



Directorate-General
for Energy
and Transport

EU Emission Regulation on Coal-fired Power Plants

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Directorate- General Energy and Transport



EUROPEAN
COMMISSION

16 November 2009

● The role of coal in key figures

- **Coal is a large contributor to EU energy supply** with a share of around 18 % of EU-27 total energy consumption; one third of power generation in the EU is based on coal
- EU remains the **third biggest consumer of coal worldwide** – despite rapid increases in coal demand worldwide
- **EU coal figures in 2008:**
 - » 146 Mt hard coal (43 % of total EU hard coal consumption)
 - » 434 Mt lignite (99 % of total EU lignite consumption)
 - » 211 Mt hard coal imports (25 % Russia, 21 % South Africa, Australia, Colombia etc)
 - » 783 Mt coal consumption (66 % in power sector)
- **Future of European coal depends on**
 - » **High-efficiency plants and wide availability of CCS**
 - » **Efficient management and production of resources**



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Convention on Long-range Transboundary Air Pollution

Convention on Long-range Transboundary Air Pollution

The 1979 Geneva Convention on Long-range Transboundary Air Pollution

The Convention on Long-range Transboundary Air Pollution is one of the central means for protecting our environment. It has, over the years, served as a bridge between different political systems and as a factor of stability in years of political change. It has substantially contributed to the development of international environmental law and has created the essential framework for controlling and reducing the damage to human health and the environment caused by transboundary air pollution. It is a successful example of what can be achieved through intergovernmental cooperation.

The history of the Convention can be traced back to the 1960s, when scientists demonstrated the interrelationship between sulphur emissions in continental Europe and the acidification of Scandinavian lakes. The 1972 United Nations Conference on the Human Environment in Stockholm signalled the start for active international cooperation to combat acidification. Between 1972 and 1977 several studies confirmed the hypothesis that air pollutants could travel several thousands of kilometres before deposition and damage occurred. This also implied that cooperation at the international level was necessary to solve problems such as acidification.

In response to these acute problems, a High-level Meeting within the Framework of the ECE on the Protection of the Environment was held at ministerial level in November 1979 in Geneva. It resulted in the signature of the Convention on Long-range Transboundary Air Pollution by 34 Governments and the European Community (EC). The Convention was the first international legally binding instrument to deal with problems of air pollution on a broad regional basis. Besides laying down the general principles of international cooperation for air pollution abatement, the Convention sets up an institutional framework bringing together research and policy.

The Convention on Long-range Transboundary Air Pollution entered into force in 1983. It has been extended by [eight specific protocols](#).

Text of the Convention :

[English](#)

[French](#)

[Russian](#)

[Status of ratification](#)



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Convention on Long-range Transboundary Air Pollution

Protocol to Abate Acidification, Eutrophication and Ground-level Ozone

The 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone

The Executive Body adopted the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone in Gothenburg (Sweden) on 30 November 1999.

The Protocol sets emission ceilings for 2010 for four pollutants: sulphur, NOx, VOCs and ammonia. These ceilings were negotiated on the basis of scientific assessments of pollution effects and abatement options. Parties whose emissions have a more severe environmental or health impact and whose emissions are relatively cheap to reduce will have to make the biggest cuts. Once the Protocol is fully implemented, Europe's sulphur emissions should be cut by at least 63%, its NOx emissions by 41%, its VOC emissions by 40% and its ammonia emissions by 17% compared to 1990.

The Protocol also sets tight limit values for specific emission sources (e.g. combustion plant, electricity production, dry cleaning, cars and lorries) and requires best available techniques to be used to keep emissions down. VOC emissions from such products as paints or aerosols will also have to be cut. Finally, farmers will have to take specific measures to control ammonia emissions. Guidance documents adopted together with the Protocol provide a wide range of abatement techniques and economic instruments for the reduction of emissions in the relevant sectors, including transport.

It has been estimated that once the Protocol is implemented, the area in Europe with excessive levels of acidification will shrink from 93 million hectares in 1990 to 15 million hectares. That with excessive levels of eutrophication will fall from 165 million hectares in 1990 to 108 million hectares. The number of days with excessive ozone levels will be halved. Consequently, it is estimated that life-years lost as a result of the chronic effects of ozone exposure will be about 2,300,000 lower in 2010 than in 1990, and there will be approximately 47,500 fewer premature deaths resulting from ozone and particulate matter in the air. The exposure of vegetation to excessive ozone levels will be 44% down on 1990.

