

External Costs of Electricity Production

February 28th-March 1st, 2005

Krakow, Poland at Jagiellonian University

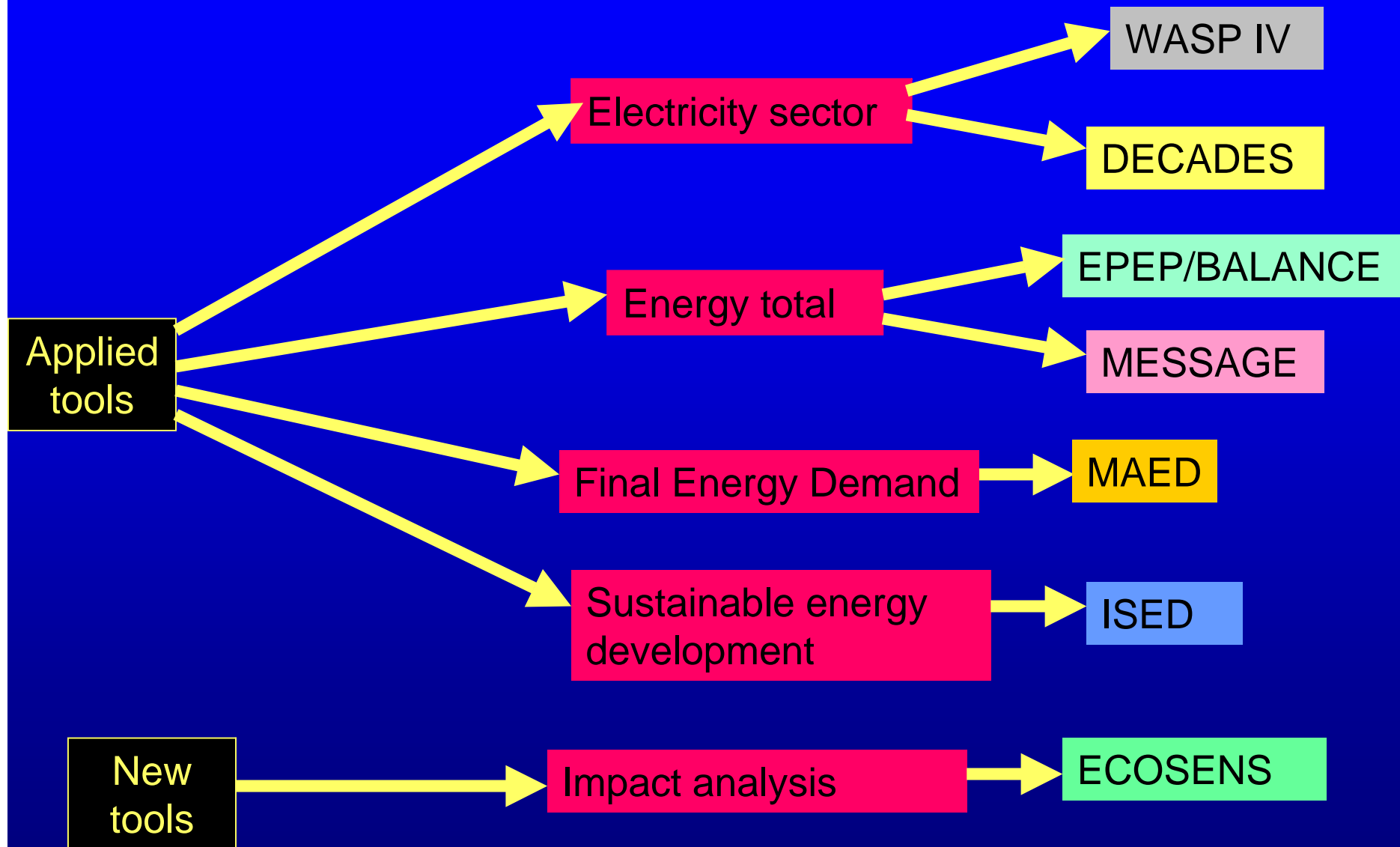
Preliminary Information for Slovakia Case Study

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Background information

- 1) Sustainable development analysis**
- 2) Energy policy and its priorities**
- 3) Structure of energy supply system**
- 4) Recent development**
- 5) Relation of emission and pollutant
ambient concentration**
- 6) Healthy impact of energy system**

Analysis of sustainable development



**Priorities
of energy
policy**

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graph LR; A[Priorities of energy policy] --> B[Energy]; A --> C[Environment]; A --> D[Social impact];
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Energy

