REGULATORY CONTROL PRINCIPLES

EMISSIONS TO ATMOSPHERE

1. Conveyed (or ducted) emissions - emitted from (tall) stacks - **MAIN TOPIC**
2. Diffuse emissions (e.g. from Wastewater treatment plants, vapours emitted from tanks)
3. Fugitive emissions (important for refineries and chemical industries) (equipment leaks: from valves, flanges, pressure reliefs, ..)

NO CLEAR-CUT DEFINITION! ***MOST OF THE TIME "DIFFUSE EMISSIONS" INCLUDE FUGITIVE EMISSIONS, TOO****! MOREOVER, THE TERM FUGITIVES EMISSIONS IS USED TO MEAN DIFFUSE EMISSIONS!!*

«DIFFUSE EMISSIONS»: ONLY ONCE REPORTED IN THE DIRECTIVE 2010/75/EU: NO CLEAR DEFINITION

(4) 'emission' means the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into air, water or land;

«Emissioni diffuse»: IN THE D.Lgs. 152/2006:

n) 'emissione': lo scarico diretto o indiretto, da fonti puntiformi o diffuse dell'installazione, di sostanze, vibrazioni, calore o rumore nell'aria, nell'acqua o nel suolo;

EMISSIONS TO ATMOSPHERE

«FUGITIVE EMISSIONS»: *NOT EVEN MENTIONED IN THE DIRECTIVE 2010/75/EU:*

n) 'emissione': lo scarico diretto o indiretto, da fonti puntiformi o diffuse dell'installazione, di sostanze, vibrazioni, calore o rumore nell'aria, nell'acqua o nel suolo;

Fugitive emission (from EEA)
Emissions not caught by a capture system which are often due to equipment leaks, evaporative processes and windblown disturbances. *(I do not like this definition, either…)*

«EMISSIONE FUGGITIVE»: ONLY ONCE REPORTED IN THE D.Lgs. 152/2006:

Art. 29-sexies AUTORIZZAZIONE INTEGRATA AMBIENTALE (AIA)
7. L'autorizzazione integrata ambientale contiene le misure relative alle condizioni diverse da quelle di esercizio normali, in particolare per le fasi di avvio e di arresto dell'installazione, per le emissioni fuggitive, per i malfunzionamenti, e per l'arresto definitivo dell'installazione. L'autorizzazione può, tra l'altro, ferme restando le diverse competenze in materia di autorizzazione alla demolizione e alla bonifica dei suoli, disciplinare la pulizia, la protezione passiva e la messa in sicurezza di parti dell'installazione per le quali il gestore dichiari non essere previsto il funzionamento o l'utilizzo durante la durata dell'autorizzazione stessa. Gli spazi liberabili con la rimozione di tali parti di impianto sono considerati disponibili alla realizzazione delle migliori tecniche disponibili negli stretti tempi tecnici e amministrativi necessari alla demolizione e, se del caso, alla bonifica.

Clean Air For Europe Programme (CAFE)

To improve the AIR QUALITY, national and EU legislators have set several restrictions to the emissions from:

- mobile sources *(e.g. EURO 1, EURO 2, …..EURO 6)*
- home heating
- industrial sources
- power stations
- waste incineration
- …*most activities are regulated and require specific preventive Authorization from the Competent Authority.*

The current quality of the air is, however, unsatisfactory. It impacts negatively on human health, ecosystems, crop yields, infrastructures, buildings, cultural heritage,..:

- Vegetation: *specific Air Quality limits in EU!*
- Materials exposed to air (buildings: *dust deposition, chemical attack by acid gases, …;* infrastructures*: metallic corrosion* (no more gutter and drain pipes in galvanized iron,…), corrosion of bridges, etc.) *and concrete chemical attack;…)*
- Cultural heritage (monuments, buildings, paintings …): dust deposition, fading of colours due to O_3 and other air oxidants, ….

NEC DIRECTIVE (NECD)- Directive 2001/81/EC

In addition to specific limits and prescriptions for the different sources,

in the EU «National Emission Ceilings» have been set for Member States, since 2001, for the following FOUR macro pollutants:

1. ***SO_2*** *– acid gas + PM_{fine} precursor*
2. ***NOx*** *– "acid gas prec." + PM_{fine} precursor + O_3 precursor + eutroph.*
3. ***NMVOC*** *(Non-methane volatile organic compounds)– PM_{fine} precursor + O_3 precursor*
4. ***NH_3*** *– "acid gas prec." + PM_{fine} precursor + O_3 precursor + eutroph.*

(EU Directive: 2001/81/CE) → till June 30, 2018

2010 NEC - ITALY

ATTAINEMENT OF TARGET NECD VALUES BY EU COUNTRIES: ITALY OK (but very close to 990 kton/y for NOx;

