	0	**SIS**
IRELAND							
Moneypoint	Hard coal	842	106	47	33	7	**TNP**
ITALY							
Bastardo	Hard coal	138	15	10	7	2	**LLD**
Genova	Hard coal	271	22	15	10	2	**LLD**

ANNEX II TABLE 6. DEROGATIONS OVERVIEW - CONTINUED

COUNTRY / Plant name	Coal type	MW	PREMATURE DEATHS				Derogation
			2013	IED	BREF	BAT	
POLAND							
Laziska	Hard coal	1155	139	70	48	12	**LLD / AT**
Bielsko-Biala	Hard coal	161	12	2	1	0	**DH**
Lodz 3	Hard coal	206	59	14	9	2	**LLD / TNP / AT**
Lodz 4	Hard coal	200	42	11	8	2	**TNP / AT**
Turow	Lignite	2062	358	153	110	28	**TNP**
Dolna Odra	Hard coal	1362	141	79	54	12	**LLD / AT**
Ostroleka	Hard coal	722	193	50	34	8	**TNP / AT**
Polaniec	Hard coal	1864	178	99	68	16	**LLD / AT**
Poznan-Karolin	Hard coal	270	58	25	17	4	**TNP / AT**
Opole	Hard coal	1532	162	112	79	19	**AT**
Rybnik	Hard coal	1775	476	147	102	24	**TNP / AT**
Bydgoszcz II	Hard coal	177	76	17	12	3	**DH / AT**
Czechnica	Hard coal	100	27	7	5	1	**DH / AT**
Skawina	Hard coal	532	131	27	19	4	**TNP**
Stalowa Wola	Hard coal	250	91	19	13	3	**LLD / AT**
Pomorzany	Hard coal	134	44	11	7	2	**LLD / AT**
Miechowice	Hard coal	119	22	4	3	1	**DH**
Siersza	Hard coal	787	97	31	21	5	**LLD**
Adamow	Lignite	600	274	71	52	15	**LLD / AT**
Tychy	Hard coal	40	11	7	5	1	**TNP**
Zeran	Hard coal	386	147	44	30	7	**LLD / TNP / AT**
Wroclaw	Hard coal	263	89	21	14	3	**TNP**
Zabrze	Hard coal	74	35	5	4	1	**DH / AT**
Zofiowka Moszczenica	Hard coal	40	8	2	1	0	**DH**
Patnow II	Lignite	442	45	42	32	9	**TNP**
Bedzin	Hard coal	78	49	9	6	2	**TNP**
Gdansk 2	Hard coal	235	79	20	14	3	**TNP**
Gdynia	Hard coal	105	43	13	9	2	**LLD / TNP / AT**
Lagisza	Hard coal	820	134	54	37	9	**LLD / AT**
Jaworzno 3	Hard coal	1345	173	108	75	18	**AT**
Katowice	Hard coal	135	35	15	11	3	**TNP**
Bialystok	Hard coal	110	18	13	9	2	**TNP**
Patnow II	Lignite	1200	169	103	77	22	**TNP**
Konin	Lignite	248	31	12	9	2	**TNP**
Kozienice	Hard coal	2919	652	183	126	30	**TNP / AT**
Krakow	Hard coal	460	128	33	23	5	**AT**

2013	Currently operating plants		**AT**	Accession Treaty
IED	2016 IED limits		**DH**	District Heating
BREF	Proposed BREF limits		**DR**	Desulphurisation Rate
BAT	Best Available Techniques		**LLD**	Limited Lifetime
			SIS	Small isolated systems
			TNP	Transitional National Plan