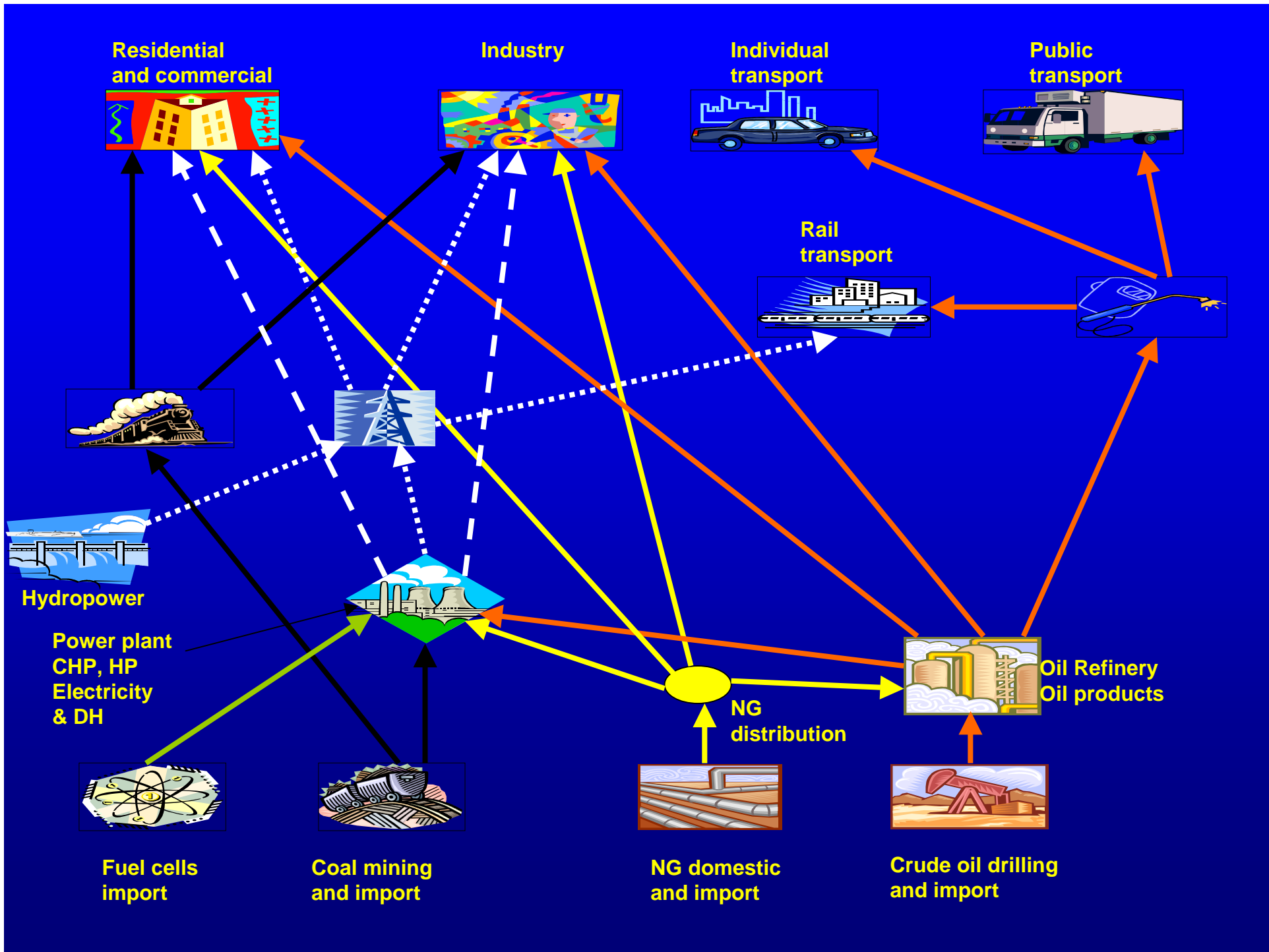
- 1 Energy intensity
- 2 Energy efficiency
- 3 Energy import and diversification

Environment

- 1 GHG Kyoto Protocol, AT, JI – EU scheme
- 2 SO₂, NO_x Protocol of acidification, eurotrification and ground layer ozone
- 3 Nuclear waste,
- 4 Solid waste, water

Social impact

- 1 Unemployment in mining sector
- 2 New jobs with the use of renewable
- 3 Energy available- grid and gas network





ENO A 28+32 MWe, Lignite
 ENO fluid 22.4 MWe, Lignite



ENO B 2 x 110 MWe with FGD
 ENO C 2 x 110 MWe, Lignite



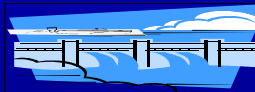
EVO I 6 x 110 MWe, Hard Coal
 EVO II 6 x 110 MWe, NG & HFO