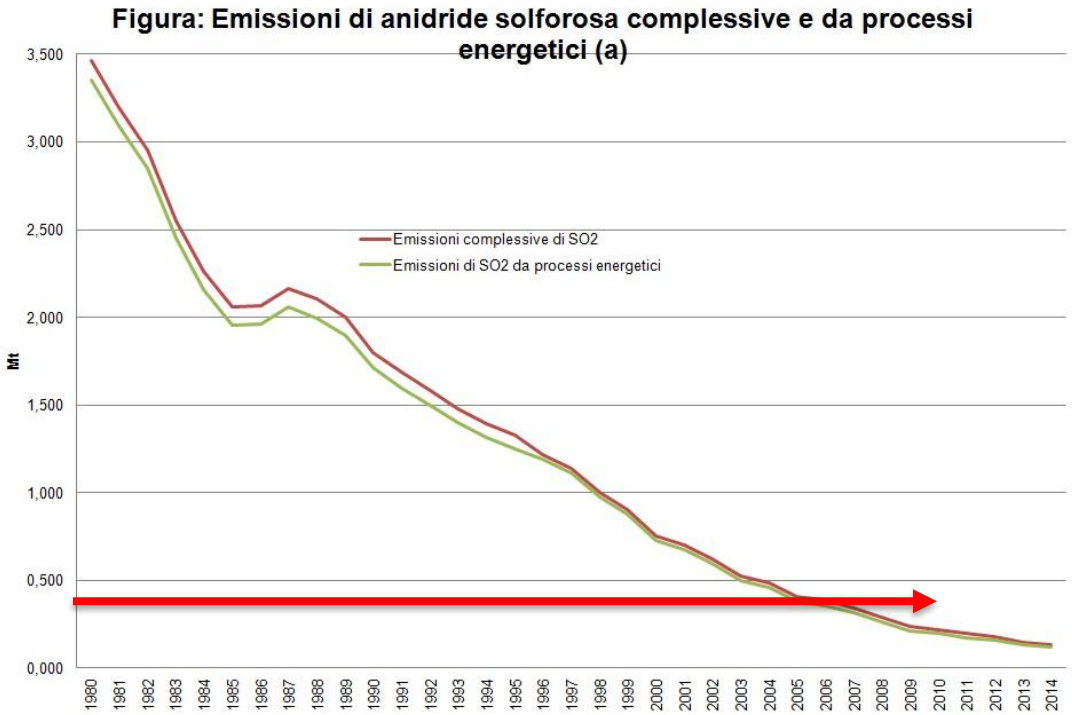
- *Several countries have persistent problems meeting their NEC: Austria, Belgium, France, Germany, Ireland and Luxembourg have breached their NOx ceilings for five consecutive years, …….*
- *Germany was the only country that exceeded three of the four emission ceilings,*

ITALY – ANNUAL EMISSIONS AND NATIONAL EMISSION CEILINGS (kton/year) to be attained by 2010 – *Directive 2001/81/EC ("NEC" Directive)*

	1990 Ann. Emiss.	Ceilings 2010
NO_x	1941	990
SO_2	1794	475
NH_3	464	419
(NM)VOCs	1979	1159

Reduction of emission of primary pollutants will result in a reduction of secondary pollutants PM_{10} / $PM_{2,5}$, too.

2010 NEC - ITALY



Nota: a) Escluse le emissioni di origine naturali (vulcani)

Fonte: ISPRA

SO_2 ANNUAL EMISSIONS IN ITALY

30 years ago the emission of SO_2 (about 2.0 Mton/y) was 10 times higher than now!

STILL PROBLEMS WITH NOx!

ITALY

SO_2, target 2010: 475Kton

NEW NEC DIRECTIVE (NECD)- Directive (EU) 2016/2284

DIRECTIVE (EU) 2016/2284 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2016 on the reduction of **national emissions of certain atmospheric pollutants**, amending Directive 2003/35/EC and repealing Directive 2001/81/EC. …

