Industrial Pollution Control and Risk Management:

IPPC, Combustion, Incineration and Asbestos

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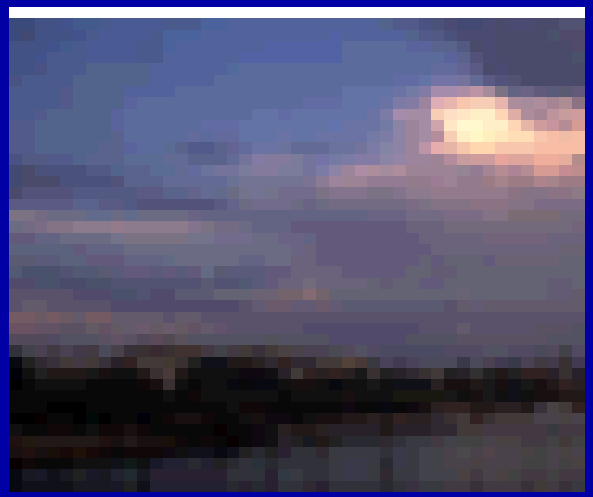
IPPC

- **Council Directive 96/61/EC of 24 September 1996 concerning INTEGRATED POLLUTION PREVENTION AND CONTROL**
- As amended by:
  - Directive 2003/35 (public participation and access to information)
  - Directive 2003/87 (greenhouse gases emission trading scheme)
  - Regulation 1882/2003 (committee procedure)

IPPC - contents

1. Scope and timetable
2. Key provisions
3. The BAT concept
4. The "Sevilla Process" and BREFs
5. Review of the Directive

Previous Legislation



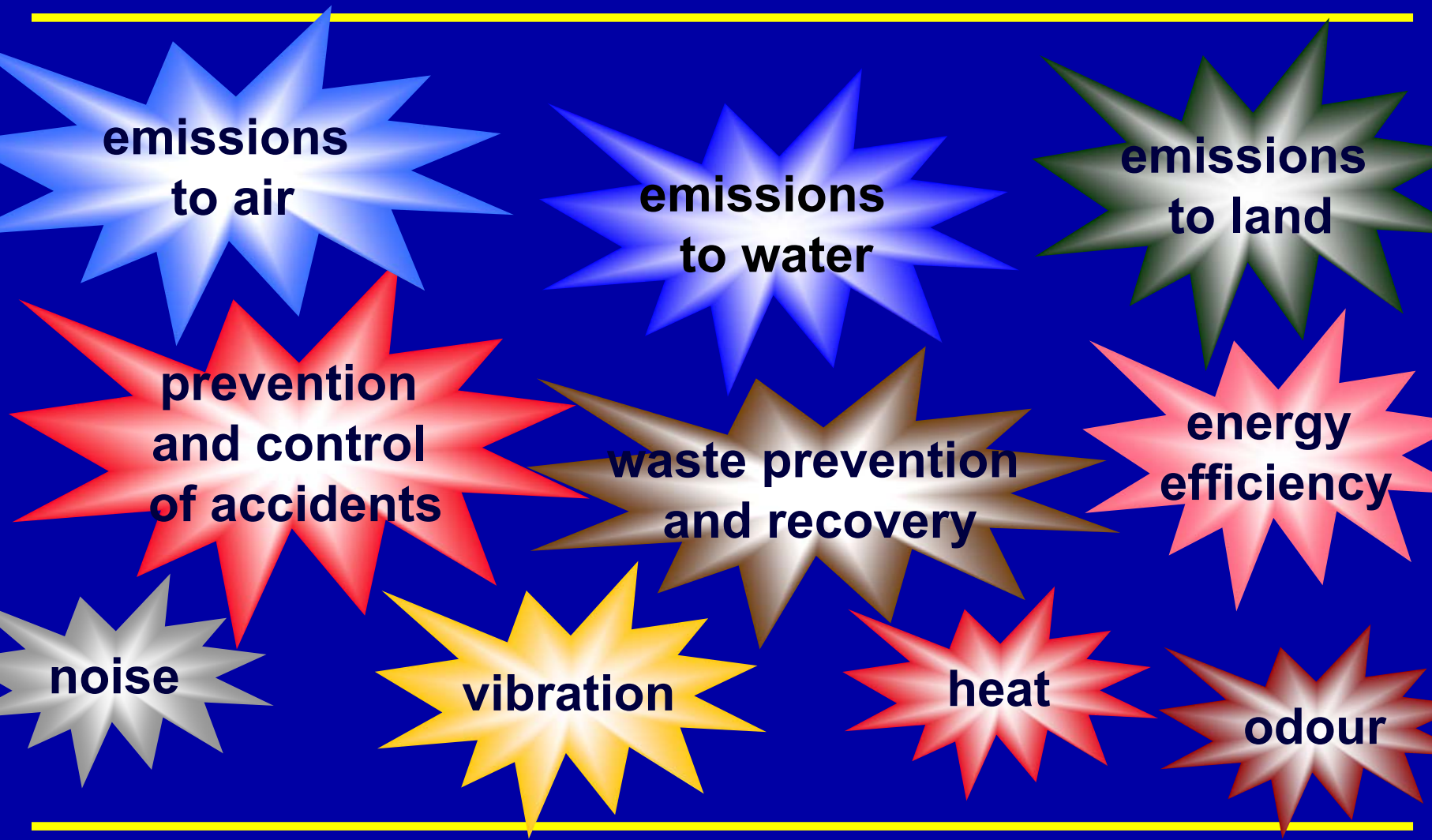
WATER :

- **Council Directive 76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community**

AIR :

- **Council Directive 84/360/EEC on the combating of air pollution from industrial plants**