Protocol text:

- English
- French
- Russian
- Status of ratification

● Current legal situation IPPC and LCP Directives

- Integrated Pollution Prevention and control Directive 2008/01/EC – codified version of 96/61/EC
 - » Aiming at a **high level of protection for the environment as a whole**
 - » Key instrument of environmental legislation covering all environmental media (air, water, soil)
- Large Combustion Plant Directive 2001/80/EC
 - » Sets minimum requirements to be met by all installations - emissions limit values, monitoring requirements etc
 - » Meeting these requirements is not necessarily sufficient to comply with IPPC Directive

● IPPC Directive

- Variety of **industrial activities** (Annex I)
 - » incl. energy industries:
combustion installations > 50 MWth
- Installations to be operated according to **integrated permits** issued by competent authorities in Member States
- Permits should contain **emission limit values (ELV)** based on “**best available techniques**” (BAT), taking into account certain local conditions and without prejudice to meeting **environmental quality standards**
- BAT information exchange leads to the **BAT Reference Documents (BREFs)**, adopted by the European Commission

● Best Available Techniques

Best

most effective
in achieving a
**high general
level of
protection** of
the
environment
as a whole

Available

developed on a scale
to be implemented in
the relevant industrial
sector, **under
economically and
technically viable
conditions**, advantages
balanced against costs

Techniques

the **technology**
used *and* the
way the
installation is
**designed, built,
maintained,
operated and
decommissioned**

BAT information exchange: BREFs

- Purpose
 - » help Member States in efficient implementation
 - » help to redress technological imbalances in EU
 - » promote worldwide dissemination of techniques used in EU
- Process
 - » **BREF author** from IPPC Bureau (Commission)
 - » Technical Working Groups: Member States, industry, NGOs
 - » **Sevilla Process**: data gathering and exchange, meetings (3-4 years)
 - » Agreement on draft final BREF by Information Exchange Forum (IEF)
 - » Formal adoption and publication by **European Commission**
- Result: 32 BREFs, both sectoral and horizontal ones



Content of BREFs

- Description of sector, activities, ..
- Current emission and consumption levels
- Techniques to be considered in determining BAT
- **BAT Chapter:** BAT + associated emission levels (BAT AEL)
- Emerging techniques
- Recommendations for future work
- Executive Summary in all EU languages

● Review of the BREFs

- To take account of dynamic nature of BAT
- Review cycle: 6-8 year
- Main concerns
 - » New information with potential impact on BAT (gaps, emerging techn.)
 - » Updated levels of performance
 - » Coherence with other BREFs
- Status
 - » Ongoing: Iron/Steel, Glass, Non-Ferrous, Livestock, Refineries, ...
 - » Foreseen 2010- : LCP, Chemicals, ...



LCP BREF



EUROPEAN COMMISSION

Integrated Pollution Prevention and Control

Reference Document on
Best Available Techniques for

Large Combustion Plants

July 2006

- adopted in 2006
- will be revised from 2010 on
- Stakeholders will be invited to contribute information

Directorate-General
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LCP BREF: BAT for solid/liquid fuel

