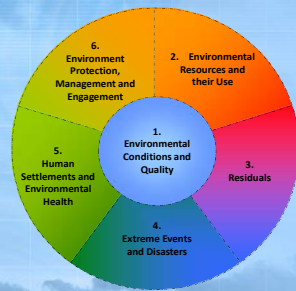


## Environment and Energy: Wastewater, Air Pollution and Waste



Environment and Energy  
Statistics Workshop for the  
Arab Region

Amman, Jordan 8-12 September 2013



Environment and Energy Statistics Branch,  
United Nations Statistics Division



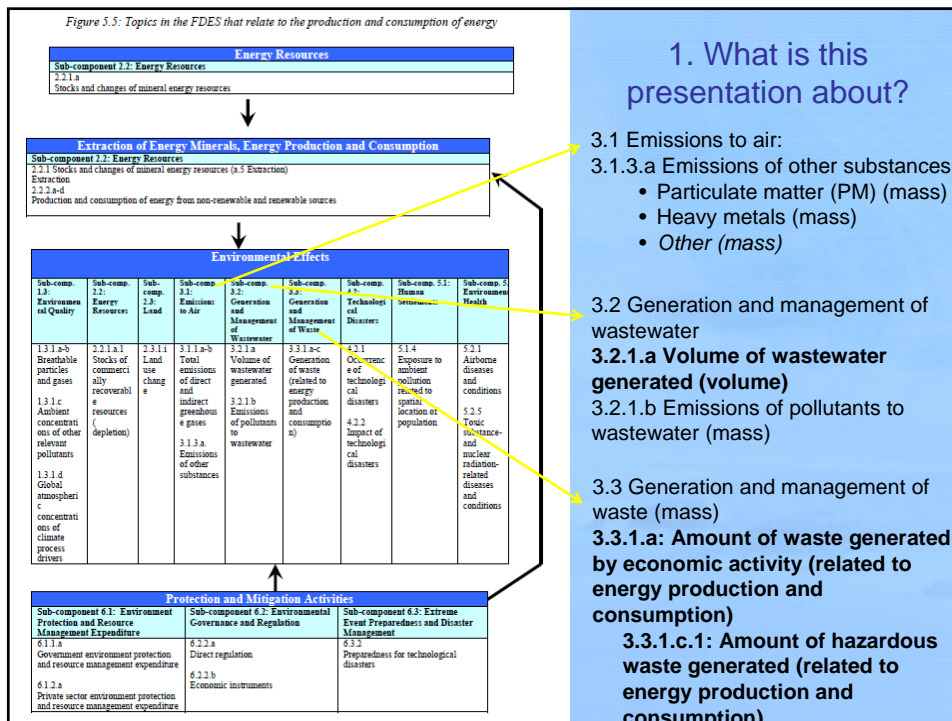
- This presentation has been elaborated by Mr. Michael Nagy on behalf of the Environment Statistics Section of the United Nations Statistics Division (UNSD).
- It is based on Chapters 3 and 5 of the Framework for the Development of Environment Statistics (FDES) 2013 that can be downloaded here:  
<http://unstats.un.org/unsd/statcom/doc13/BG-FDES-Environment.pdf>
- All presentations, handouts and background materials for the workshop can be downloaded here:  
<http://unstats.un.org/unsd/ENVIRONMENT/otherworkshops.htm>

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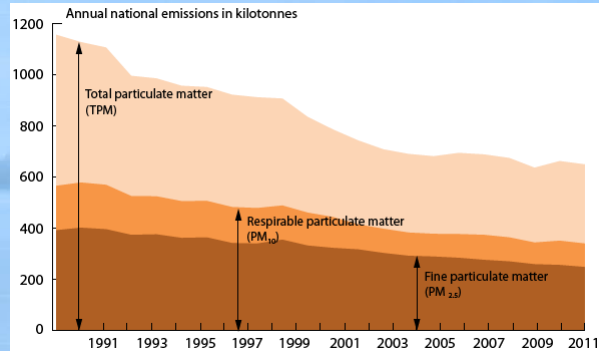
Figure 5.5: Topics in the FDES that relate to the production and consumption of energy