IPPC –integrated approach



IPPC

Pollution Prevention and Control

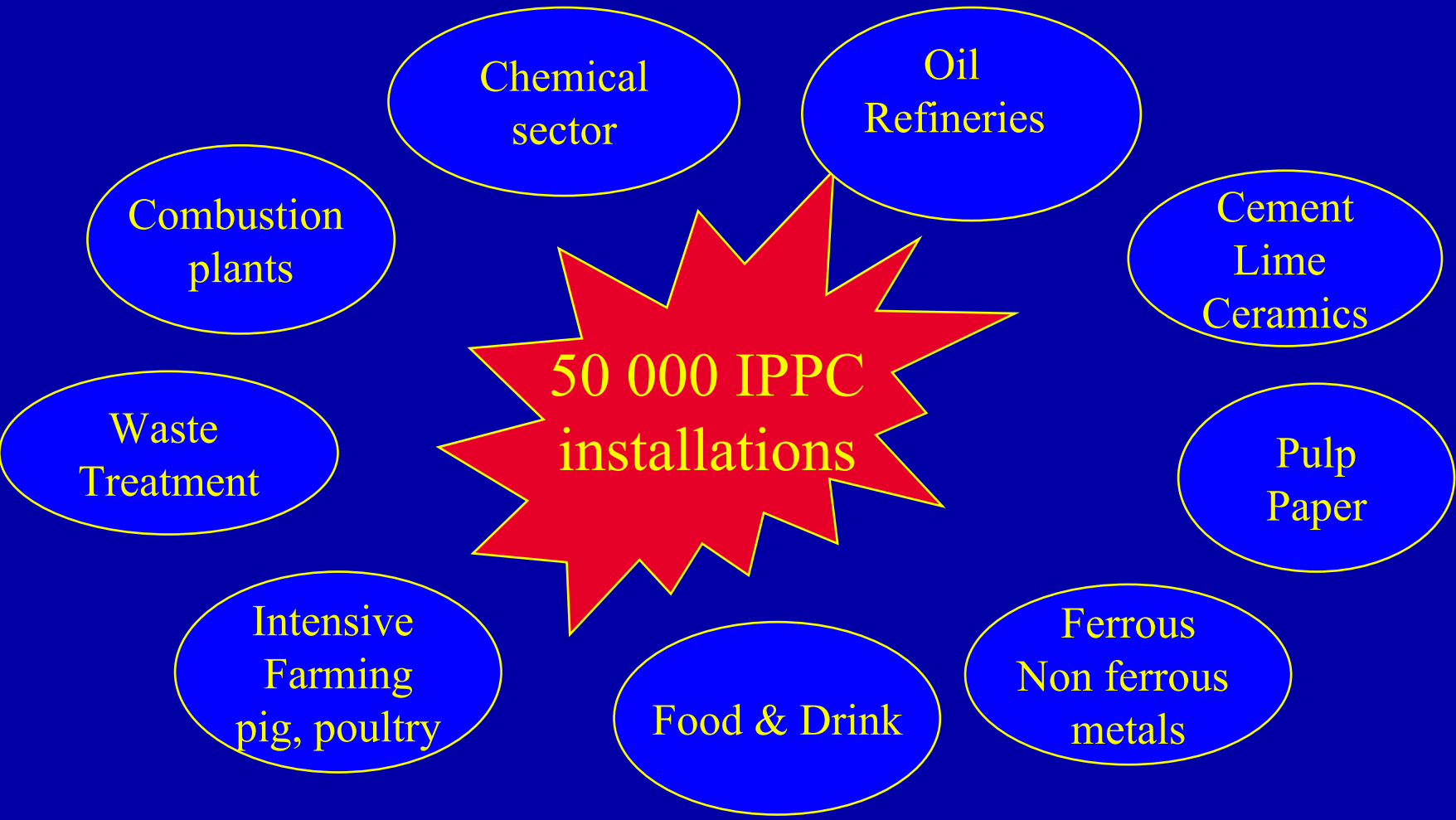
The IPPC Directive covers

1. **Prevention** of pollution caused by production
   - selection of raw materials
   - cleaner production processes
2. **Control** of pollution caused by production
   - end-of-pipe abatement techniques

It does not cover

- Pollution caused by products

Key IPPC Sectors



Key dates

- Entry into force: 30 October 1996
- Transposition = implementation for new installations and "substantial changes": from 30 Oct 1999
- Implementation for existing installations: 30 Oct 2007

Key provisions

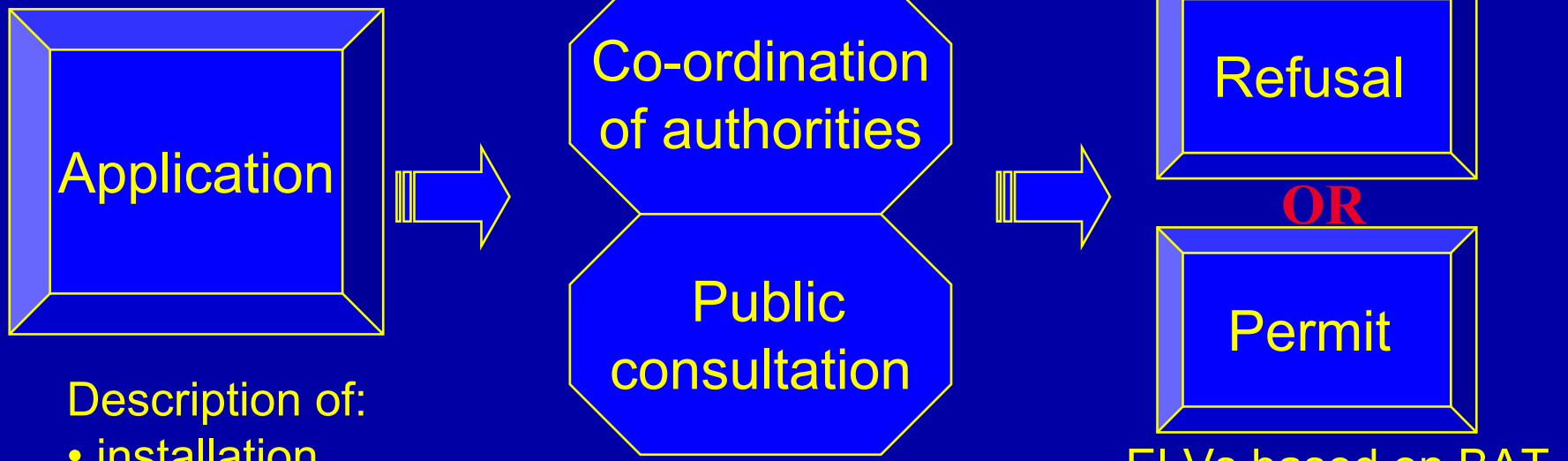
IPPC is about permitting !!

Both industry operators and authorities should take an integrated look at the overall environmental impacts of the installation before making decisions on whether and how it should be operated

Article 2 - Definitions

- "Substance", "pollution", "emission", "emission limit value" (ELV)
- "Installation" = the regulated unit
- "Operator" = the regulated party
- "Change in operation", "substantial change"
- "Best Available Techniques" (BAT) – main basis for standards

IPPC: Permitting procedure



Description of:
- installation
- raw materials
- energy used
- emission sources
- techniques used
- monitoring

Transboundary consultation if necessary

ELVs based on BAT

Measures concerning soil, groundwater, waste, energy

Monitoring requirements

Article 3 - Basic obligations of the operator

- Prevention of pollution through application of BAT
- No significant pollution
- Waste avoided, recovered or safely disposed of
- Energy used efficiently
- Accident prevention and response
- Return of site to a satisfactory state

Article 6 - Content of applications

Applications shall contain a description of :

- **Installation, its activities and conditions of the site**
- **raw and auxiliary materials, other substances and energy used or generated**
- **Sources, nature and quantities of emissions+ identification of significant effects**
- **the proposed technology and other techniques for preventing or reducing emissions**
- **further measures to comply with basic obligations of the operator**
- **measures planned to monitor emissions**

Plus a non-technical summary.

