Implementation of the LCP Directive
Reporting of emissions
What does the LCP Directive deliver to our citizens?
What’s the EU policy

• The EU regulated them since 1980’s
• The period 2004-2015, where they were regulated by:
  – The LCP Directive – minimum requirements
  – The IPPC Directive – aiming at a higher standard through the concept of Best Available Techniques (BAT)
• As from 2016, this policy has been superseded by:
  – The Industrial Emissions Directive (IED)
  – A new document on BAT (BREF)
EEA recent publications on the matter

Assessing the effectiveness of EU policy on large combustion plants in reducing air pollutant emissions

Industry

Greening the power sector: benefits of an ambitious implementation of Europe’s environment and climate policies

Europe’s electricity generation still relies largely on fossil fuels as an energy source and thus contributes to emissions of sulphur dioxide (SO2), dust and nitrogen oxides (NOx), among other pollutants. A new EEA assessment shows that with an ambitious implementation of new requirements under the EU Industrial Emissions Directive, Member States can significantly reduce pollutant emissions and thus minimise their potential harmful effects on the environment and human health. There is also a close link between future reductions in pollutant emissions and EU climate and energy policy, which drives growth in renewables and the switch towards cleaner fuels in the remaining power plants. A more fundamental restructuring of the power sector is, however, needed to meet the EU’s long-term decarbonisation targets.

- Emissions of SO2 and dust from power plants have decreased by more than three quarters since 2004, largely as a result of environmental regulation.
- New requirements regarding SO2, NOx and dust emissions from power plants were adopted in 2017 and need to be implemented by Member State authorities by 2021 at the latest.
- By 2030, the requirements are projected to lead to emission reductions of 66-91% for SO2, 95-92% for dust and 51-79% for NOx, compared with 2015 reported emissions.
- Authorities have the opportunity to ensure an ambitious implementation that brings about significant future emission reductions.
Indexed evolution of $\text{SO}_2$, $\text{NO}_x$ and dust from LCPs (EU-28)

- Significant transformation of environmental performance of ‘LCP sector’
- How did this happen?
- Is the evolution similar across countries / regions?
- What were the key drivers?

![Graph showing indexed evolution of $\text{SO}_2$, $\text{NO}_x$, and dust from LCPs (EU-28)]

<table>
<thead>
<tr>
<th>Year</th>
<th>SO$_2$</th>
<th>NO$_x$</th>
<th>Dust</th>
</tr>
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<tbody>
<tr>
<td>2004</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2015</td>
<td>25%</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

%-decrease 2004-2015:
- SO$_2$: -77%
- NO$_x$: -49%
- Dust: -81%

European Environment Agency
Country grouping

Figure 2.1 Groups of countries based on average SO₂ IEF

**Group 1**
"LOW": low implied emission factor
Austria, Belgium, Germany, Denmark, Finland, Hungary, Italy, Luxembourg, Latvia, Netherlands, Sweden

**Group 2**
"MEDIUM": medium implied emission factor
Czechia, Spain, France, Croatia, Ireland, Lithuania, Malta, Poland, Portugal, Slovenia, United Kingdom

**Group 3**
"HIGH": high implied emission factor
Bulgaria, Cyprus, Estonia, Greece, Romania, Slovakia
Figure 4.7  Trends and main drivers of key air pollutant emissions from LCPs, 2004-2015

Index (2015 = 1)  LCPD: binding ELVs for all plants, from 01/01/2008

- Phase 1 (2005-2007)
- EU ETS phase 2 (2008-2012)
- Phase 3 (2013-2020)

Anticipation of binding IED limits from 2016

- RED adoption
- 2010 NREAPs
- Min. national indicative RES trajectories (2011-2012; 2013-2014; ...)
- Binding national 2020 targets
- Indicative national 2020 targets

Note:  NREAP, National renewable energy action plan; RES, renewable energy sources.
Source:  EEA, 2018a; own analysis.
Bridging differences across countries – the EU at work

Figure 3.1  National average SO₂ IEF versus share of coal use, in 2004 (left) and 2015 (right)
Decomposition analysis

Decomposition analysis is a statistical technique used to break down the various driving factors of a phenomenon and attribute a relative weight to each of these driving factors.

Decomposition analysis is widely accepted in policy analysis, where its use is increasing.

From the various statistical routines that can be used, this report uses the Logarithmic Mean Divisia Index (LMDI), which is a decomposition method based on the Shapley/Sun approach. It can be used to decompose an aggregate number into more than two underlying factors.