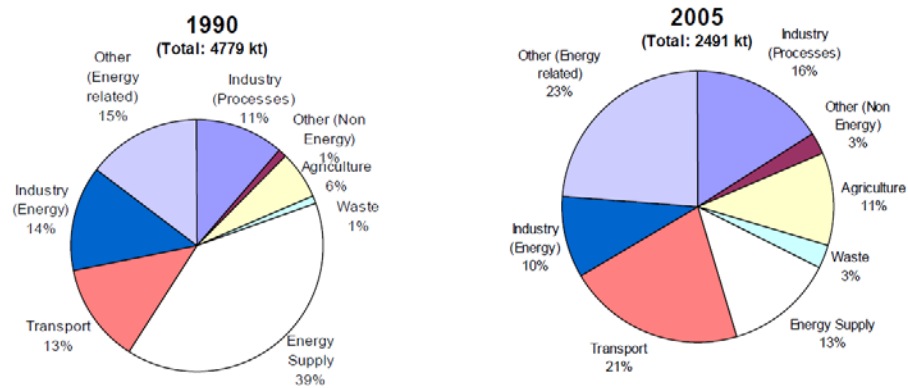
## 2. Particulate Matter

EPA Description	Particle size ( $\mu\text{m}$ )
Super-coarse	>10
Coarse	>2.5 and <10
Fine	>0.1 and <2.5
Ultra-fine	<0.1

Particulate matter emissions, Canada, 1990 to 2011



## Primary PM<sub>10</sub> in Europe (EU-27)

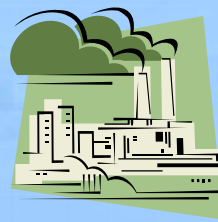


Source: <http://www.eea.europa.eu/data-and-maps/indicators/en07-energy-related-particulate-matter-emissions-1/en07>

# How to monitor emissions of PM

- Direct measurement
- Continuous emission monitor
- Emission factors

(Source: [http://www.ccsd.biz/PSE\\_Handbook/6/6/2/](http://www.ccsd.biz/PSE_Handbook/6/6/2/))



## 3. Heavy Metals

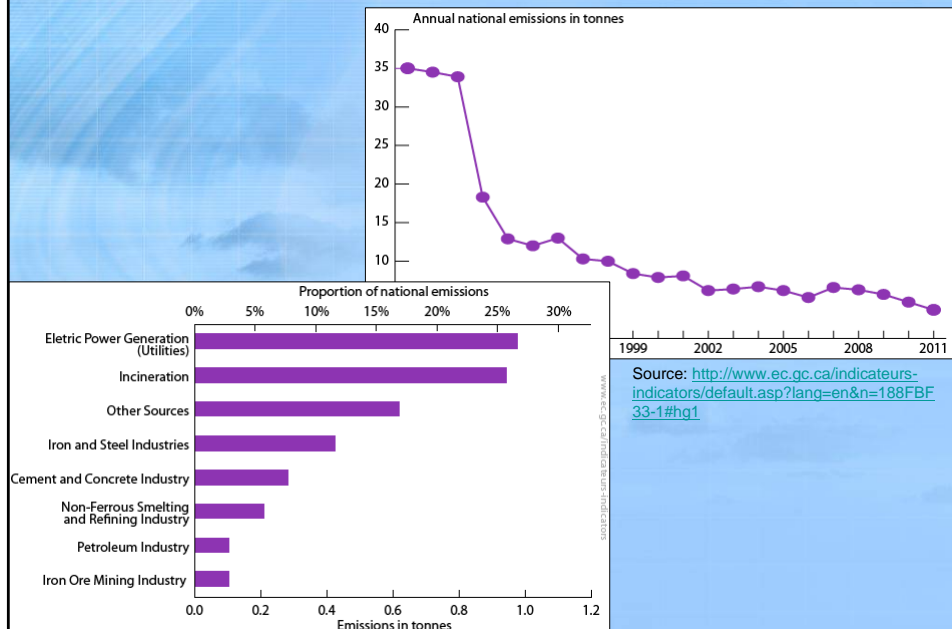
**Definition:**

- Several definitions exist (density, atomic number, atomic weight).
- A loosely-defined subset of transition metals, some metalloids, lanthanides, and actinides.