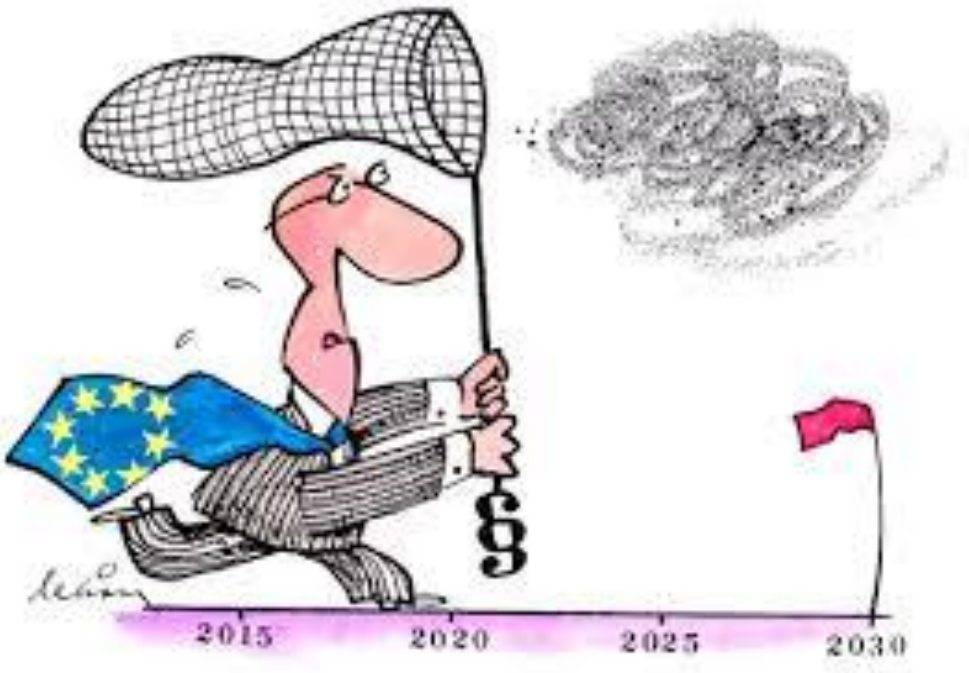
→ **NEW NECD HAS SET A FURTHER STRONG REDUCTION OF ANNUAL EMISSION CEILINGS FOR SO2, NOx, NH3, NMVOC + FINE PARTICULATE MATTER ($PM_{2,5}$)**

Transposition. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 1 July 2018.

	$PM_{2.5}$	NO_X	NH_3	SO_2	NMVOC
Health impacts due to particles	X	X	X	X	(X)
Health impacts due to ozone		X			X
Eutrophication		X	X		
Acidification		X	X	X	
		Regulated by directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants and by the Gothenburg Protocol 1999			

BASIC ARCHITECTURE

Basic architecture → **source emission limits**
+ air quality standards
+ emission trading approach



Source emission limits

- maximum allowable emission
  - source category
  - pollutants
- based on
  - international protocols to regulate emissions at national level of pollutants with large scale effects
    - Greenhouse gases: Kyoto protocol
    - Acid deposition and photochemical pollution
    - EU: Long Range Transboundary Air Pollution (LRTAP), national emission ceilings
  - application of BAT (Best Available Technologies) / BATNEEC (Best available technologies not entailing excessive costs) principles
    - EU: Integrated Pollution Prevention and Control (IPPC)
    - definition of basic regulatory compliances for highly polluting industrial/agricultural activities to prevent/reduce pollution of the environment as a whole (air, water, soil, …)
    - interventions on production cycle + gaseous emissions treatment processes

National, regional, local air quality

1. TO IMPROVE THE AIR QUALITY WE HAVE TO REDUCE THE EMISSION OF POLLUTANTS TO THE ATMOSPHERE.

2. TO IMPROVE THE LOCAL AIR QUALITY WE HAVE ALSO TO IMPROVE THE WAY IN WHICH THE POLLUTANTS ARE EMITTED!

("Local" refers to the area nearby the points of emissions; cells up-to 5 km should be considered in case of tall chimneys and large industrial activities)

EU GHG emission ceilings and trading scheme

EU GHG emission ceilings and trading scheme

- -8% in 2020 with respect to baseline (1990)
- selected industrial activities included in the regulation

Activities	Greenhouse gases
Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)	Carbon dioxide
Refining of mineral oil	Carbon dioxide
Production of coke	Carbon dioxide
Metal ore (including sulphide ore) roasting or sintering, including pelletisation	Carbon dioxide
Production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2,5 tonnes per hour	Carbon dioxide
Production or processing of ferrous metals (including ferro-alloys) where combustion units with a total rated thermal input exceeding 20 MW are operated. Processing includes, inter alia, rolling mills, re-heaters, annealing furnaces, smitheries, foundries, coating and pickling	Carbon dioxide
Production of primary aluminium	Carbon dioxide and perfluoroc
Production of secondary aluminium where combustion units with a total rated thermal input exceeding 20 MW are operated	Carbon dioxide
Production or processing of non-ferrous metals, including production of alloys, refining, foundry casting, etc., where combustion units with a total rated thermal input (including fuels used as reducing agents) exceeding 20 MW are operated	Carbon dioxide

Activities	Greenhouse gases
Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day	Carbon dioxide
Production of lime or calcination of dolomite or magnesite in rotary kilns or in other furnaces with a production capacity exceeding 50 tonnes per day	Carbon dioxide
Manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day	Carbon dioxide
Manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day	Carbon dioxide
Manufacture of mineral wool insulation material using glass, rock or slag with a melting capacity exceeding 20 tonnes per day	Carbon dioxide
Drying or calcination of gypsum or production of plaster boards and other gypsum products, where combustion units with a total rated thermal input exceeding 20 MW are operated	Carbon dioxide
Production of nitric acid	Carbon dioxide and nitrous oxide
Production of adipic acid	Carbon dioxide and nitrous oxide
Production of glyoxal and glyoxylic acid	Carbon dioxide and nitrous oxide

HOW CAN EMISSIONS TO ATMOSPHERE BE REDUCED? (most for conveyed emissions)

HOW CAN EMISSIONS TO ATMOSPHERE BE REDUCED?