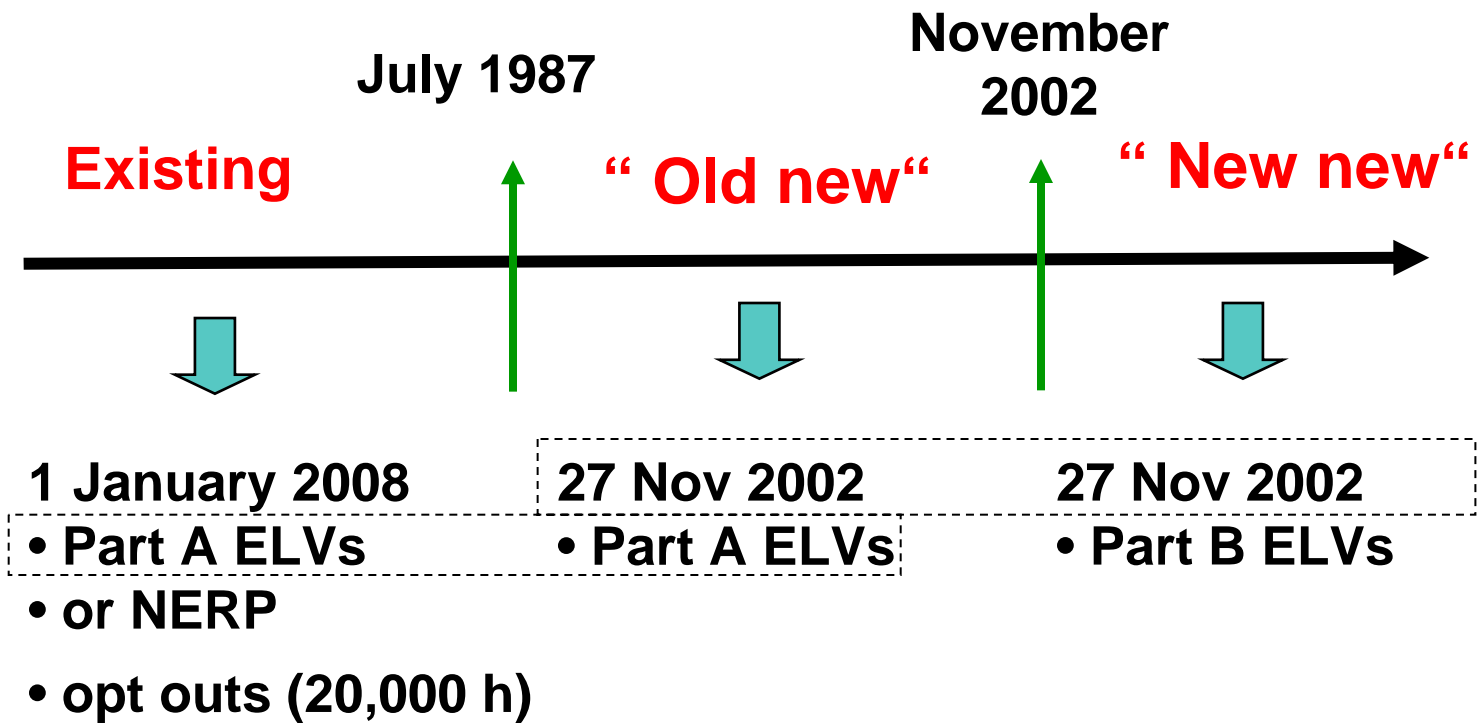
Capacity (MW _{th})	SO ₂ emission level (mg/Nm ³)						BAT to reach these levels
	Coal and lignite		Peat		Liquid fuels for boilers		
	New plants	Existing plants	New plants	Existing plants	New plants	Existing plants	
50 – 100	200 – 400* 150 – 400* (FBC)	200 – 400* 150 – 400* (FBC)	200 – 300	200 – 300	100 – 350*	100 – 350*	Low sulphur fuel or/and FGD (dsi) or FGD (sds) or FGD (wet) (depending on the plant size). Seawater scrubbing. Combined techniques for the reduction of NO _x and SO ₂ . Limestone injection (FBC).
100 – 300	100 – 200	100 – 250*	200 – 300 150 – 250 (FBC)	200 – 300 150 – 300 (FBC)	100 – 200*	100 – 250*	
>300	20 – 150* 100 – 200 (CFBC/ PFBC)	20 – 200* 100 – 200* (CFBC/ PFBC)	50 – 150 50 – 200 (FBC)	50 – 200	50 – 150*	50 – 200*	
Notes: FBC: Fluidised bed combustion CFBC: Circulating fluidised bed combustion PFBC: Pressurised fluidised bed combustion FGD(wet): Wet flue-gas desulphurisation FGD(sds): Flue-gas desulphurisation by using a spray dryer FGD(dsi): Flue-gas desulphurisation by dry sorbent injection * Some split views appeared in these values and are reported in Sections 4.5.8 and 6.5.3.3 of the main document.							

