UNITED NATIONS
ECONOMIC COMMISSION
FOR EUROPE

UNECE CONVENTION ON LONG-RANGE TRANBOUNDARY AIR POLLUTION (LRTAP) AND FOSSIL FUEL-FIRED POWER PLANTS

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Reducing greenhouse gas emissions from fossil fuel-fired electricity production workshop, Geneva, 20 October 2014

Outline

1. Emission trends

2. Convention and its latest three Protocols

3. Gothenburg Protocol and provisions on emissions from stationary sources (Emission Limit Values)

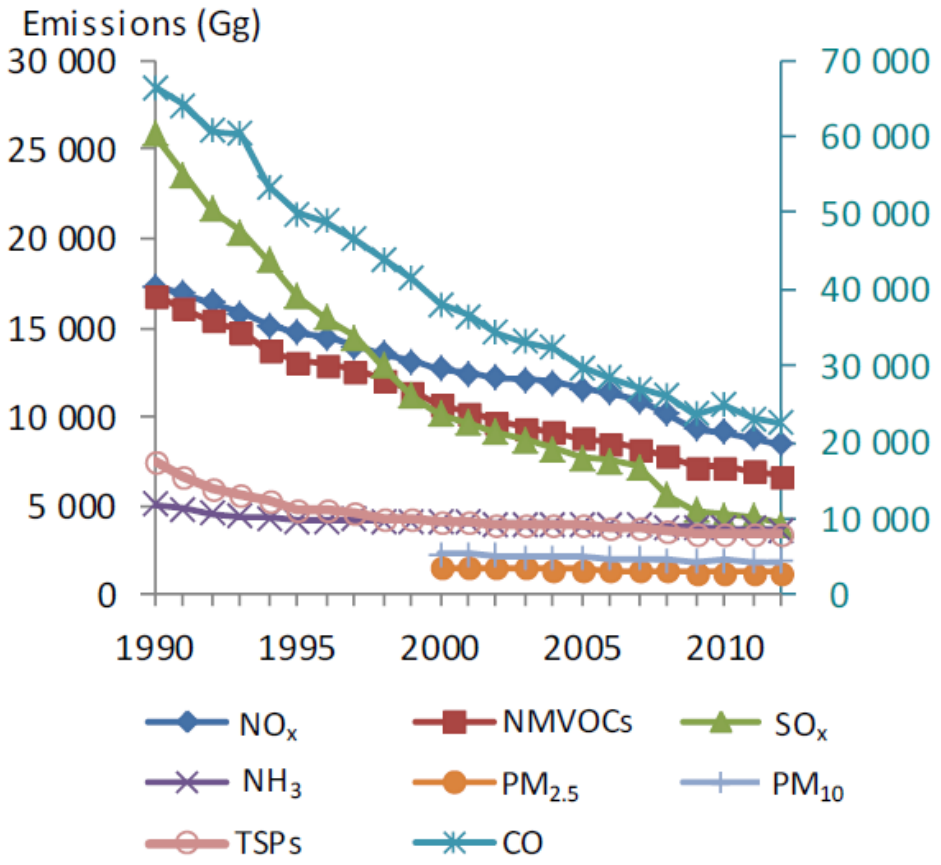
4. Guidance on emissions from stationary sources