Articles 7 and 8 – Permitting decisions

- **Article 7 – procedures and conditions of permit to be fully coordinated if more than one authority involved**

- **Article 8 – grant of a permit with conditions guaranteeing compliance, or refusal**

Article 9(1) – Permit conditions

Member States shall ensure that the permit includes all measures necessary for compliance with the requirements of Articles 3 and 10 for the granting of permits in order to achieve a high level of protection for the environment as a whole by means of protection of the air, water and land.

Article 9(3) – ELVs and other permit conditions

- Permit to include ELVs for pollutants likely to be emitted in significant quantities
- ELVs for greenhouse gases covered by emission trading only where necessary to avoid local pollution
- Permit to include appropriate requirements to protect soil and groundwater and manage waste

Article 9(4) – Permit conditions based on BAT

Emission limit values and equivalent parameters and technical measures shall be based on the best available techniques, without prescribing the use of any technique or specific technology, but taking into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions.

Article 9(8) – General Binding Rules

Member States may prescribe certain requirements for certain categories of installations in general binding rules instead of including them in individual permit conditions, provided that an integrated approach and an equivalent high level of environmental protection as a whole are ensured.

Article 10 – Environmental Quality Standards

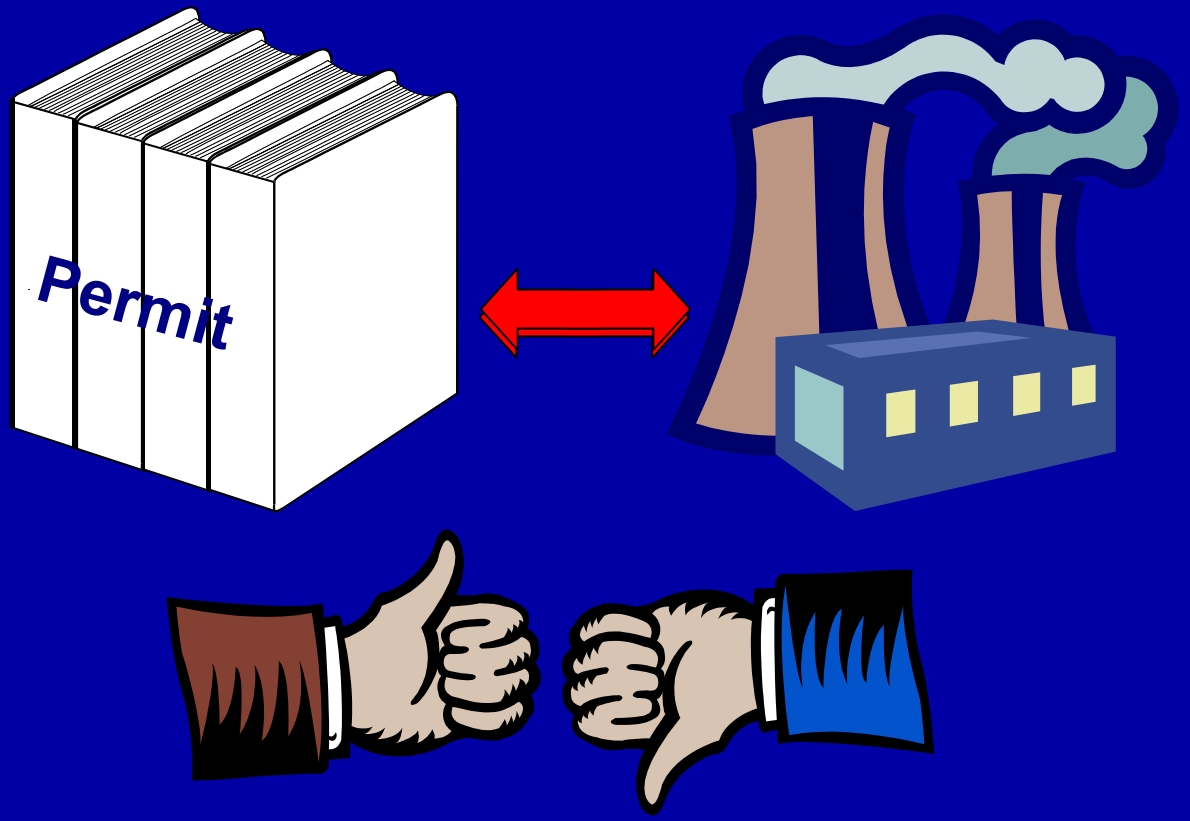
Where an environmental quality standard requires stricter conditions than those achievable by the use of best available techniques, additional measures shall be required in the permit.

Articles 12 and 13 – Changes and permit reviews

- Article 12 – operator to inform authority of any planned changes in operation
- "Substantial changes" to be subject to the permitting procedure

- Article 13 – permit conditions to be periodically reconsidered and updated

Article 14 - Compliance



Articles 15 and 15a

- **Article 15 - Public to be able to participate in procedures for issuing/updating permits**
- **Authority to publish the reasons and considerations on which the permit decision is based**
- **Permits and monitoring data to be available to the public**
- **Article 15a – Public concerned to have access to a review procedure**

Article 17 – Transboundary effects

- Applications that might have transboundary effects to be communicated to the other Member States concerned
- Such applications to be provided to the public for comment
- Results of consultations to be taken into consideration in permitting decisions

BAT – Article 2

- **BEST means "most effective in achieving a high general level of protection of the environment as a whole"**
- **AVAILABLE means "developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages"**
- **TECHNIQUES include "both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned"**

BAT (2)

- **BAT is a dynamic concept**
- **Integrated approach and BAT definition imply trade-off decisions**
- **Member States and their competent authorities are ultimately responsible for these decisions**

"Sevilla Process" / BREFs (1)
http://eippcb.jrc.es/

- **Information exchange required by Art. 16(2)**
- **purpose to support licensing authorities**
- **published BAT Reference Documents (BREFs) for each sector**
- **BREFs are to be taken into account by the licensing authorities**

"Sevilla Process" / BREFs (2)

Annex IV

Considerations to be taken into account generally or in specific cases when determining BAT, as defined in Article 2 (11), bearing in mind the likely costs and benefits of a measure and the principles of precaution and prevention:

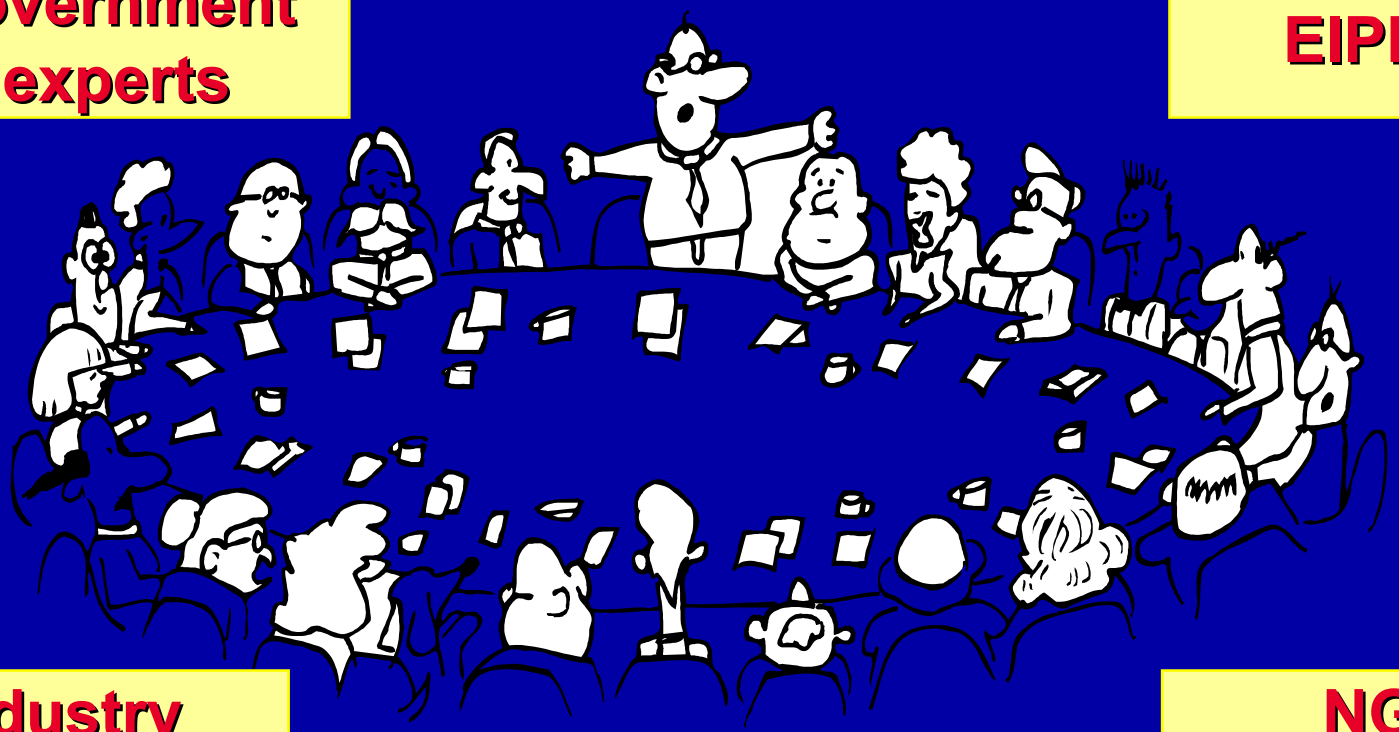
...

12. the information published by the Commission pursuant to Article 16 (2) (i.e. the BREFs) or by international organizations

"Sevilla Process" / BREFs (3)

Government experts

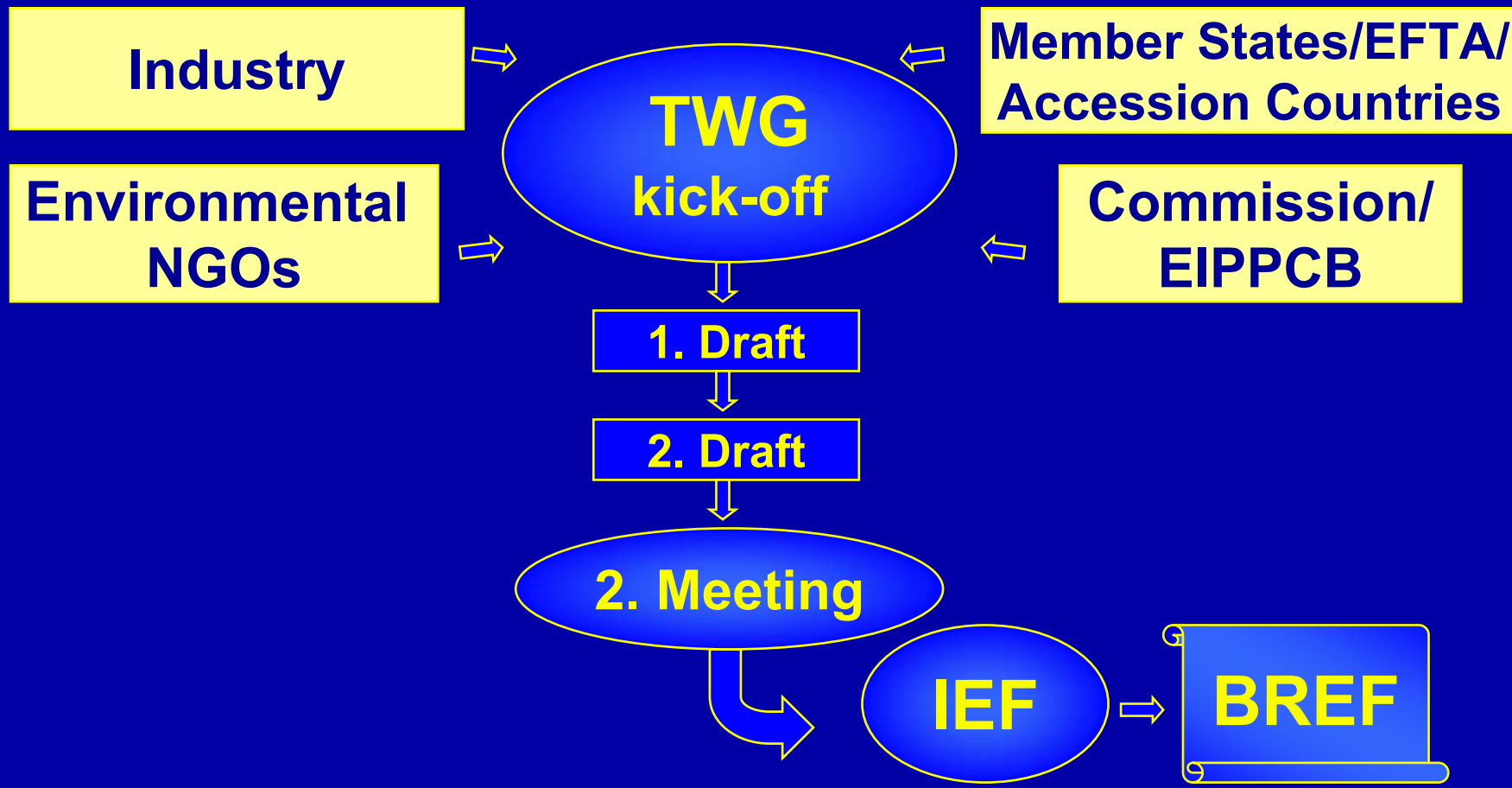
EIPPCB



Industry experts

NGO experts

"Sevilla Process" / BREFs (4)