➔ **APPLY "IPPC" (INTEGRATED POLLUTION PREVENTION AND CONTROL) CRITERIA (ORIGINAL DIRECTIVE 96/61/EC; NOW DIR. 2010/75/EU) ➔ "BAT"**

1st POLLUTION PREVENTION:

- **1A - CLEANER RAW MATERIALS/FUELS**
- **1B - CLEANER TECHNIQUES** (CLEANER PRODUCTION CYCLES AND/OR CLEANER TECHNOLOGIES; MORE EFFICIENT TECHNOLOGIES; …)

2nd POLLUTION CONTROL:

THE USE OF APCDs TO REDUCE EMISSIONS OF POLLUTANTS THROUGH PHYSICAL AND/OR CHEMICAL TECHNIQUES, TO REMOVE (and possibly recover):

- **DUST**
- **ACID GASES**
- **NOx** *(pay attention: removal of acid gas does not remove NOx!* ***NH_3 is required (SNCR, or SCR)***
- **DIOXINES** *(AND TOGETHER: PCB, PAH, Hg and TRACES OF MANY OTHER MICROPOLLUTANTS)*
- **VOC** (or, better, NMVOC)
- **Heavy metals (Pb, Hg, Ni, Cu, Cd, …)**

3rd OPTIMIZE DISPERSION PROCESS

Source emission limits: some comments

LIMITS TO THE EMISSION FROM CIVIL AND INDUSTRIAL INSTALLATIONS HAVE BEEN SET BY MANY EU AND NATIONAL DIFFERENT TYPES OF "LAWS". (SOME REGIONS HAVE SET LIMITS, TOO)

→ EU: DIRECTIVES, DECISIONS, REGULATIONS (Industrial Emissions Directive IED, 2010/75/EU)

→ ITALY: Leggi, DM, DPCM, D.Lgs., DPR,…

The limits have been established in relationship with many aspects: fuel, "size" of plant, new or existing installation, control technique used (for instance SNCR or SCR, or DLN), …

PARAMETERS

ELV: Emissions Limit Values set by EU legislation – must be respected under ordinary running of the plant.

VLE: VALORI LIMITE DI EMISSIONE STABILITI DALLA NORMATIVA ISTATALE (QUALCHE VOLTA ANCHE REGIONALE)

BAT-AEL: STRONGLY RECOMMENDED RANGES OF VALUES of POLLUTANT CONCENTRATIONS (equivalent measures must be applied, if such values cannot be attained!). BAT-AEL APPLY ONLY TO PLANTS IN ANNEX 1 OF DIRECTIVE 2010/75/EU → IPPC INSTALLATIONS → AUTHORIZED AS "AIA" IN ITALY.

EU HAS NOT SET GENERAL ELVs FOR SPECIFIC POLLUTANTS, VALID FOR ALL APPLICATIONS! --

IN ITALY, IN ADDITION TO SPECIFIC LIMITS, GENERAL LIMITS HAVE BEEN SET.

IF SPECIFIC LIMITS HAVE BEEN SET, THEY SHALL PREVAIL OVER THE GENERAL LIMITS!

Things are not at all easy, neither for the Competent Authorities (CA), nor for stakeholders!

I think it will be quite a challenge for you, too!

Source emission limits: concentration correction

REMEMBER THAT EMISSION CONCENTRATIONS SHOULD BE REFEREED TO SPECIFIC CONDITIONS:

1) NORMALISATION

2) DRY GAS CORRECTION

3) O2 % REFERENCE

THE O_2 (*AND HUMIDITY*) CORRECTION FORMULA IS MAINLY USED WITH COMBUSTION PLANTS:

O_s = 3% for liquid and gas fuels;

O_s = 6% for solid fuels;

O_s = 11% for waste fuels (*all liquid/solid waste incinerators*);

O_s = 15% for gas turbines

…...

O_2% CAN CHANGE BY CHANGING THE FUEL… CHECK CAREFULLY

Extact from 2010/75/EU

PART 3

Air emission limit values for waste incineration plants

1. All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correcting for the water vapour content of the waste gases.

They are standardised at 11 % oxygen in waste gas except in case of incineration of mineral waste oil as defined in point 3 of Article 3 of Directive 2008/98/EC, when they are standardised at 3 % oxygen, and in the cases referred to in Point 2.7 of Part 6.