Table 6: BAT for the reduction of SO₂ emissions from some combustion plants

● Large Combustion Plant Directive 2001/80/EC

- Replaced “old” LCP Directive 88/609/EC
- Regulates emissions of SO₂, NO_x and dust from combustion plants > 50 MW rated thermal input
 - » ELVs depend on **fuel - capacity - age**
 - » 3 age categories: **existing - “old new”** ↔ **“new new”**
 - » **existing** plants: Member States may choose to apply **national plan (NERP)** limiting overall emissions from all plants included
 - » **opt out** for “limited life time” plants (20,000 h)
 - » emission **monitoring**: continuous if > 100 MW
- Reporting obligations for Member States to Commission (Annex VIII) – emission inventories can be accessed via Reportnet

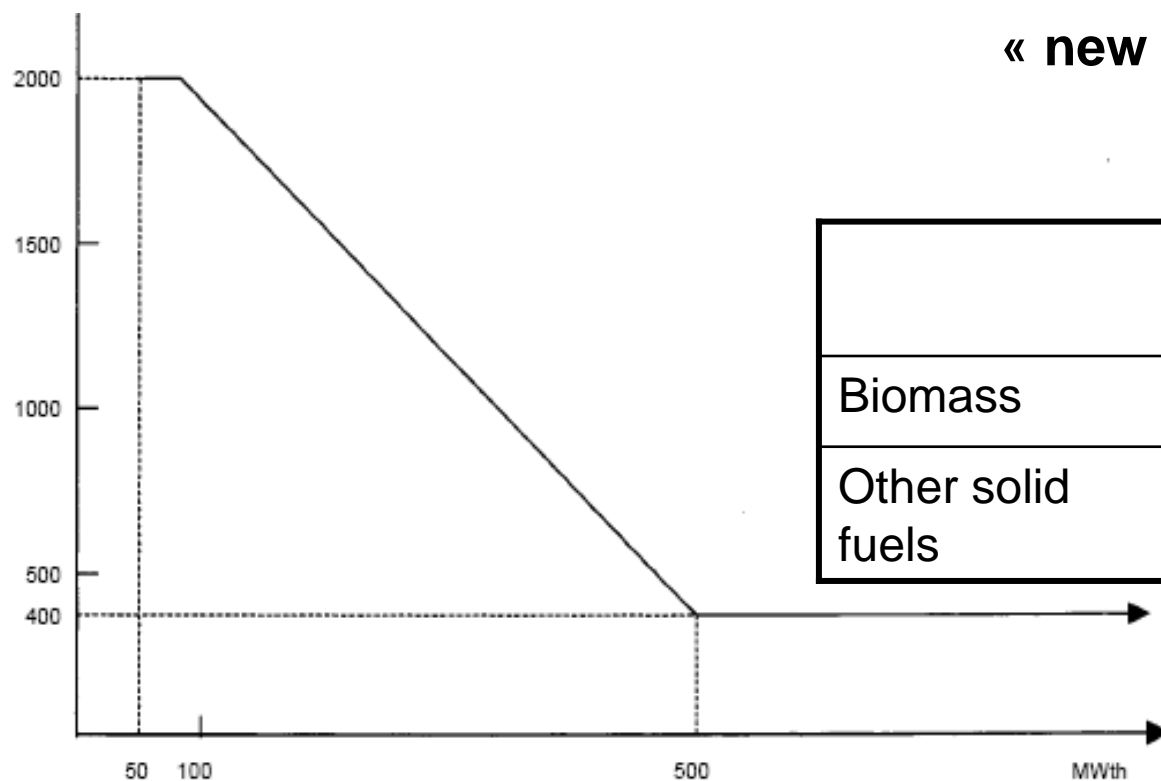
● LCP Directive
SO₂, NO_x and dust emissions



LCP Directive emission limit values

SO₂ (mg/Nm³) - solid fuels

existing + « old new » plants



« new new » plants

	50 - 100 MWth	> 100 MWth
Biomass	200	200
Other solid fuels	850	200

LCP Directive

Minimum Desulphurisation Rate

- Where SO₂ ELVs cannot be met due to characteristics of solid fuel used, there is a possibility to apply a minimum rate of desulphurisation [Annex III footnotes]
- rate of desulphurisation' =
(sulphur not emitted) / (sulphur introduced through fuel) in %

MWth	Existing + old new	New new
50-100	>60%	>92%
100-300	>75%	>92%
300-500	>90%	>95% + 400 mg/Nm ³
> 500	>94% (92% in some cases)	>95% + 400 mg/Nm ³



- Commission Proposal for an Industrial Emissions Directive

IPPC Recast Proposal from 21 December 2007:
COM(2007) 844 final

- It recasts into one single act the IPPC and LCP Directives and 5 other 'sectoral' Directives
- Maintains key principles of IPPC
- **Main changes:**
 - » **strengthening of BAT and the role of the BREFs**
 - » **tightening minimum emission limit values for existing and new LCPs**