5. Reporting on emissions (inventories)

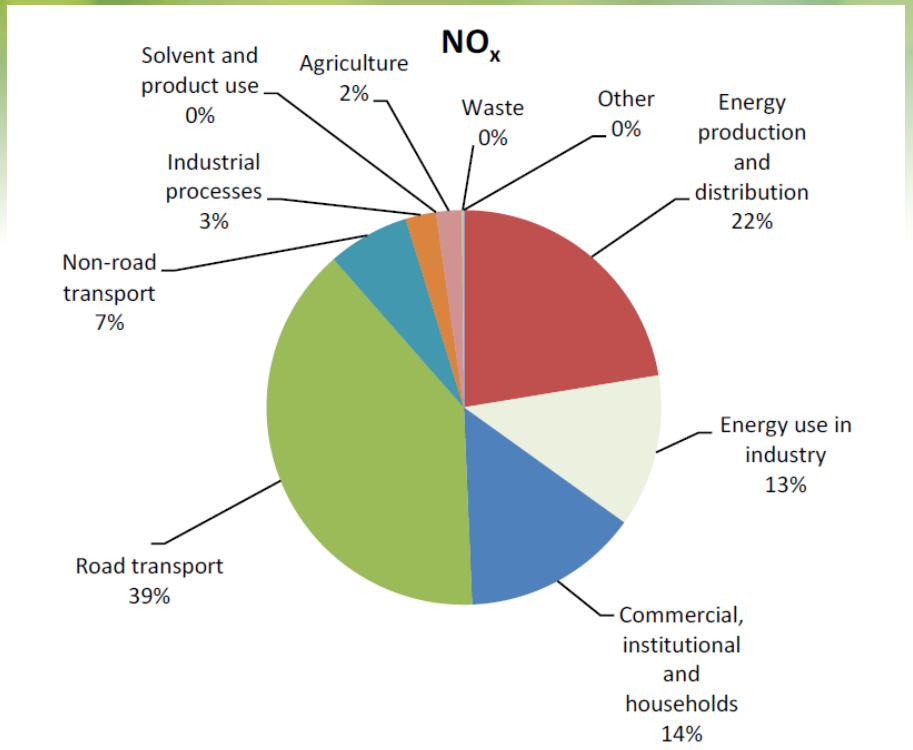
1. Emission trends

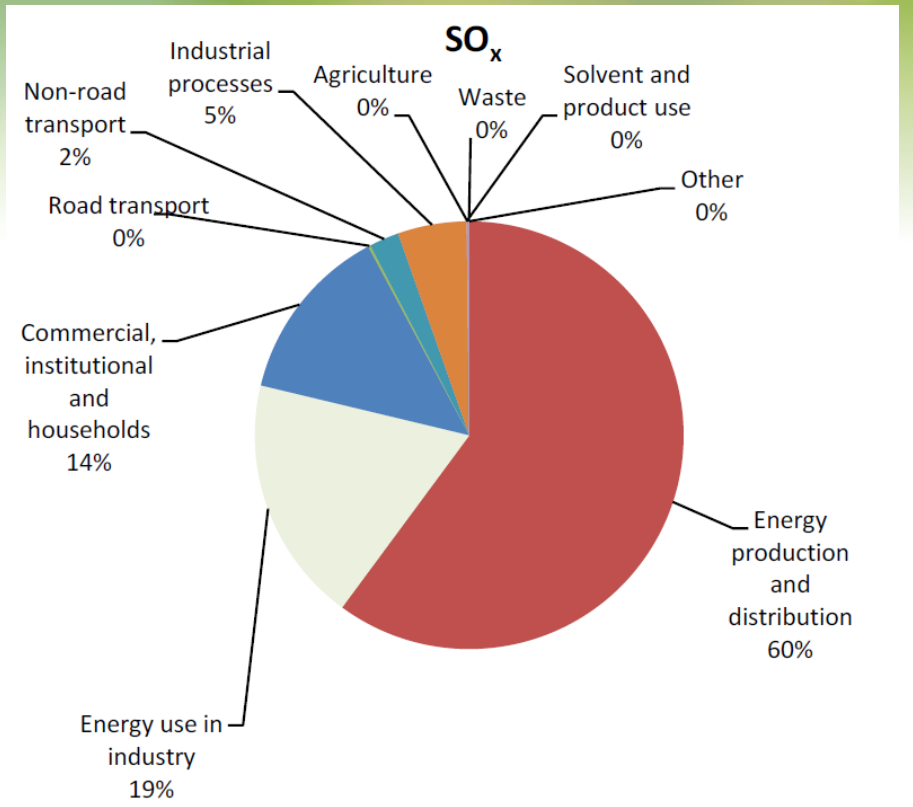
- EU-28 emission trends for main pollutants, 1990-2012