Source emission limits: ELVs vs. TIME

ELVs ARE CONSTANTLY REDUCED WITH TIME

→WHEN DESIGNINING A NEW PLANT A SIGNIFICANT REDUCTION OF THE ELVs WITH TIME SHOULD BE TAKEN INTO ACCOUNT!

→ CORRECT SEQUENCE → ROOM FOR INSTALLATION OF NEW APCD IN THE FUTURE → ...

EXAMPLE: Emission limit values for NOx and CO for natural gas (NG) fired combustion plants
CCGT: Combined-cycle gas turbine, with or without supplementary firing
Thermal power input: ≥ 50 MWth

		NOx (as NO_2), mg/Nm^3	CO mg/Nm^3	O_2 %REF
~~Dir. 2001/81/CE ELV~~	~~New gas turbines~~	~~50 daily average~~	~~No limit~~	~~15~~
~~BAT-AEL BRef (2006)~~ (*)	~~New gas turbines~~	~~20 -50 daily average~~	~~5 – 100 daily average~~	~~15~~
Dir. 2010/75/EU ELV	NEW Gas turbines (including CCGT)	50 daily average	100 daily average	15
BAT-AEL BRef (2017) (*)	New gas turbines	15 – 40 daily average 10 – 30 yearly average	As an indication: 5 -30 yearly average	15
DECISION (EU) 2017/1442 ELV	New CCGT	15 – 40 daily average 10 – 30 yearly average	As an indication: 5 -30 yearly average	15
		EFFICIENCY %	50–600 MW_{th}	53–58,5 %
			≥ 600 MW_{th}	57–60,5 %

(*) http://eippcb.jrc.ec.europa.eu/reference/ (Spain, Sevilla)

Source emission limits: ELVs vs. SIZE DIMENSIONS

GENERAL RULE: HIGHER CAPACITY PLANTS MUST COMPLY WITH LOWER LIMITS

DATA FROM DIR. 2010/75/EU:

Emission limit values, ELVs, (mg/Nm^3) for SO_2 for boilers using solid or liquid fuels (new plants)

Rated thermal input (MWth)	**Coal and lignite and other fuels**	**Biomass**	**Peat**	**Liquid fuels**
50-100	400	200	.. *omitted*	350
100-300	200	200	…	200
> 300	150	150	..	150

Emission limit values, ELVs, (mg/Nm^3) for NO_x for boilers using solid or liquid fuels (new plants)

Rated thermal input (MWth)	**Coal and lignite**	**Biomass**	**Liquid fuels**
50-100	300	250	300
100-300	200	200	150
> 300	150	150	100

Source emission limits: AVARING TIME

EMISSION LIMITS OF POLLUTANT EMITTED FROM **SMALL PLANTS**, GENERALLY REFER TO RELATIVELY SHORT PERIOD, BECAUSE MANUAL SAMPLING IS MOST OF TIMES USED. Typically, the sampling period and the averaging period for periodic (manual) monitoring is 1,0 h.

Manual sampling is also necessary for some pollutants (e.g. emission of metals) in large plants. The established sampling period for such pollutants is most of times 1,0 h.

Manual sampling of micro-organic pollutants such as dioxins, PAH, PCB, instead must be longer. The required time is 8 h (min. 6 h of effective sampling), to get enough amount of pollutant for a correct analysis.

For some pollutants emitted from waste incineration plants, HALF-HOUR LIMITS HAVE BEEN SET.

Different averagings times set by EU/Italian legislation: t = 0.5 h; 1 h; 8 h; 1 day; 48 hr; 1 month; 1 year!

The longer the averaging period, the lower the set ELV (or BAT-AEL):

e.g. WI

- HCl(g) limit: half-hourly average emission limit: 60 mg/Nm^3 (dry gas, 11%O_2);

  daily average emission limit: 10 mg/Nm^3 (dry gas, 11%O_2);.

Source emission limits: the case of Dust

What are the PM Emission Limit Values (ELVs) set by EU for the industrial activities?

Industrial plants in EU must respect specific limits.

It concerns only generic PM (not PM_{10}, $PM_{2.5}$ or the like). .

Generally, the regulated ELVs are in the range of 10 - 50 mg/Nm^3, but there can be different averagings times: t = 0.5 h; 1 h; 1 day; 48 hr; month!