JE V1 & JE V2
 4 x 440 MWe



JEMO
 2 x 440 MWe

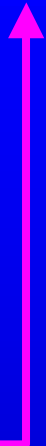


Hydropower run-off



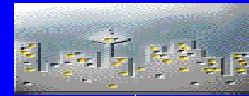
Pumping storage

Total hydropower
 2395 MWe
 Including
 pumping storage



Heat supply
 from JEVO & ENO A

High voltage
 grid



DH
 supply



Local HP



Dispatch

Electricity
 exchange
 with grid

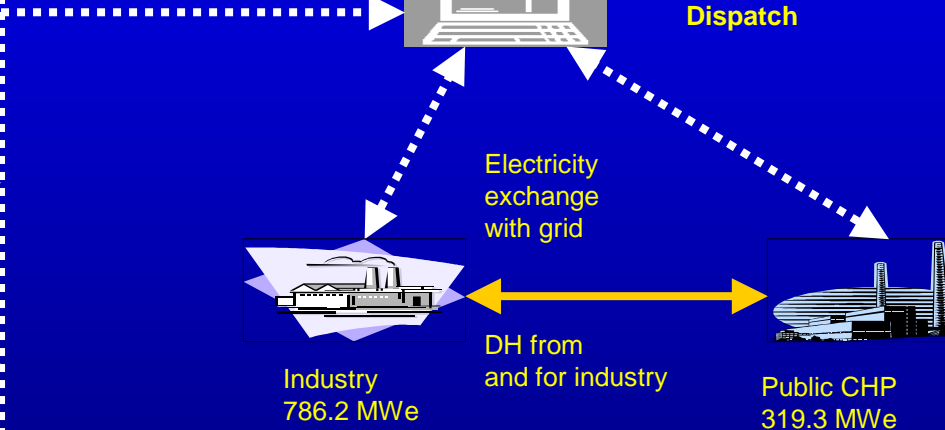


Industry
 786.2 MWe

DH from
 and for industry

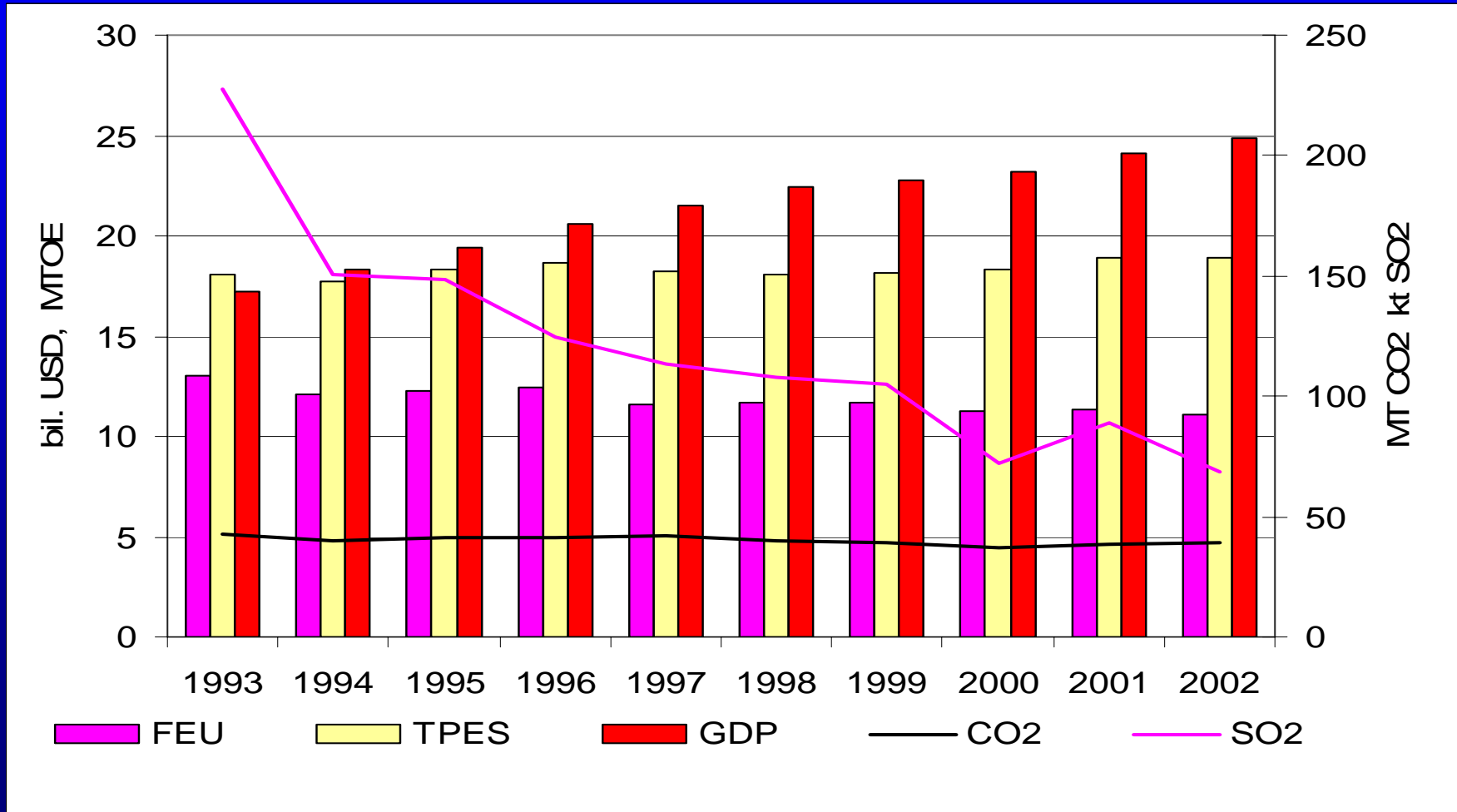


Public CHP
 319.3 MWe

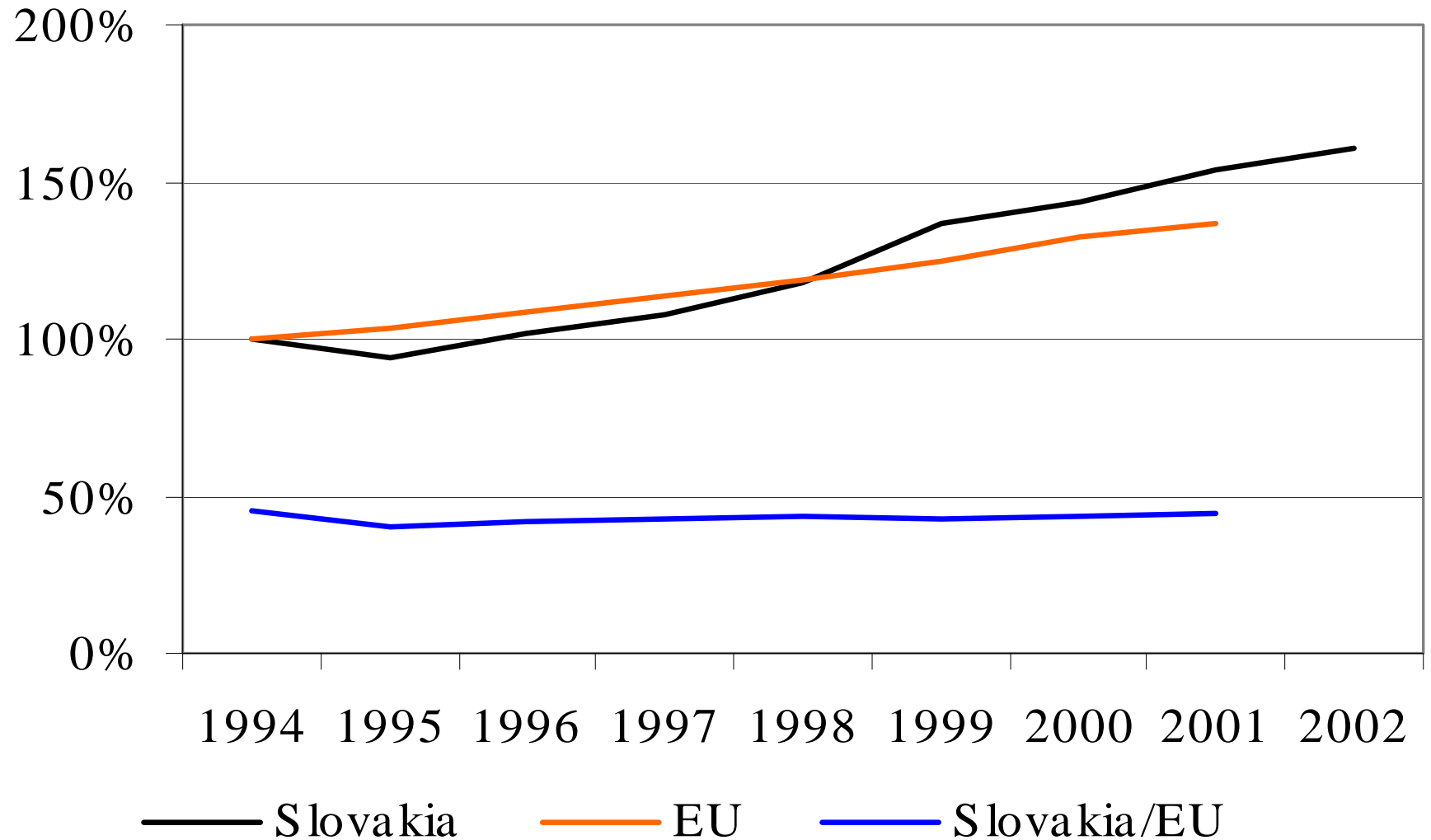


Recent development

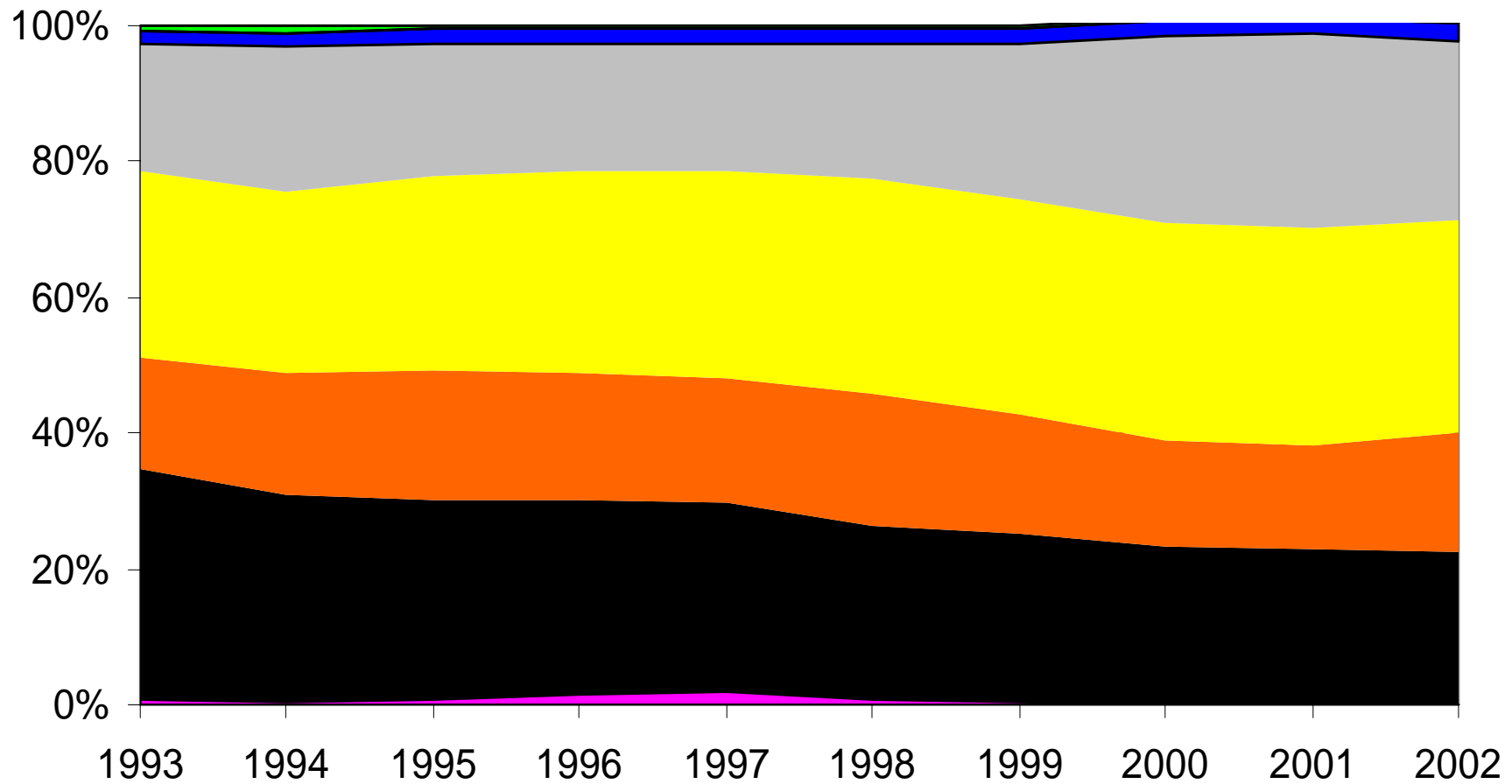
Economy GDP
Energy TPES, FEU
Environment CO₂ & SO₂ emission