source: EU IIR, 2014



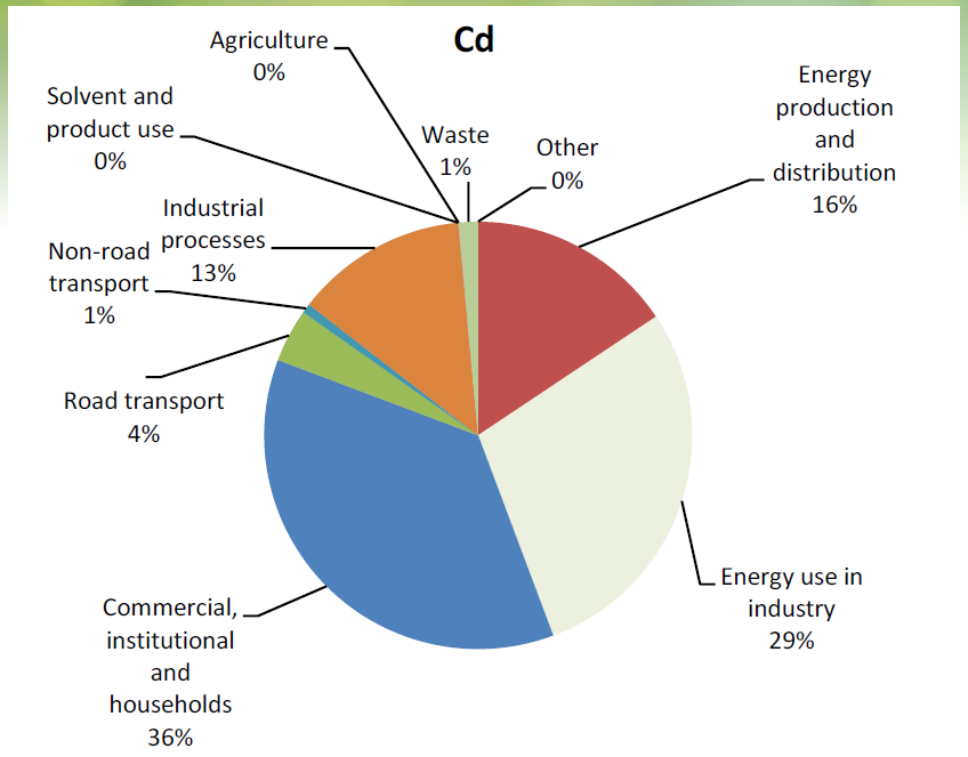
Main emitting sectors: NOx and SOx

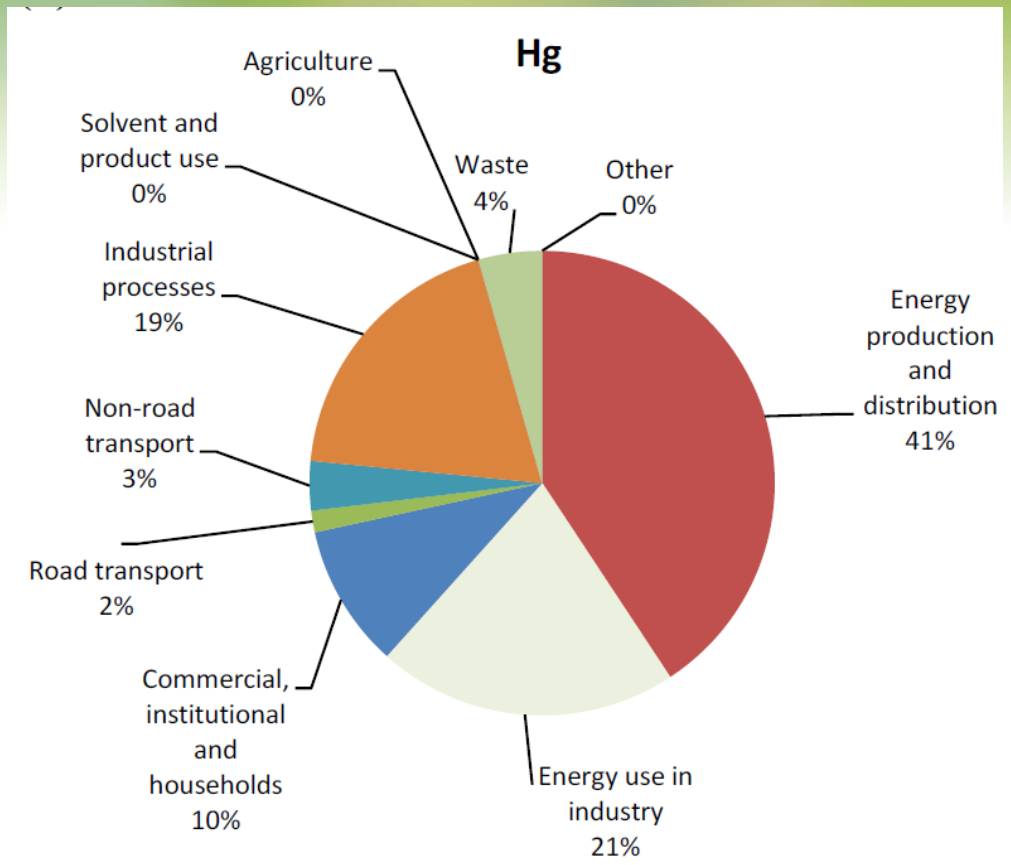




Source: ibid

Main emitting sectors: heavy metals





Source: ibid

2. Convention and its latest 3 Protocols

- **Amendments of the three latest Protocols completed:**
  - **Protocol on Heavy Metals in December 2012**
    - New emission limit values and extended emission source categories
    - Flexibilities for new Parties
  - **Protocol to Abate Acidification, Eutrophication, Ground-level Ozone (Gothenburg Protocol) in May 2012**
    - Emission ceilings for 2020
    - Inclusion of Particulate Matter incl. Black Carbon as a short-lived climate forcer
    - Flexibilities for new Parties
  - **Protocol on Persistent Organic Pollutants in 2009**
    - Addition of new substances