By identifying the individual contribution of the drivers to the overall changes observed, decomposition analysis in this report helps isolate the impact of those factors that were most likely driven by legislation.

Factors

- Overall economic activity
- Economic structure
- Sectoral energy intensity
- Generation type
- Sectoral degree of electrification
- Generation efficiency
- Share of fuel used in electricity production by LCPs
- Emission factor
LCPs: Minimum requirements vs BAT implementation (IPPCD)
IED ELVs vs BAT-AELs LCP BREF 2017: what we can achieve

**SO₂**

- 2016 emissions
- kt/year
- 2021, 2025, 2030
- Current IED limit, New upper limit, New lower limit

**NOₓ**

- 2016 emissions
- kt/year
- 2021, 2025, 2030
- Current IED limit, New upper limit, New lower limit

**Dust**

- 2016 emissions
- kt/year
- 2021, 2025, 2030
- Current IED limit, New upper limit, New lower limit

**Notes:**
- kt/year: kilotonnes per year;
The starting point for the Energy Community Treaty

- For context, EU Implied emission factors:
  - SO2 typical range: 0.02 - 0.09.
  - NOx typical range: 0.05 - 0.08;
  - Dust typical range: 0.001 – 0.002.

<table>
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<tr>
<th>Row Labels</th>
<th>Sum of Total energy</th>
<th>Sum of SO2 (t)</th>
<th>Sum of NOx (t)</th>
<th>Sum of Dust (t)</th>
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Reminder: reporting LCP Directive data under the Energy Community Treaty
What are combustion plants?

- LCPs are combustion plants at big scale, firing fuels with capacities greater than 50 MWh
- Coals, gas, liquid fuels, biomass
What are NOT combustion plants?

- When using waste partially or totally as an energy input
• Reporting fuel input for each plant:

- Coal
- Lignite
- Biomass
- Peat
- Natural Gas
- Liquid Fuels
- Other Solid Fuels
- Other Gases

• All values are net calorific value
Other Solid and Gaseous Fuels (subcategories)

### Other solid fuels

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<th>Notation</th>
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• Report fuel use for each of the 3 units which are part of a single LCP ‘plant’ even though oil boiler < 15 MW.

Annual Fuel Inputs by Fuel Type

Coal: 12,500 TJ
Natural Gas: 2,500 TJ
Oil: 150 TJ
Reporting Data on Operating Hours

• Total operational hours of the plant over a year when any emissions are being generated
• Maximum possible operational hours = 8,760 hours (365 days)
• Generally exclude periods of start-up and shut-down, but must normally have clear definition of start-up and shut-down
Reporting data on pollutant emissions

• Sulphur dioxide (Tonnes)
• Oxides of nitrogen (Tonnes)
• Dust (Tonnes)
Reporting Data on Pollutant Emissions

• Reported data typically based on measured emissions data from Automated Measurement Systems (AMS)

• N.B. Must not subtract measurement uncertainty from reported emissions

• LCP Directive requires that CEN standards are applied to measurements, including methods for calibration of AMS
Reporting Data on Emissions

Example: Total Plant Emissions

- **Coal:** 400 MW boiler (Coal)
  - Coal: 12,500 TJ
  - 4,440 tonnes SO2
  - 1,780 tonnes NOX
  - 168 tonnes Dust

- **Oil:** 10 MW boiler (Oil)
  - Oil: 150 TJ
  - 0 tonnes SO2
  - 500 tonnes NOX
  - 1 tonnes Dust

- **Natural Gas:** 100 MW CCGT (natural gas)
  - Natural Gas: 2,500 TJ
  - 0 tonnes SO2
  - 500 tonnes NOX
  - 1 tonnes Dust

**Reported Emissions:**
- SO2: 4,440 tonnes
- NOX: 2,280 tonnes
- Dust: 169 tonnes
• Location – Latitude and Longitude
• Reporting country and year
• Is the LCP part of a refinery?
• Details of competent authority
• Total number of reported plants
• Plant Name and address
• Unique plant identification code
• Derogations?
Reference materials

- CDR help section
- A yearly letter to reporters
- A Manual for Reporters
How to obtain credentials

- Official request from the country nominating reporter (email)
- Eionet account and appropriate permissions for the relevant data flow
- All correspondence automatically directed to nominated experts
Thank you!

Q&A