Comparison of GDPpps/cap trends for Slovakia and EU average (1993 = 100%)



STRUCTURE OF PRIMARY ENERGY CONSUMPTION



Electricity net import

Coal:

Oil:

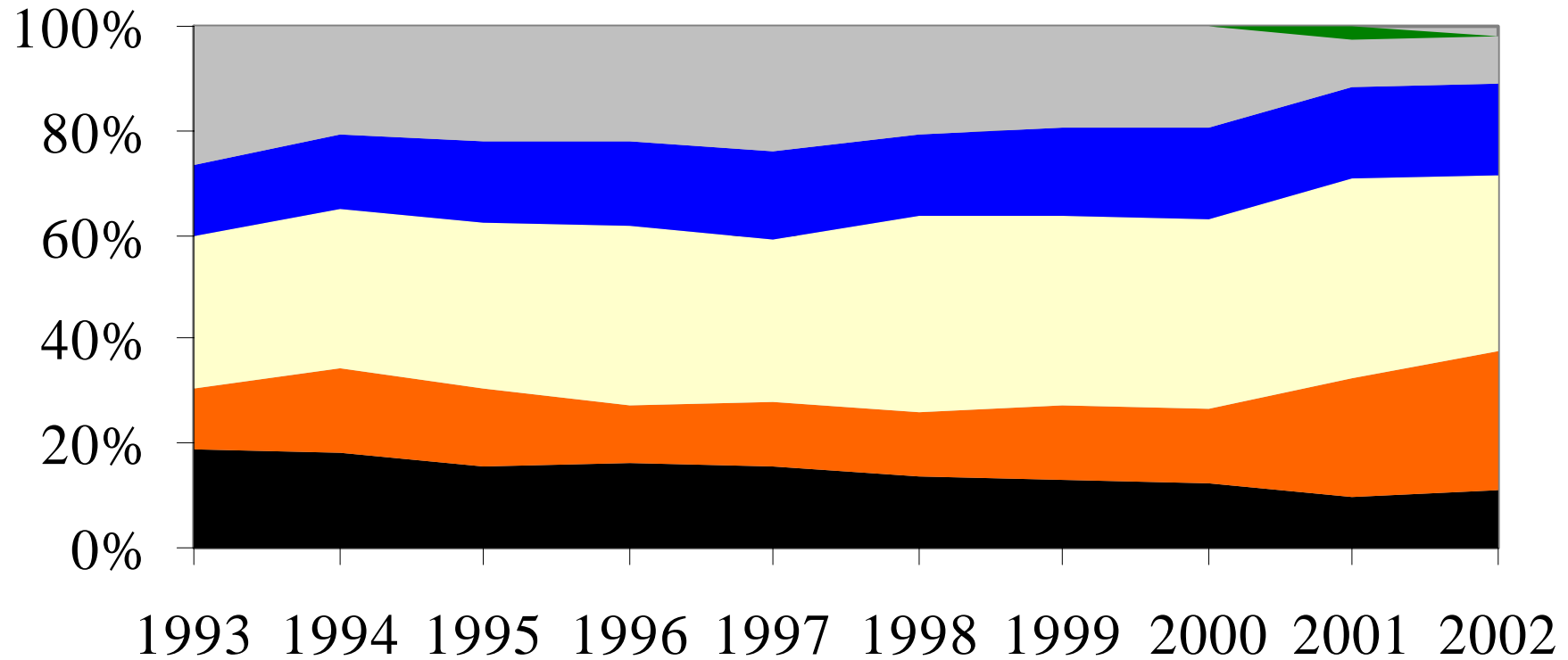
Gas:

Nuclear power:

Hydro power:

CRW:

STRUCTURE OF FINAL ENERGY CONSUMPTION



■ Coal:

■ Petroleum products:

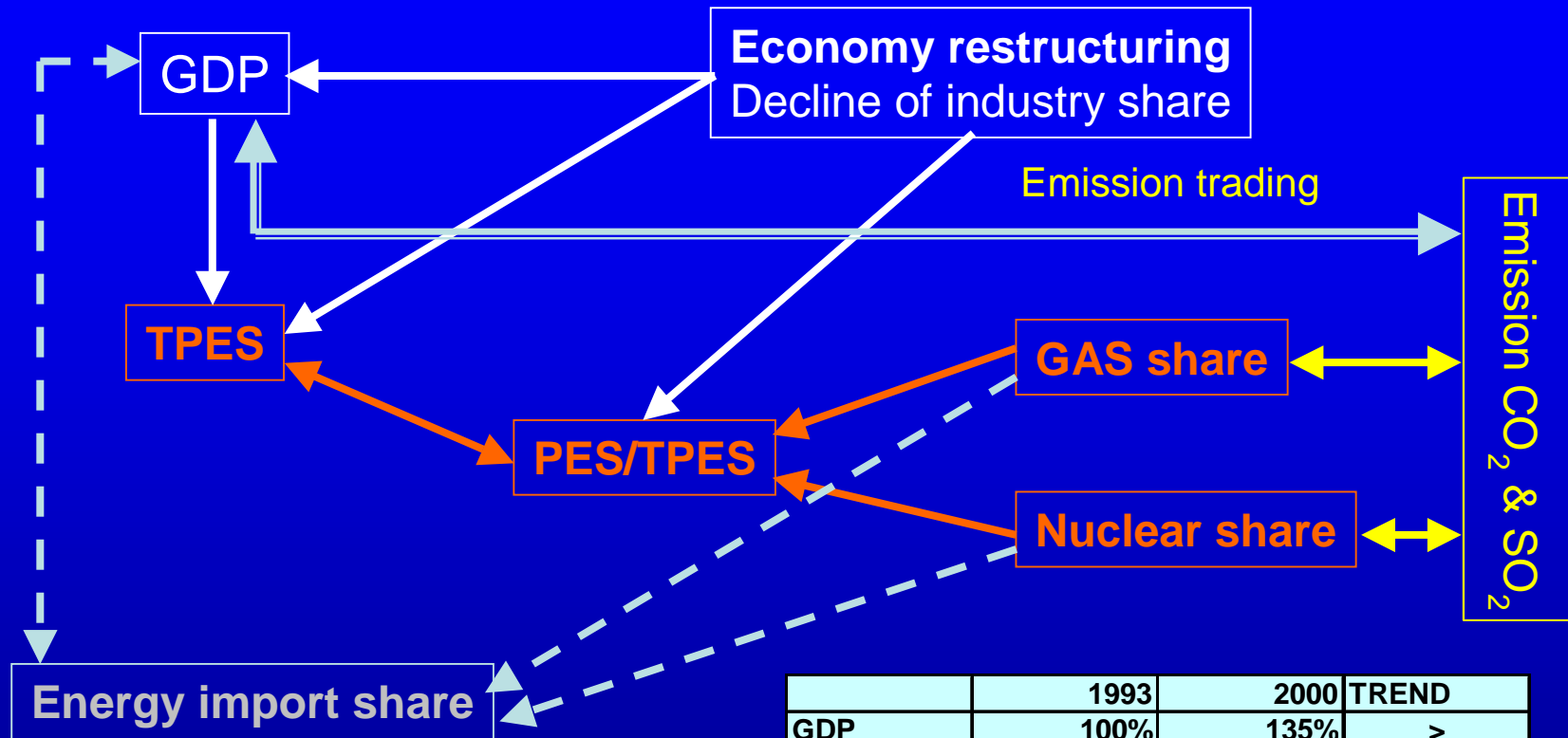
■ Gas:

■ Electricity:

■ Heat:

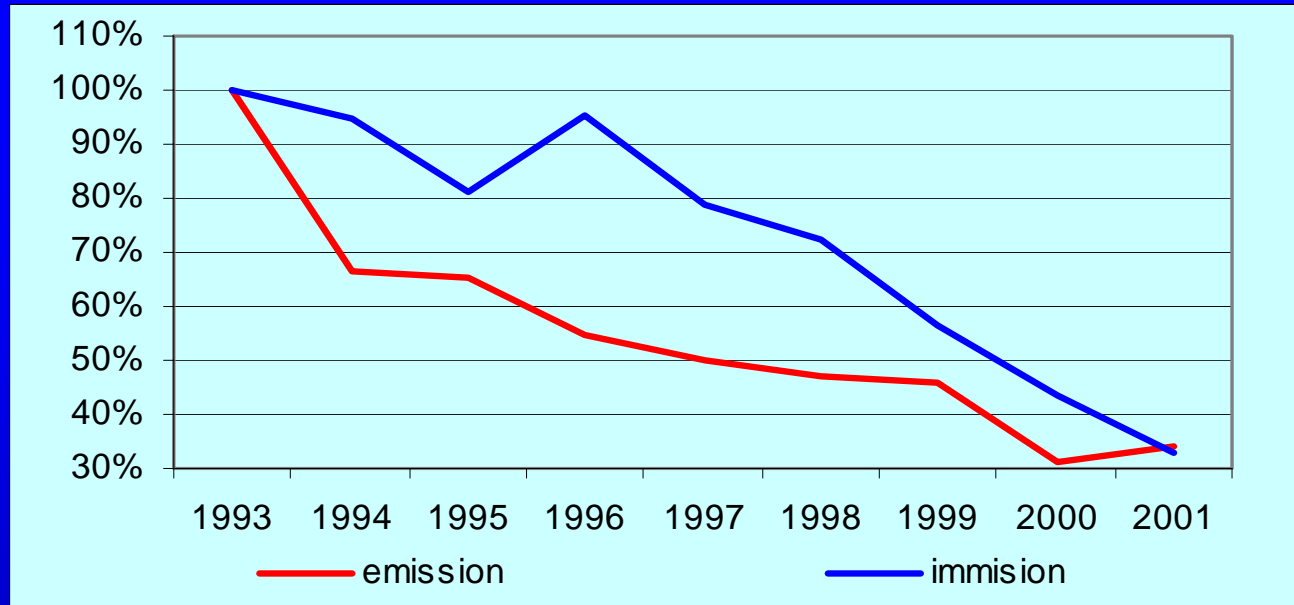
■ Renewables:

Common interdependence

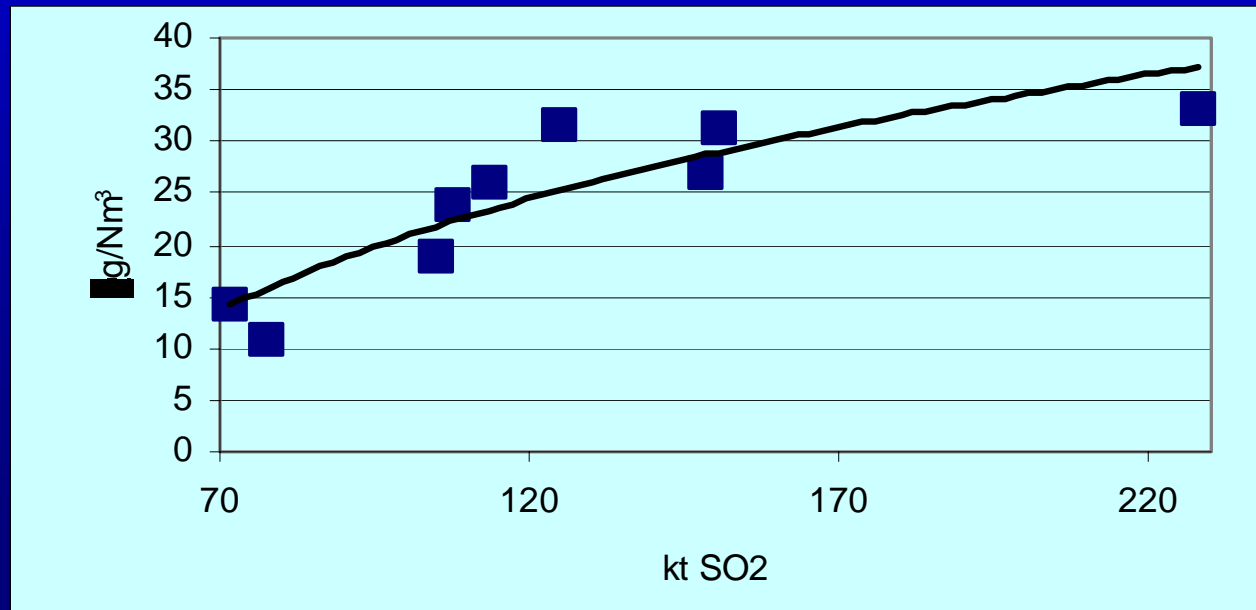


	1993	2000	TREND
GDP	100%	135%	>
Ind share	35%	30%	<
TPES	100%	102%	=>
PES/TPES	72%	61%	>
Non-fossil	22%	29%	<
GAS	28%	32%	>
Nuclear	19%	28%	>
CO ₂	100%	86%	<
SO ₂	100%	31%	<
Energy imp.	90%	90%	=

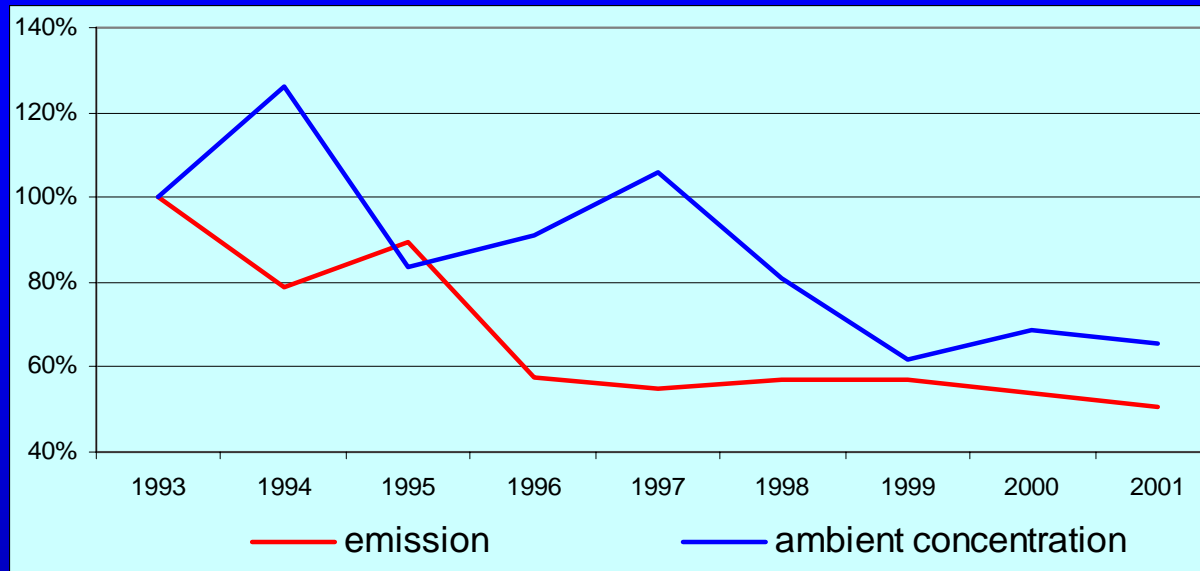
SO₂ emission and ambient concentration trends