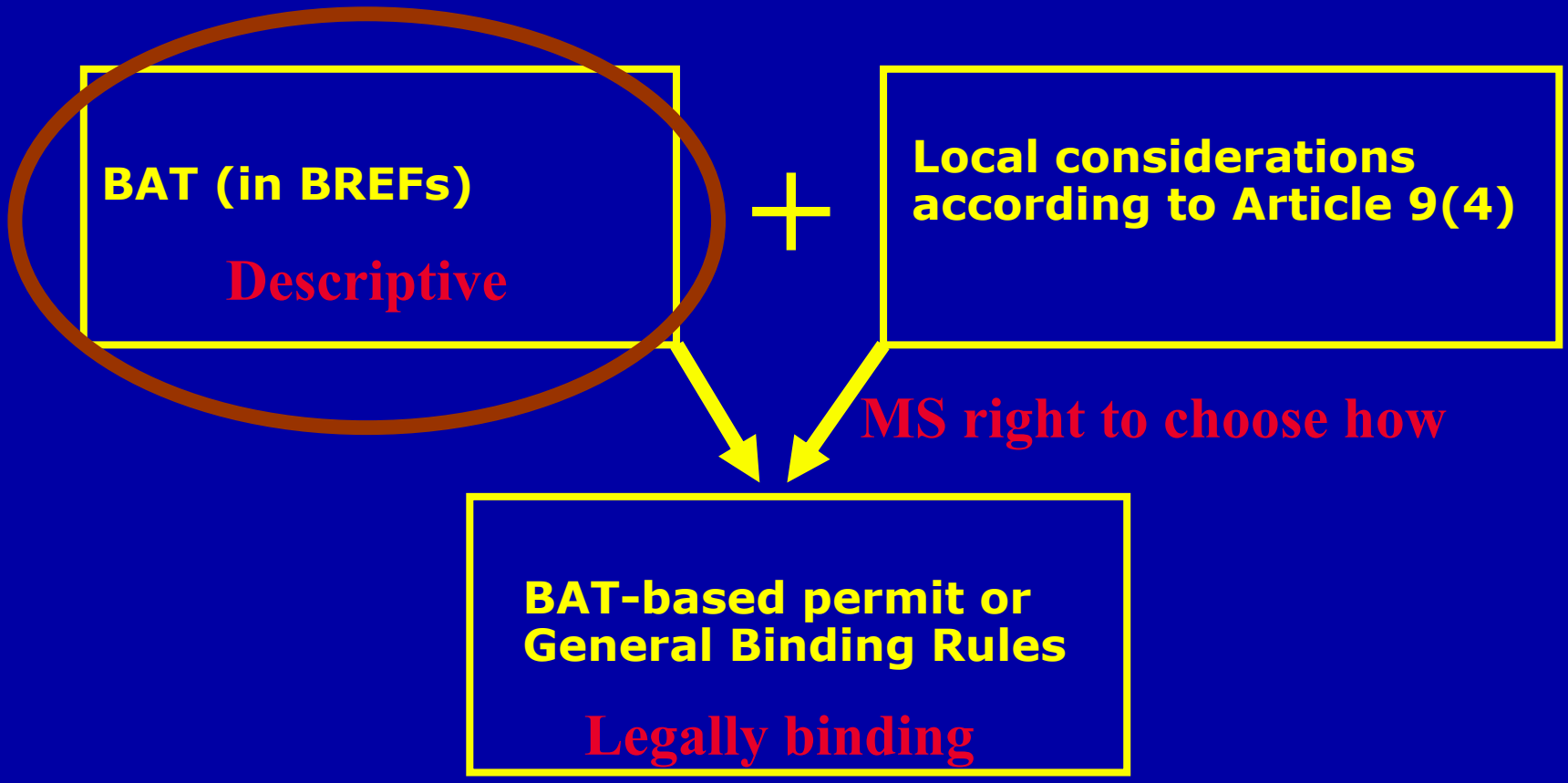


"Sevilla Process" / BREFs (6)

What is a BREF?

- **Results of an information exchange on best available techniques**
- **Provides competent authorities, companies, public, Commission etc. with information for their decision-making, including BAT-associated emission levels**
- **Tool to drive environmental performance**

IPPC: From BREF to Permit conditions



Review of the Directive (1)

Core objectives

An ambitious review while not altering the fundamental principles and objectives of the present Directive (high level of environmental protection, integrated approach, BAT, permitting …)

Review (2)

- Examine scope for legislative streamlining
- Encourage industry to go beyond regulatory compliance:
- “Technical” amendments in the light of experience:
- Assess implementation status
- Assess impacts on competitiveness + environmental benefits

Possible Outputs, Timing?

- **Conclusion of review in 2007 with long-term vision on industrial emissions control**
- **Expected accompanying legislative proposal based on an impact assessment**
  - **Unlikely to come into effect until ~ 2012 at earliest**

⟷ 2007 deadline unaffected!