Note:

- *Combustion plants and some other plants must consider the O_2 reference value and dry gas.*

EU national emission ceilings for long range pollutants (LRTAP)

Table 1.2 Examples of Emission Limit Values for NO_x, SO_2 and dust as specified in the LCP Directive for existing plants and new plants having started operating before 27 November 2003

Pollutant	Capacity (MW_{th})	ELV (mg/Nm^3)		
		Solid fuels (except biomass)	Liquid fuels	Gas (*)
NO_x	> 500	500 (200 after 1 January 2016)	400	200
	50–500	600	450	300
SO_2	> 500	400	400	35 (*)
	100–500	2 000–400 (linear decrease)	1 700 (100–300 MW_{th}) 1 700–400 (300–500 MW_{th}; linear decrease)	
	50–100	2000	1700	
Dust (PM)	> 500	50	50	5 (*)
	50–500	100	50	

IPPC (Integrated Pollution Prevention and Control) regulations

- EU IPPC (Integrated Pollution Prevention and Control) regulations
  - BAT (Best Available Technologies): framework regulations including indications, availability, applicability, achievable reductions and emissions of applicable technologies for controlling pollutants typical of activity sectors with high environmental pressure

- Concerned activities
  - energy industries
  - metals production/processing
  - mineral industry
  - chemical industry
  - waste management
  - livestock management
  - ...

http://eippcb.jrc.ec.europa.eu/reference/

BAT definition

- 'best available techniques' means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole
  - 'techniques' includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned
  - 'available techniques' means those 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, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator
  - 'best' means most effective in achieving a high general level of protection of the environment as a whole

BAT GENERAL CRITERIA

ANNEX III

Criteria for determining best available techniques

1. the use of low-waste technology;
2. the use of less hazardous substances;
3. the furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate;
4. comparable processes, facilities or methods of operation which have been tried with success on an industrial scale;
5. technological advances and changes in scientific knowledge and understanding;
6. the nature, effects and volume of the emissions concerned;
7. the commissioning dates for new or existing installations;
8. the length of time needed to introduce the best available technique;
9. the consumption and nature of raw materials (including water) used in the process and energy efficiency;
10. the need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it;
11. the need to prevent accidents and to minimise the consequences for the environment;
12. information published by public international organisations.

CRITERIA FOR SPECIFIC ACTIVITIES ARE REPORTED IN "VERTICAL" BREF DOCUMENTS!

IPPC (Integrated Pollution Prevention and Control) regulations

EU IPPC (integrated pollution prevention and control) regulations: example for large combustion plants (LCP)

Table 1.3 BAT Associated Emission Levels (BAT AELs) for NO_x, SO_2 and dust for existing LCPs (boilers) as set out in the LCP BREF

Pollutant	Type	Capacity (MWth)	Emission level (mg/Nm³)				
			Hard coal	Brown coal	Fuel oil	Other oil	Gas(*)
NO_x	BREF, 'upper end' of BAT AEL	> 300	200	200	150	150	100
		100–300	200	200	200	200	100
		50–100	300	450	450	450	100
	BREF, 'lower end' of BAT AEL	> 300		50	50	50	20
		100–300		90	50	50	20
		50–100	90	200	150	150	20
SO_2	BREF, 'upper end' of BAT AEL	> 300	200	200	200	200	10
		100–300	250	250	250	250	10
		50–100	400	350	350	350	10
	BREF, 'lower end' of BAT AEL	>300	20	50	50	50	10
		100–300	100	100	100	100	10
		50–100	150	100	100	100	10
Dust (PM)	BREF, 'upper end' of BAT AEL	>300	20	20	20	20	
		100–300	25	25	25	25	
		50–100	30	30	30	30	
	BREF, 'lower end' of BAT AEL	> 300	5	5	5	5	
		100–300	5	5	5	5	
		50–100	5	5	5	5	

Note: (*) The NO_x emission levels of dust caused by using natural gas as a fuel are normally well below 5mg/Nm³ and SO_2 emissions are well below 10 mg/Nm³ (15 % O_2) without any additional technical measures being applied. Dust emissions are well below 5 mg/Nm³ without any additional abatement techniques applied (LCP BREF, see JRC, 2010).

LIST OF WASTE MANAGEMENT ACTIVITIES UNDER IPPC DIRECTIVE - FROM ANNEX I

5. Waste management

5.1. Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving one or more of the following activities:

(a) biological treatment;

(b) physico-chemical treatment;

(c) blending or mixing prior to submission to any of the other activities listed in points 5.1 and 5.2;

(d) repackaging prior to submission to any of the other activities listed in points 5.1 and 5.2;

(e) solvent reclamation/regeneration;

(f) recycling/reclamation of inorganic materials other than metals or metal compounds;

(g) regeneration of acids or bases;

(h) recovery of components used for pollution abatement;

(i) recovery of components from catalysts;

(j) oil re-refining or other reuses of oil;

(k) surface impoundment.

5.2. Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants:

(a) for non-hazardous waste with a capacity exceeding 3 tonnes per hour;

(b) for hazardous waste with a capacity exceeding 10 tonnes per day.

5.3. (a) Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment (1):

(i) biological treatment;

(ii) physico-chemical treatment;

(iii) pre-treatment of waste for incineration or co-incineration;

(iv) treatment of slags and ashes;

(v) treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.