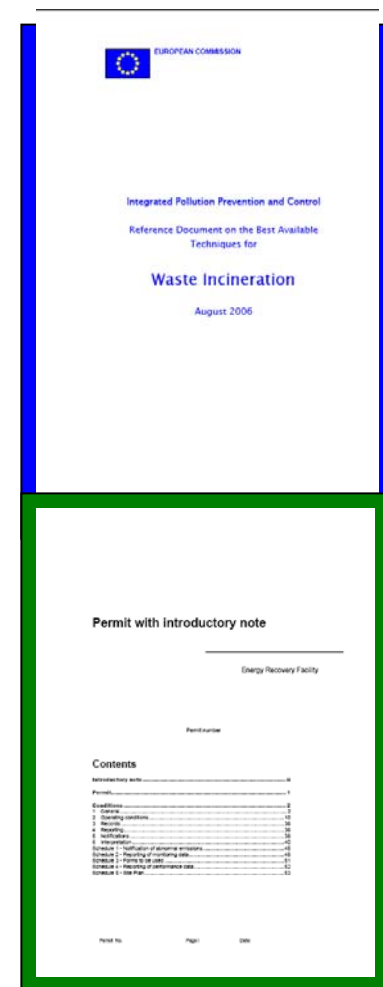
BAT: strengthening the role of the BREFs

BREFs [Political Agreement: BAT conclusions] shall be the reference for setting the permit conditions

BREFs contain emission levels associated with the use of BAT (**BAT AELs**)

Permits must contain **emission limit values** (ELVs) set by the competent authority that **do not exceed BAT AELs**
[Political Agreement: “emissions do not exceed BAT AELs”]

Derogation from BAT AELs is allowed in **specific** cases as long as it is **justified**



● IPPC Recast: new minimum ELVs for LCPs

- **Stricter Emission Limit Values** for SO₂, NO_x and dust for existing and new plants
→ aligned with BAT levels from the LCP BREF (2006)

Impacts: net environmental benefits from emission reduction of **€7-28 billion per year**