Large Combustion Plants (LCP) Directive (2001/80/EC)

Contents

- Overview of Directive
- Implementation options for Existing Plants
- Interface LCP-IPPC
- Monitoring and reporting
- SO_2 and NO_x emissions standards for Solid Fuels

Overview of Directive

- Applies to combustion plants with a rated thermal input >= 50 Megawatts
- Sets provisions for emission reductions for sulphur dioxide (SO_2), nitrogen oxides (NO_x) and dust.
- Main sectors covered: electricity, refineries, iron & steel, chemicals, paper, sugar, others
- Directive 2001/80/EC: in force since 27 November 2001
- Previous Directive: 88/609/EC, adopted on 24 November 1988

Timing

Existing installations

1 January 2008
- Part A ELV
- national plans
- combined approach
- exception: 20000h

"Old" new installations (July 1987)

27 November 2002
- Part A ELV
- Jan 2008 partly stricter ELV

"New" new installations (November 2002)

27 November 2002
- Part B ELV

ELV for SO_2, NOx, dust

Emission limit values - new plants

- "New-New" plants (Article 4.2)
  - Emission limit values in Annex III to VII part B
  - Must consider potential for combined heat & power applications (Article 6)
  - Average emission limit values for refineries (Article 8.3(b))
- "Old-New" Plants (Article 4.1)
  - those licensed after 1 July 1987 before 27 November 2002
  - Emission limit values in Annex III to VII Part A

Implementation options for existing plants

- **Art. 4.3 requires significant emission reductions from existing (pre-July 87) plants by 1.1.2008:**
  - **by individual compliance with ELVs established for "old new" plants referred to in Art. 4.1 or**
  - **through a NERP that achieves overall reductions calculated using the ELVs**

What is a NERP?

- **Art. 4.6: The NERP shall reduce total annual emissions of NO_x, SO_2 and dust to the levels that would have been achieved by applying the ELVs to existing plants in operation in 2000 on the basis of each plant's actual annual operating time, fuel used and thermal input, averaged over the last 5 years of operation up to and including 2000**
- **A NERP must comprise objectives and related targets, measures and timetables and a monitoring mechanism**
- **Closure of a plant shall not increase total annual emissions from remaining plants covered by the plan**

Combined approaches – Possibilities

a) Applying a NERP for some plants and ELVs for others for all compliance periods

b) Adopting a NERP for a/some compliance period(s) and complying with ELVs for the rest

c) Mixing option a) and b) above

- But a NERP must address all the three pollutants

Assessment by Commission

- **Art. 4.6:**
  - **MS shall communicate their NERP to Commission by 27.11.2003 or by date of Accession for Acceding Countries**
  - **within 6 months Commission shall evaluate whether the plan meets the requirements of this paragraph. When Commission considers this is not the case, it shall inform the MS and within 3 months the MS shall communicate any measures it has taken in order to ensure the requirements of this paragraph are met**

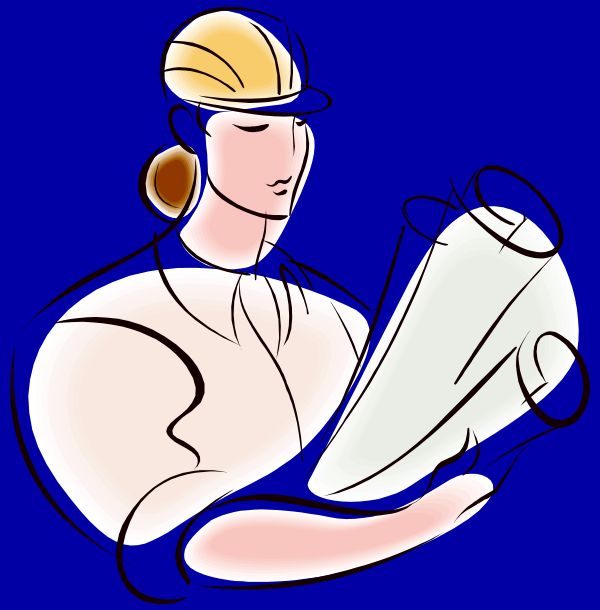
MS that have submitted NERPs

Final versions of:

- **Czech Republic**
- **Finland**
- **Ireland**
- **Spain**
- **UK**

+ previous versions of:

- **France**
- **Greece**
- **Netherlands**



LCP

"Existing combustion plant"

- **Art. 2.7: Where 2 or more separate new plants are installed such that, taking technical and economic factors into account, their waste gases could, in the judgement of the competent authorities, be discharged through a common stack, they shall be regarded as a single unit**

- **Existing plants whose waste gases are de facto discharged through a common stack should be considered as a single plant**

Exemption of plants

- **Art. 4.4: Existing plants may be exempted if operator undertakes not to operate the plant for more than 20,000 operational hours starting from 1 January 2008 and ending no later than 31 December 2015**

- **A plant is considered to be operating when any part of it operates, irrespective of the load factor**

Interface LCP-IPPC

- For the purposes of the LCP Directive, plants subject to a NERP do not have to comply individually with the ELVs of the Directive

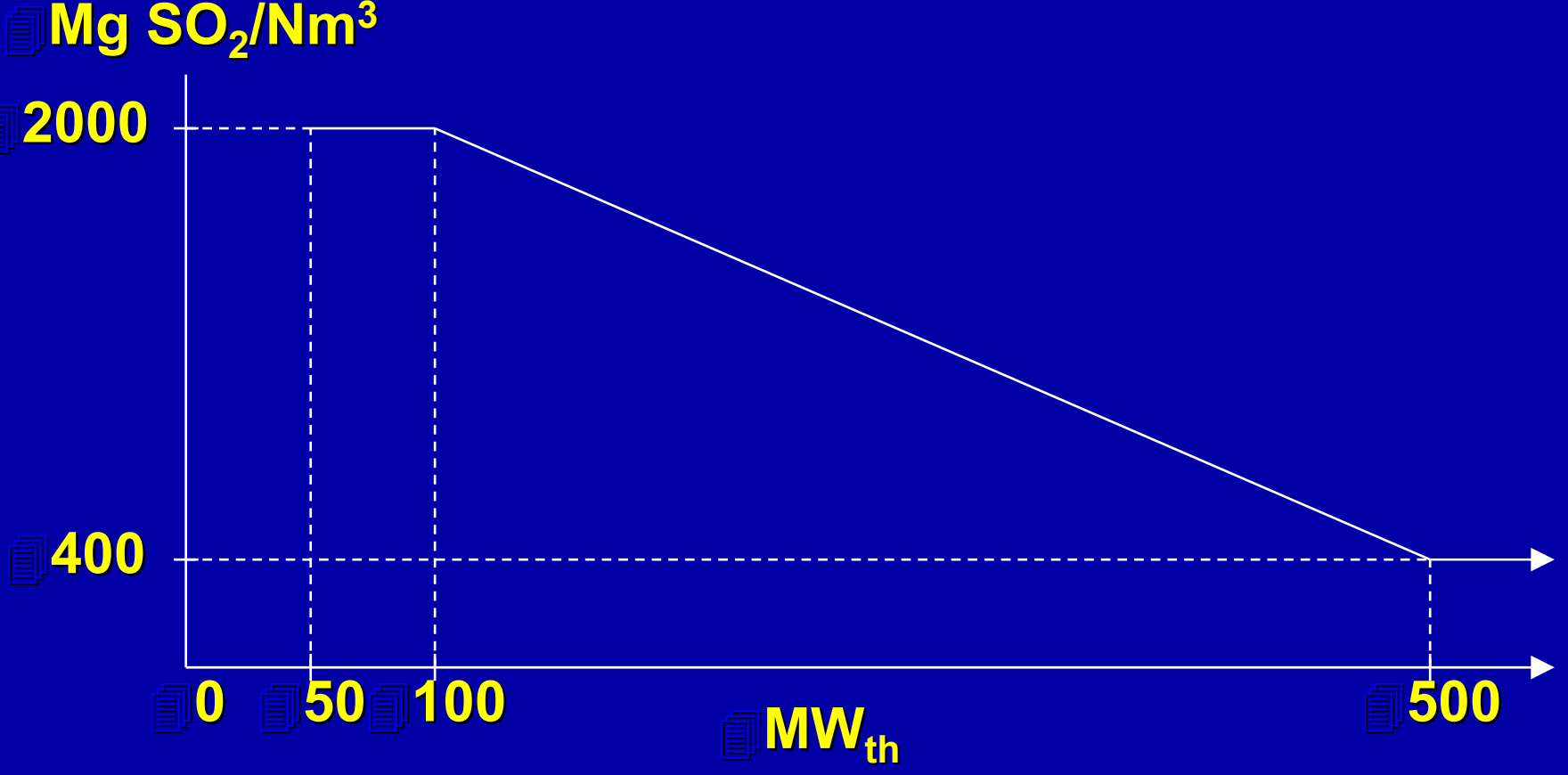
- This is without prejudice to application of the IPPC Directive, which may require ELVs more stringent than those of the LCP Directive, determined objectively, taking account of the LCP BREF among other factors