ECE Standard Statistical Classification of Ambient Air Quality (1990):

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)

## Mercury Emissions to Air in Canada



## 4. Other Air Emissions

Examples:

- Ammonia
- Carbon Monoxide
- Dioxins and Furans
- ...

→ Selection for statistics is based on national circumstances and priorities.

## 5. Wastewater Generation

### Definition of wastewater

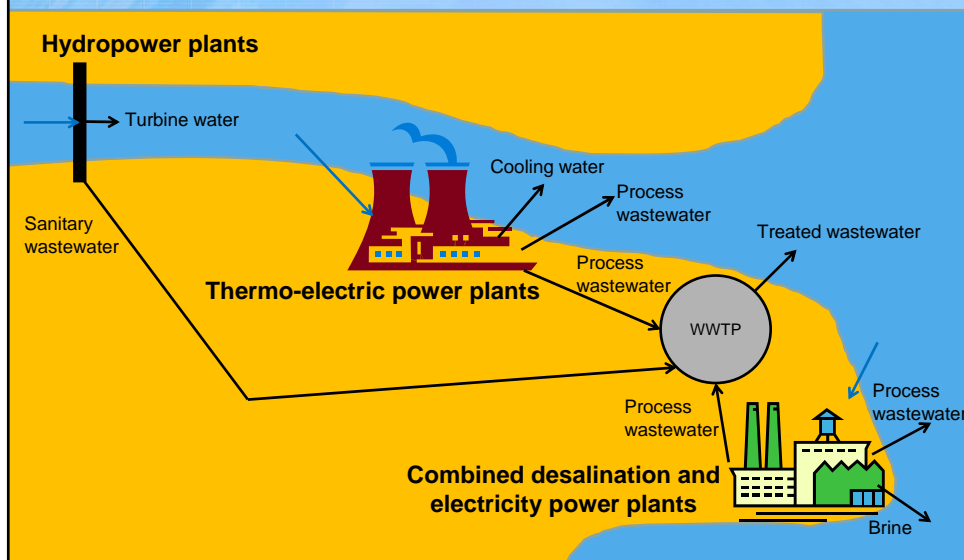
*Water which is of no further value to the purpose for which it was used because of its quality, quantity or time of occurrence. However, wastewater from one user can be a potential supply to a user elsewhere*

### IMPORTANT!!!

#### Always distinguish in your statistics

- a) Cooling water: Huge amounts, typically only polluted with heat
- b) Wastewater from industrial processes (other than cooling) and sanitation
- c) Water used/discharged by hydropower plants

## Wastewater Generation in Electricity Some Examples



## 6. Wastewater Pollution

### Wastewater flows from energy relevant for statistics about wastewater pollution

- Directly and indirectly discharged wastewater (process and sanitary)
- Cooling water if receives additional pollution (consider background-concentrations!)
- (Brine)

## 6. Wastewater Pollution

### Typical pollutants for monitoring and statistics

- BOD
- COD
- Nitrogen
- Phosphorus
- Suspended Solids
- Metals (Zn, Hg, Pb, Cd,...)





## 7. Generation of Waste

### Distinguish

- Waste Generation (mass per year, including non-hazardous and hazardous waste)
- Generation of Hazardous Waste (mass per year)