COUNTRY / Plant name	Coal type	MW	PREMATURE DEATHS				Derogation
			2013	IED	BREF	BAT	
PORTUGAL							
Pego	Hard coal	628	31	31	24	4	**TNP**
Sines	Hard coal	1192	78	78	63	10	**TNP**
ROMANIA							
Isalnita	Lignite	572	85	20	15	5	**TNP**
Mintia	Hard coal	1123	337	29	20	5	**TNP**
Oradea II	Lignite	134	241	15	11	3	**AT**
Govora	Lignite	174	234	17	12	4	**TNP**
Rovinari	Lignite	1166	245	66	49	14	**TNP / AT**
Turceni	Lignite	2083	178	64	48	14	**TNP / AT**
Craiova II	Lignite	244	171	17	13	4	**TNP**
Drobeta	Lignite	262	430	27	20	6	**LLD**
SWEDEN							
Vaesteras	Hard coal	138	1	1	1	1	**LLD**
SLOVENIA							
Te-Tol	Hard coal	114	23	18	14	3	**TNP**
Sostanj	Lignite	1122	179	121	89	23	**LLD**
SLOKAVIA							
Vojany I	Hard coal	607	7	5	4	1	**LLD**
Zvolenska	Lignite	28	21	2	1	0	**TNP**
Martinska	Lignite	39	9	2	2	0	**DH**
UNITED KINGDOM							
Cottam	Hard coal	2008	217	128	86	20	**TNP**
Fiddler's Ferry	Hard coal	1961	213	111	77	18	**TNP**
Eggborough	Hard coal	1960	335	144	97	22	**LLD**
Ferrybridge	Hard coal	1960	256	103	70	16	**LLD**
Ratcliffe	Hard coal	2000	231	132	91	21	**TNP**
West Burton	Hard coal	2012	207	131	91	21	**TNP**
Aberthaw	Hard coal	1586	269	103	73	17	**TNP**
Rugeley	Hard coal	1006	109	58	50	12	**TNP**
Drax	Hard coal	2580	591	281	195	45	**TNP**
Kilroot	Hard coal	520	52	31	21	5	**TNP**
Longannet	Hard coal	2260	383	117	80	18	**LLD**

"THE DANGEROUS IMPACTS OF COAL ON HEALTH FROM EXPOSURE TO AIR POLLUTION… AND THE MAJOR CONTRIBUTION THAT BURNING COAL AND THE RELEASE OF GREENHOUSE GASES HAS IN CHANGING THE LONG-TERM CLIMATE ALMOST CERTAINLY UNDERMINES THE USE OF COAL AS A LONG-TERM FUEL."

2015 Lancet Commission on Health and Climate Change

EUROPEAN ENVIRONMENTAL BUREAU (EEB)

The European Environmental Bureau is the largest federation of environmental citizens' organisations in Europe. It currently consists of over 150 member organisations in more than 30 countries (virtually all EU Member States plus some accession and neighbouring countries), including a growing number of European networks, and representing some 15 million individual members and supporters. The EEB stand for environmental justice, sustainable development and participatory democracy. Our aim is to ensure the EU secures a healthy environment and rich biodiversity for all.

CLIMATE ACTION NETWORK (CAN) EUROPE

The Climate Action Network Europe is Europe's largest coalition working on climate and energy issues. With over 120 member organisations in more than 30 European countries – representing over 44 million citizens – CAN Europe works to prevent dangerous climate change and promote sustainable climate and energy policy in Europe. CAN Europe is a regional node of the Climate Action Network International, a worldwide network of over 900 Non-Governmental Organisations.

HEALTH AND ENVIRONMENT ALLIANCE (HEAL)

The Health and Environment Alliance is a leading European not-for-profit organisation addressing how the environment affects health in the European Union. We demonstrate how policy changes can help protect health and enhance people's quality of life. Our broad alliance of more than 70 member organisations represents health professionals, not-for-profit health insurers, cancer and asthma groups, citizens, women's groups, youth groups, environmental NGOs, scientists and public health research institutes. Members include international and Europe wide organisations, as well as national and local groups.

SANDBAG

Sandbag is an evidence-based non-profit organisation to help European decarbonisation. We focus on phasing out coal generation across Europe, getting a higher carbon price through EUETS reform, and working on long term ways to decarbonise energy intensive industries.

WWF

WWF is one of the world's largest and most experienced independent conservation organisations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

THE WWF EUROPEAN POLICY OFFICE

The European Policy Office contributes to the achievement of WWF's global mission by leading the WWF network to shape EU policies impacting on the European and global environment.