3. Amendments to the Gothenburg Protocol

- Adopted by Parties to the 1999 Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone (Gothenburg Protocol) at the 30th session of the Executive Body on 4 May 2012
- National emission reduction targets for 2020 and beyond (compared to 2005 base year) for key air pollutants: sulphur and nitrogen oxides, ammonia and volatile organic compounds
- Adoption – for the first time – of reduction targets for fine particulate matter PM2.5
- Inclusion of black carbon (soot) as a component of PM2.5
- Uniform set of air pollutant standards for stationary sources (Emission Limit Values)

→ **First legally binding agreement containing obligations to reduce black carbon emissions which both is an air pollutant and a short-lived climate forcer/pollutant**

Flexible arrangements

- Introduction of **flexibilities** to encourage accession by the countries of Eastern Europe, the Caucasus and Central Asia (article 3 bis on Flexible transitional arrangements and the annex VII on timescales under article 3):
    - Applicable for countries acceding to the Protocol by 2019
    - Full implementation of ELVs no later than eight years after entry into force for the new Party, or 2022, whichever is sooner

Emission limit values for power plants

Table 1
Limit values for NO_x emissions released from combustion plants[a]

Fuel type	*Thermal input (MWth)*	*ELV for NO_x (mg/m^3)*[b]
Solid fuels	50–100	New plants: 300 (coal, lignite and other solid fuels) 450 (pulverized lignite) 250 (biomass, peat) Existing plants: 300 (coal, lignite and other solid fuels) 450 (pulverized lignite) 300 (biomass, peat)
	100–300	New plants: 200 (coal, lignite and other solid fuels) 200 (biomass, peat) Existing plants: 200 (coal, lignite and other solid fuels) 250 (biomass, peat)
	>300	New plants: 150 (coal, lignite and other solid fuels) (general) 150 (biomass, peat) 200 (pulverized lignite) Existing plants: 200 (coal, lignite and other solid fuels) 200 (biomass, peat)

- Annex IV (sulphur), Annex V (NOx), and Annex X (dust) set ELVs for combustion plants

Entry into force

- The amended Gothenburg Protocol will enter into force when 2/3 of its 26 Parties accept the amendments.
- The EU, Belarus, Norway and Switzerland already announced their emission reduction commitments.
- The Russian Federation and other countries of Eastern Europe, the Caucasus and Central Asia indicated their intention to ratify the revised GP in the near future.

Guidance documents to support implementation

At its 31st session, the Executive Body adopted:

- **Guidance document on control techniques for emissions of sulphur, nitrogen oxides, volatile organic compounds and particulate matter (including PM10, PM2.5 and black carbon) from stationary sources**
- Guidance document on economic instruments to reduce emissions of regional air pollutants
- Guidance document on national nitrogen budgets
- Guidance document on preventing and abating ammonia emissions from agricultural sources
- Guidance document on health and environmental improvements using new knowledge, methods and data
  (adopted at 32nd session of the EB)

4. Guidance document on control techniques for emissions from stationary sources

Work was led by the Expert Group on Techno-economic issues (EGTEI)

For every major pollutant the Guidance provides information on effects of:

- Fuel switching
- Fuel cleaning
- Primary measures
- Secondary measures
- Costs of reduction techniques
- Side effects

Provides BAT-related information for different type of installations

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Average reduction efficiency of selected primary and secondary measures for reducing NO_x emissions in large combustion plants for boilers

Technique	Average NO_x reduction rate	Technical limitations
Low excess air (LEA)	10–44%	incomplete burn-out
Burner out of service (BOOS)	10–70%	incomplete burn-out
Biased burner firing (BBF)		
Overfire air (OFA)		
Flue gas recirculation (FGR)	< 20% (coal) 30–50% (gas, combined with OFA)	flame instability
Reduced air preheat (RAP)	20–30%	
Fuel staging (FG)	50–60%	
Air-staged LNB	25–35%	incomplete burn-out flame instability
Flue-gas recirculation LNB	<20%	flame instability
Fuel-staged LNB	50–60%	incomplete burn-out flame instability
Selective catalytic reduction (SCR)	80–95%	ammonia slip; contamination of fly ash by ammonia; air heater fouling
Selective non-catalytic reduction (SNCR)	30–50%	ammonia slip which is usually higher than with SCR

4. Reporting on emissions

- Parties to Protocols submit annual emission data to Centre on Emission Inventories and Projections according to emitting sectors
- NFR category 1A1a – Public electricity and heat production
- Informative Inventory reporting

Convention's 2014-2015 Workplan

- **Policy:** Exchange of experiences on implementation of the Convention
- **Capacity Building:** Emphasis on enhanced accession to / ratification of the Convention's most recently amended Protocols by countries in Eastern Europe, the Caucasus and Central Asia (including improving reporting capacities (inventories))
- **Communication and Outreach:** Raise awareness on air pollution and abatement measures among countries in Eastern Europe, the Caucasus and Central Asia
- **Science – largest part, Compliance**

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Thank you for your attention!

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