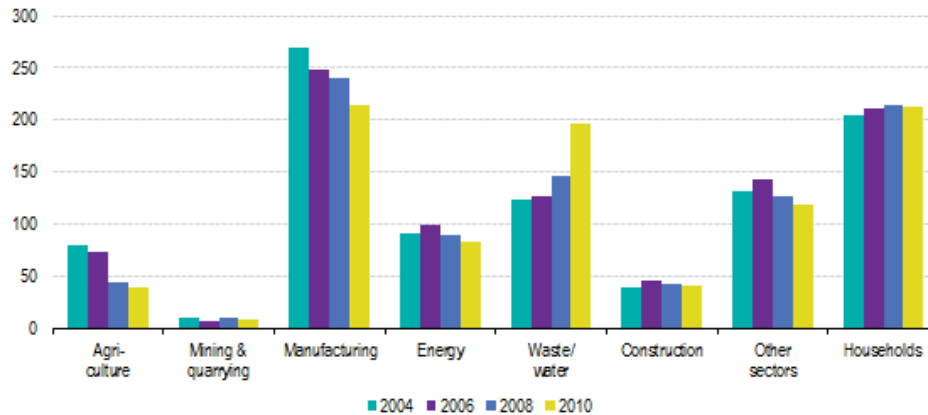
## 7. Generation of Waste

### Hazardous Waste

- Hazardous waste is a special group of waste that due to its toxic or other hazardous character needs special management.
- Statistics use the definitions and waste lists of the Basel Convention (UN Convention regulating transboundary movements of hazardous wastes and their disposal)
- Examples for typical energy-related wastes:
  - Wastes from heat treatment and tempering operations containing cyanides
  - Waste mineral oils unfit for their originally intended use
  - Waste oils/water, hydrocarbons/water mixtures, emulsions
  - Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)

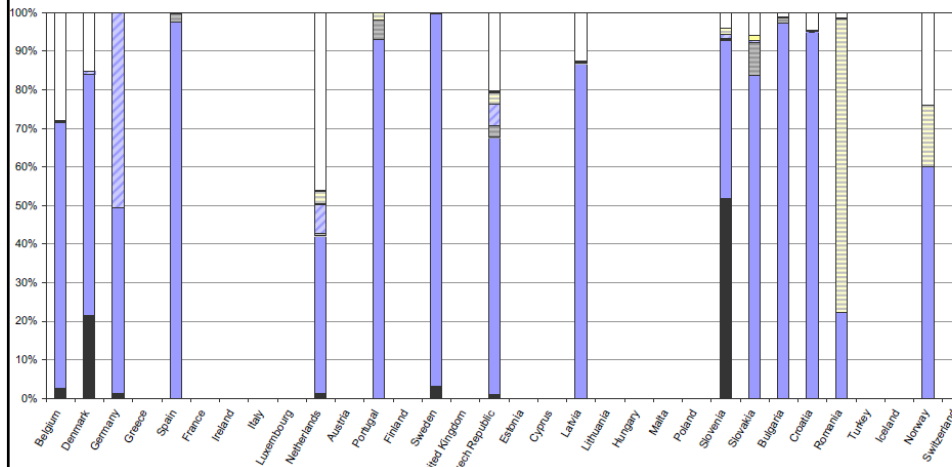


## 7. Generation of Waste per Economic Activity (Example from Europe)



Source: [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Waste\\_statistics](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Waste_statistics)

## 7. Generation of Hazardous Waste (Example Europe 2002)



Source: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-69-05-755/EN/KS-69-05-755-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-69-05-755/EN/KS-69-05-755-EN.PDF)

□ Other economic sectors - incl. non spec.  
 □ Agriculture and forestry (01-02)  
 □ Mining and quarrying (10-14)  
 □ Construction (45)  
 □ Energy Production (40) and Water Purification & Distribution (41)  
 □ Manufacturing industry (15-37)  
 ■ Municipal waste

## 8. Data Sources and Reference

- Survey
- Administrative records:
  - Ministry of Environment
  - Ministry of Energy
  - Ministry of Water
  - Environment Agency
- **Water:** International Recommendations of Water Statistics – IRWS (<http://unstats.un.org/unsd/envaccounting/irws/>)
- **Emissions to Air:** UN-ECE Standard Statistical Classification of Ambient Air Quality (<http://www.unescap.org/stat/envstat/stwes-class-air01.pdf>)
- **Hazardous Waste:** Basel Convention (<http://www.basel.int/>)

## Thank you for your attention!

For more information please contact the Environment Statistics Section  
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website: <http://unstats.un.org/unsd/ENVIRONMENT/>