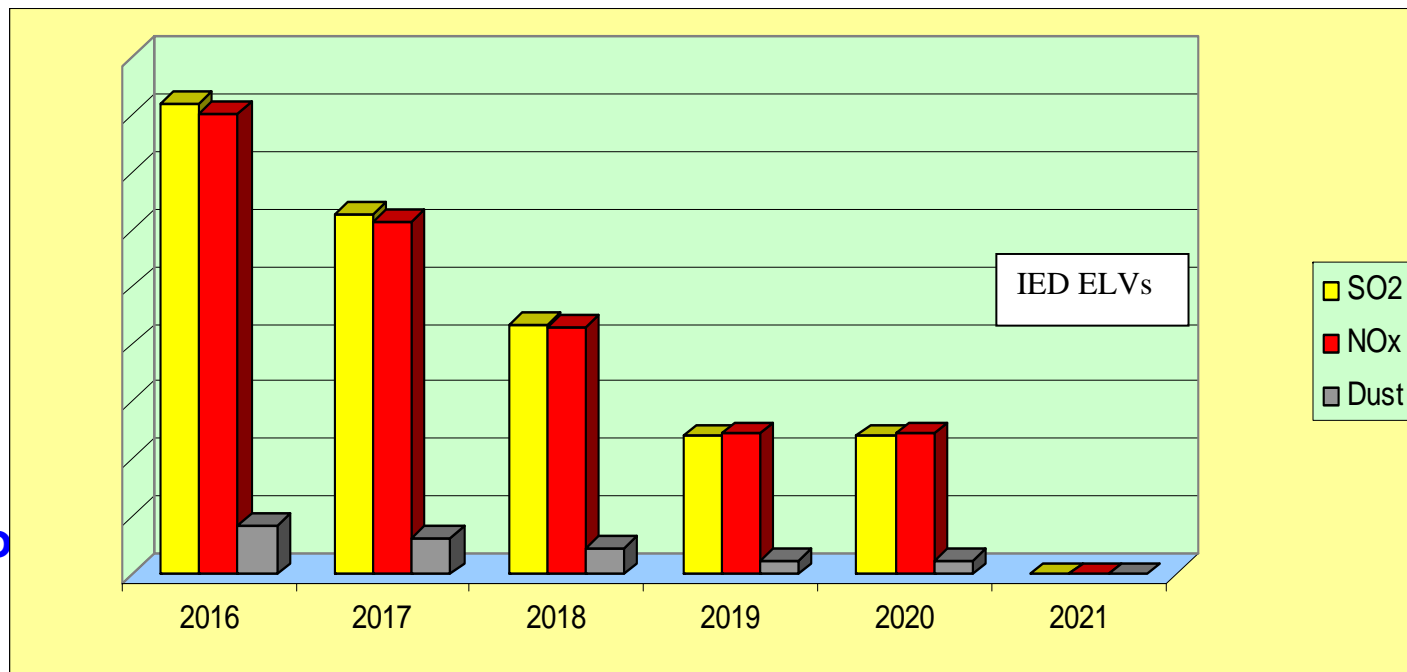
New minimum ELVs for LCP: NO_x

NO _x ELVs mg/Nm ³	LCP Directive			Industrial Emissions Recast Proposal	
	MWth	existing "old new"	"new new"	existing	new
<i>coal/lignite</i>	<i>50 - 100</i>	600	400	300 (450)	300 (400)
	<i>100 - 300</i>		200	200	200
	<i>300 - 500</i>	500 → 200 (> 2016)		200	150 (200)
	<i>> 500</i>			400	
<i>liquid fuels</i>	<i>50 - 100</i>	450	400	200	150
	<i>100 - 300</i>		200	150	100
	<i>300 - 500</i>	150		100	
	<i>> 500</i>	400		100	100
<i>natural gas (boilers)</i>	<i>50 - 300</i>	300	150	100	100
	<i>300 - 500</i>		100		
	<i>> 500</i>	200			
<i>gas turbines</i>	<i>natural gas</i>	not covered	50 (75) (*)	50 (75) (*)	50 (*)
	<i>other gases</i>		120	90	50
<i>gas engines</i>	not covered			100	75

(*) efficiency to be taken into account in some cases

Minimum requirements for LCP: Political Agreement introduces more flexibility

- Existing plants: ELVs apply from 1 January 2016 but possibility to have a [Transitional National Plan \(TNP\)](#) 2016 – 2020
=> Annual ceilings with linear decrease: LCPD → IED limit values





Co-decision procedure

- European Parliament: **1st reading amendments voted in plenary on 10 March 2009**
- Council: **political agreement reached on 25 June 2009**
- ➔ **Common Position is being prepared**
- **The proposal now goes to second reading in EP**
- **End of co-decision foreseen in 2010**
- **Entry into force: 2012 (?)**
- **Application for existing installations: 2012-2016 (?)**

● For more information...

- DG ENV industrial emissions website
<http://www.ec.europa.eu/environment/ippc/index.htm>
- CIRCA website on the IPPC review (reports)
http://circa.europa.eu/Public/irc/env/ippc_rev/library
- LCP emission inventories 2004-2006
http://eea.eionet.europa.eu/Public/irc/eionet-circle/reporting/library?l=/lcp_reporting/summary_report/
- E-PRTR (pollutant release and transfer register)
<http://prtr.ec.europa.eu/>
- European IPPC Bureau (BREFs)
<http://eippcb.jrc.ec.europa.eu/reference/>

Summary

- Following the Geneva Convention and the Gothenburg Protocol, the EU has created a regulatory framework to achieve a high level of protection of the environment and to lower emissions in line with its energy and climate policy.
- The conditions of required permits have to be based on Best Available Techniques (BAT).
- Best Available Techniques Reference Documents (BREFs) were adopted for the different industrial sectors including large combustions plants as well as for horizontal issues such as energy efficiency.
- Regulatory framework fosters development and investment into advanced fossil fuels technologies that belong to Europe's energy mix.
- It facilitates knowledge sharing to accelerate uptake of clean coal technologies in accordance with BAT
- EU is ready to share experiences and best available techniques on modern clean coal technologies including CCS with non-EU countries on multilateral (UNECE ...) and bilateral basis.

A wide-angle photograph of a vast field of bright yellow flowers, likely rapeseed, stretching to the horizon. The sky is a deep blue, filled with soft, white and grey clouds. The foreground shows the green stems and leaves of the plants. The overall scene is bright and cheerful.

Thank You for Your Attention