Monitoring and reporting

- **Monitoring (Annex VIII)**
  - **Continuous monitoring is required for all plants > 100 MWth after three years from entry into force (27 November 2001)**
- **Reporting (Annex VIII)**
  - **Tri-annual emission reporting from 1 January 2004**
  - **Remaining operational life for plants availing of 20000 hour exemption (article 4.4) from 1 January 2008**

Example - Emission Limit Values SO_2

SO_2 limit values for solid fuels to be applied to existing plants



Emission Limit Values SO_2

- Alternative requirements
  - Rate of desulphurisation approach 60 % to 94 % depending on plant size (Annex III nb)
- Article 5(1)
  - Until Dec 31 2015 < 800 mg/Nm3 < 2000 hrs*
  - From 1 Jan 2016 < 800 mg/Nm3 < 1500 hrs*
  - *(rolling average over a period of five years)

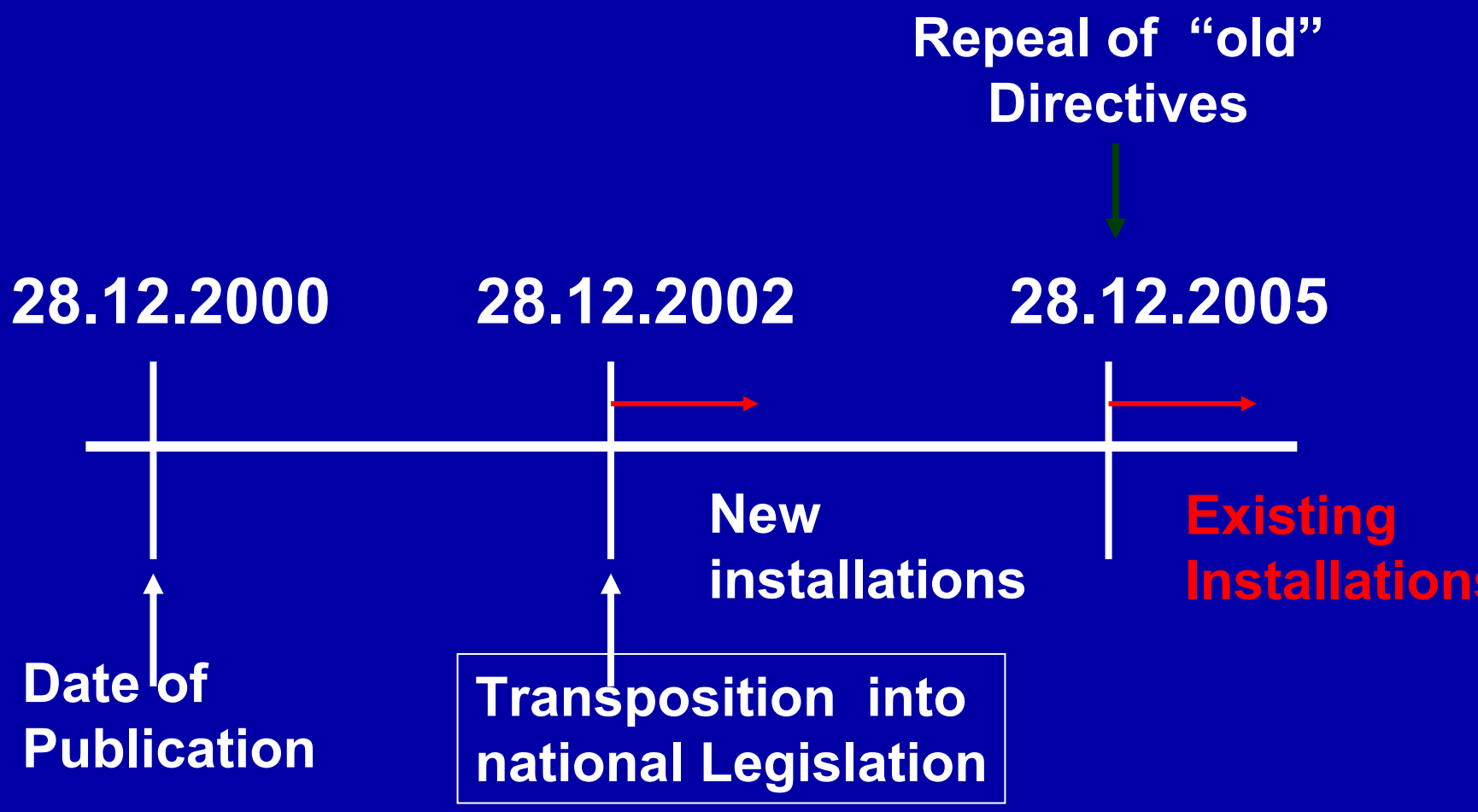
Emission Limit Values for NO_x (mg/Nm^3)