(b) Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, and excluding activities covered by Directive 91/271/EEC:

(i) biological treatment;

(ii) pre-treatment of waste for incineration or co-incineration;

(iii) treatment of slags and ashes;

(iv) treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.

When the only waste treatment activity carried out is anaerobic digestion, the capacity threshold for this activity shall be 100 tonnes per day.

5.4. Landfills, as defined in Article 2(g) of Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (1), receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25 000 tonnes, excluding landfills of inert waste

5.5. Temporary storage of hazardous waste not covered under point 5.4 pending any of the activities listed in points 5.1, 5.2, 5.4 and 5.6 with a total capacity exceeding 50 tonnes, excluding temporary storage, pending collection, on the site where the waste is generated

5.6. Underground storage of hazardous waste with a total capacity exceeding 50 tonnes

IPPC (Integrated Pollution Prevention and Control) regulations

Waste incineration plants

Pollutant (mg/Nm^3 except PCDDs $ng_{I\text{-}TEQ}/Nm^3$)	Emission Limits	BAT level ranges
Particulates	10	1-5
HCl	10	1-8
SO_x	50	1-40
HF	1	<1
TOC	10	1-10
CO	50	5-30
NO_x	200	40-100 (SCR) 120-180 (SNCR)
Hg	0.05	0.001 - 0.02
Cd + Tl	0.05	0.005 - 0.05
Heavy metals*	0.5	0.005 - 0.5
PCDDs	0.1	0.01 - 0.1
* As+Co+Cr+Cu+Ni+Pb+Sb+V		

Integration of global strategies into regulations for related sectors

- transport: emission limits for cars, LD and HD vehicles, motorcycles

European emission standards for passenger cars (Category M*), g/km

Tier	Date	CO	THC	NMHC	NO_x	HC+NO_x	PM
Diesel							
Euro 1†	July 1992	2.72 (3.16)	-	-	-	0.97 (1.13)	0.14 (0.18)
Euro 2	January 1996	1.0	-	-	-	0.7	0.08
Euro 3	January 2000	0.64	-	-	0.50	0.56	0.05
Euro 4	January 2005	0.50	-	-	0.25	0.30	0.025
Euro 5	September 2009	0.500	-	-	0.180	0.230	0.005
Euro 6 (future)	September 2014	0.500	-	-	0.080	0.170	0.005
Petrol (Gasoline)							
Euro 1†	July 1992	2.72 (3.16)	-	-	-	0.97 (1.13)	-
Euro 2	January 1996	2.2	-	-	-	0.5	-
Euro 3	January 2000	2.3	0.20	-	0.15	-	-
Euro 4	January 2005	1.0	0.10	-	0.08	-	-
Euro 5	September 2009	1.000	0.100	0.068	0.060	-	0.005**
Euro 6 (future)	September 2014	1.000	0.100	0.068	0.060	-	0.005**

- reduction of NMVOC emissions from petrol storage and distribution at service stations