- **Special provisions for:**
  - low volatile coals
  - (1200 mg/Nm^3 until 1 January 2018) if operating on such coal in the 12 month period ending 1 January 2001
  - Plants > 500 MWth
    - 2000 hrs per yr until 1 January 2016 – 600 mg/Nm3
    - 1500 hrs per yr from 1 January 2016 – 450 mg/Nm3

Plant Size MWth	*2008*	*2016*
50 to 500	600	600
> 500	500	200

Waste Incineration (WI) Directive (2000/76/EC)

Timetable for implementation



WI

Waste Incineration – Overview

- Waste incineration subject to permitting
- Permit must list explicitly the waste that may be treated
- Permit must give effect to provisions on:
  - Waste delivery and reception
  - Operating conditions
  - Emission limit values
  - Incineration residues

Article 2
Excluded Installations

- Incineration of vegetable waste from agriculture and forestry and food processing industry/virgin pulp production with heat recovering
- Incineration of wood waste, except treated wood and wood from demolition
- cork waste
- radioactive waste
- animal waste and carcases

Article 3 Definitions

"incineration plant" means any stationary or mobile technical unit and equipment dedicated to the thermal treatment of wastes with or without recovery of the combustion heat generated. This includes the incineration by oxidation of wastes as well as other thermal treatment processes such as pyrolysis, gasification or plasma process in so far as the substances resulting from the treatment are subsequently incinerated

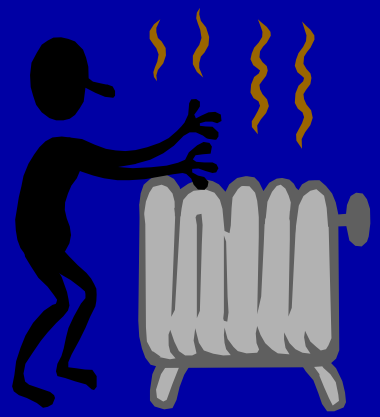
Article 3 Definitions

"co-incineration plant" means a plant whose main purpose is the generation of energy or production of material products and

- which uses waste as a regular or additional fuel; or
- in which waste is thermally treated for the purpose of disposal

Article 6 Operating Conditions

- TOC of slag and bottom ash < 3%, or loss on ignition < 5%
- 850°C, 2 s for incineration or co-incineration plants (1.100°C for some hazardous waste)
- Authorization for different operating conditions
- Any heat generated by the incineration or co-incineration process shall be recovered as far as practicable



Article 7
Air Emission Limit Values

- **Incineration plants shall be … operated in such a way that the ELVs set out in Annex V are not exceeded …**
- **Co-incineration plants shall be … operated in such a way that the ELVs determined according to or set out in Annex II are not exceeded …**
- **In the case of co-incineration of untreated, mixed municipal waste Annex V shall apply**
- **If more than 40% of heat release comes from hazardous waste in a co-incineration plant, the ELVs of Annex V shall apply.**

Approach for Co-incineration

mixing rule
Annex II

Cement kilns
fixed ELV
Annex II.1

Combustion plants
fixed starting points
mixing rule
Annex II.2

Other co-incineration
dependent starting points
mixing rule
Annex II.3

Article 8
Water Discharge

- Discharges to the aquatic environment of waste water resulting from the cleaning of exhaust gases shall be limited as far as practicable

- Minimum requirements (ELV) are set in Annex IV. No dilution is allowed.

Article 9 Residues

1. Residues resulting from the operation of the (co-)incineration shall be minimised in their amount and harmfulness.

2. Residues shall be recycled where appropriate directly in the plant or outside in accordance with relevant Community legislation.
3. Prior to determining the routes for the disposal or recycling of the residues from incineration and co-incineration plants, appropriate tests shall be carried out.

Articles 10+11 – Monitoring and measurement

- **Default requirements:**
  - **Continuous monitoring of NOx, CO, dust, TOC, HCl, HF, SO2**
  - **Continuous monitoring of combustion temperature and exhaust gas parameters, residence time subject to verification**
  - **2 measurements/year of heavy metals, dioxins and furans**
- **Some described possibilities for periodic rather than continuous measurements if emissions are below certain levels**

Emission limit values air (Annex V)

	Daily average	1/2 h average
Total dust	10 mg/m³	30 mg/m³
Total organic carbon	10 mg/m³	20 mg/m³
HCl	10 mg/m³	60 mg/m³
HF	1 mg/m³	4 mg/m³
SO_2	50 mg/m³	200 mg/m³
NO_x > 6 t/h, **new installations**	200 mg/m³	400 mg/m³
NO_x **existing installations, < 6 t/h**	400 mg/m³	

Emission limit values air (Annex V) heavy metals, dioxins

Cd, Tl, Hg	0,05 mg/m^3
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V	0,5 mg/m^3
Dioxins	0,1 ng I-TEQ/m^3

Annex IV
water discharge (mg/l)

Suspended Solids	**95% 100%** **30 45**
Hg	0,03
Cd	0,05
Tl	0,05
As	0,15
Pb	0,2

Cr	0,5
Cu	0,5
Ni	0,5
Zn	1,5
Dioxins	0,3 ng/l

WI

Interaction of IPPC and Waste Incineration Directives

- **WI Directive only** (e.g. incineration below IPPC thresholds): sets minimum requirements, MS may choose to go further

- **WI + IPPC** (e.g. co-incineration > 50 MW): any stricter requirements under IPPC overrule minimum WI requirements

- **IPPC only** (e.g. non-WI exempt incineration plant): BAT-based permitting

Directive 87/217/EEC – prevention & reduction pollution by asbestos

- **Objective: to prevent and reduce pollution by asbestos**

- **Scope: activities involving handling of more than 100 kg of raw asbestos per year:**
  - **Production of raw asbestos ore excluding mining of ore**
  - **Manufacturing and industrial finishing of certain products (eg asbestos cement, filters, textiles, flooring)**

Requirements for industrial sites

- General principle of using best available techniques not entailing excessive costs to reduce asbestos emissions (Art 3)
- Minimum emissions limit values for asbestos into air and water (Art 4 and 5)
- Regular measurements of emissions (Art 6 + Annex)

=> still production and finishing of asbestos products?

Demolition issues

- Demolition and removal of asbestos shall not cause significant pollution (Art 7)

- Reference to plan of work provided in Directive 83/477/EC (protection of workers)

=> No essential requirement since new and more detailed legislation on worker protection has now been included in Directive 83/477/EC

Waste management issues

- **Prevention of asbestos release during transport and deposition of waste (Art 8)**

- **Prevention of asbestos release during landfilling (Art 8)**

=> No essential requirement since Landfill Directive 1999/31/EC and implementing measures set requirements for landfilling of asbestos