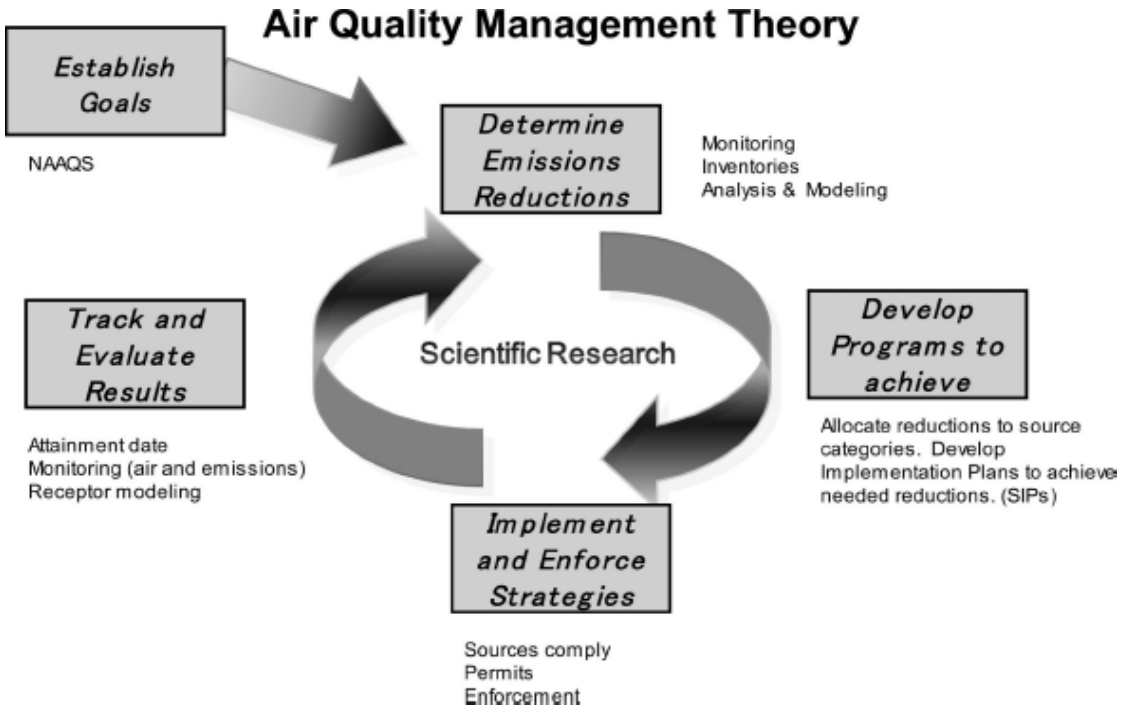
Air quality standards

- Pollutants concentration values designed to avoid, prevent or reduce harmful effects on human health and the environment
- Limit values defined based on:
  - averaging period: time interval considered for averaging recorded data
    - calendar year
    - day
    - one/multiple hour(s)
  - statistical parameter: to be calculated out of the recorded data
    - arithmetic average
    - maximum/extreme value
- Averaging periods and statistical parameters are specifically defined for each pollutant
  - acute effects**:** short averaging periods & extreme values
  - chronic effects**:** long averaging periods & average values

Air quality standards

Base parameters of systems for air quality management at local scale whose main points are:

- air quality monitoring and assessment for AQS compliance verification
- evaluation of source emissions/air quality relationships (emission inventories, modeling exercises)
- development and enforcement of source intervention programs for air quality objectives attainment: implementation plans at local scale



EU Air quality standards

Table 1.4 Summary of EU air quality limit and target values for NO_2, PM_{10}, $PM_{2.5}$ and ozone (Air Quality Directive, 2008/50/EC)

Pollutant	Protecting	Period of analysis	Value	Status
Nitrogen dioxide (NO_2) (a)	Humans	Annual mean	40 µg/m^{-3}	Limit value; valid from 2010
	Humans	Hourly mean; exceedances may occur for a maximum of 18 hours per year	200 µg/m^{-3}	Limit value; valid from 2010
Particulate matter (PM_{10}) (b)	Humans	Annual mean	40 µg/m^{-3}	Limit value
	Humans	Daily mean; exceedances may occur for a maximum of 35 days per year	50 µg/m^{-3}	Limit value
Particulate matter ($PM_{2.5}$)	Humans	Annual mean	25 µg/m^{-3}	Target value, to be reached in 2010; limit value enters into force in 2015
	Humans	Annual mean, averaged over observations in urban background locations (c)	20 µg/m^{-3}	Limit value; Valid from 2015
	Humans	Annual mean, averaged over observations in urban background locations (c)	15–20 % reduction	Exposure reduction target value; to be reached in 2020 relative to 2010
Ozone (O_3)	Humans(d)	Maximum daily 8 hour mean; exceedances may occur for a maximum of 25 days per calendar year	120 µg/m^{-3}	Target value; to be reached in 2010
	Vegetation	AOT40,(e) accumulated over May, June and July	18 000 (µg/m^{-3}).h	Target value to be reached in 2010
Sulphur dioxide (SO_2)	Humans	Hourly mean	350 µg/m^{-3}	Limit value; valid since 2005
	Humans	Daily mean	125 µg/m^{-3}	Limit value; valid since 2005

EU Air quality standards

Lead (Pb)	0.5 µg/m3	1 year	Limit value entered into force 1.1.2005 (or 1.1.2010 in the immediate vicinity of specific, notified industrial sources; and a 1.0 µg/m3 limit value applied from 1.1.2005 to 31.12.2009)	n/a
Carbon monoxide (CO)	10 mg/m3	Maximum daily 8 hour mean	Limit value entered into force 1.1.2005	n/a
Benzene	5 µg/m3	1 year	Limit value entered into force 1.1.2010**	n/a
Arsenic (As)	6 ng/m3	1 year	Target value enters into force 31.12.2012	n/a
Cadmium (Cd)	5 ng/m3	1 year	Target value enters into force 31.12.2012	n/a
Nickel (Ni)	20 ng/m3	1 year	Target value enters into force 31.12.2012	n/a
Polycyclic Aromatic Hydrocarbons	1 ng/m3 (expressed as concentration of Benzo(a)pyrene)	1 year	Target value enters into force 31.12.2012	n/a

Regio decreto 27 luglio 1934, n. 1265 - Testo unico delle leggi sanitarie.
Il sindaco è il responsabile della condizione di salute della popolazione del suo territorio.

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AIA – IPPC D.Lgs. 152/2006
Art. 29-quater
Procedura per il rilascio dell'autorizzazione integrata ambientale

...

"[6] Nell'ambito della Conferenza dei servizi di cui al comma 5, vengono acquisite le prescrizioni del sindaco di cui agli articoli 216 e 217 del R.D. 27/07/1934, n. 1265..."