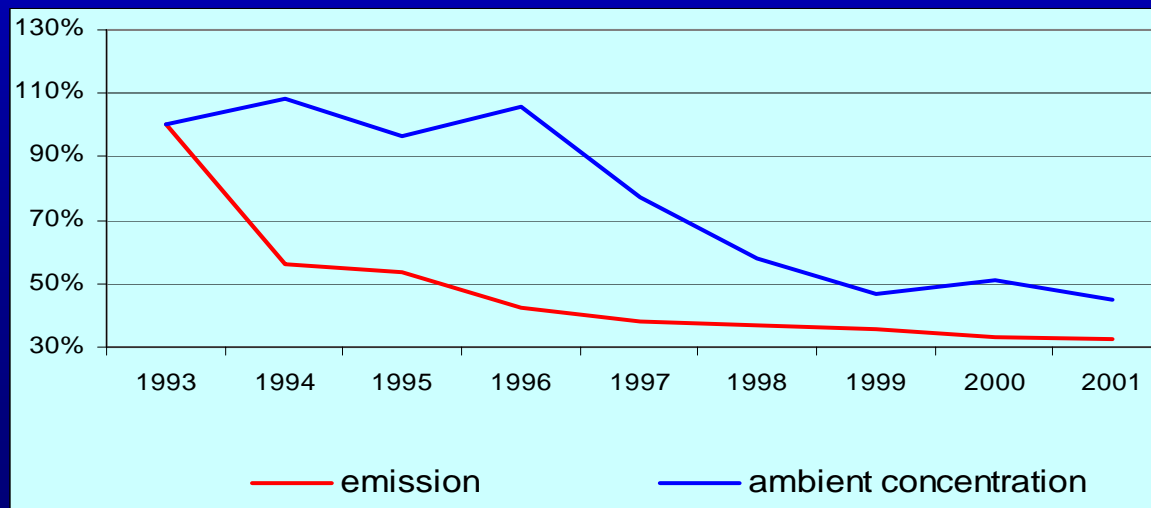
SO₂ emission and ambient concentration relation



Trends of NOx emissions and ambient concentration

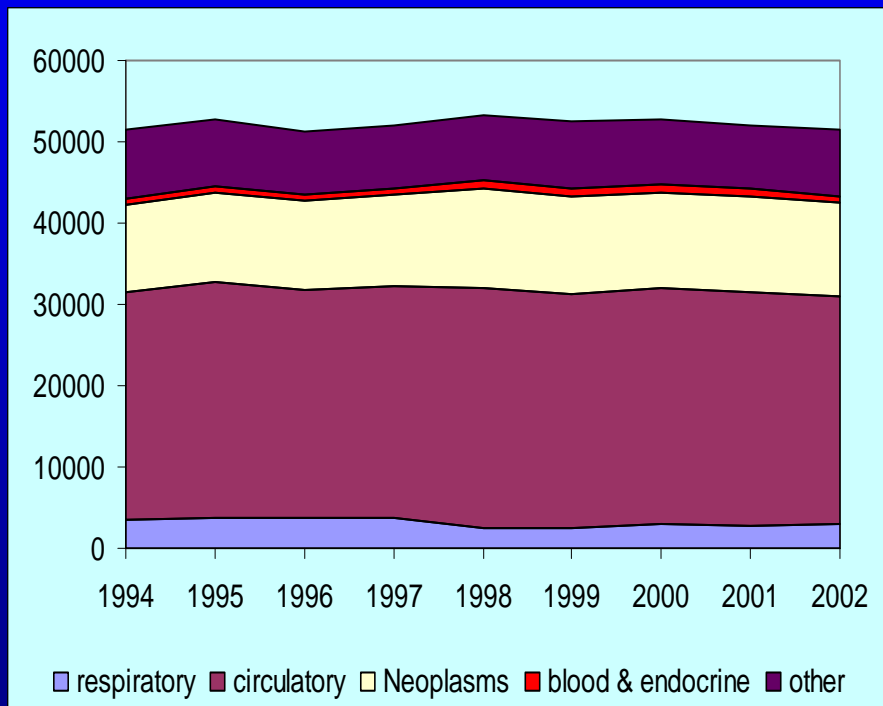


Trends of SP emissions and ambient concentration

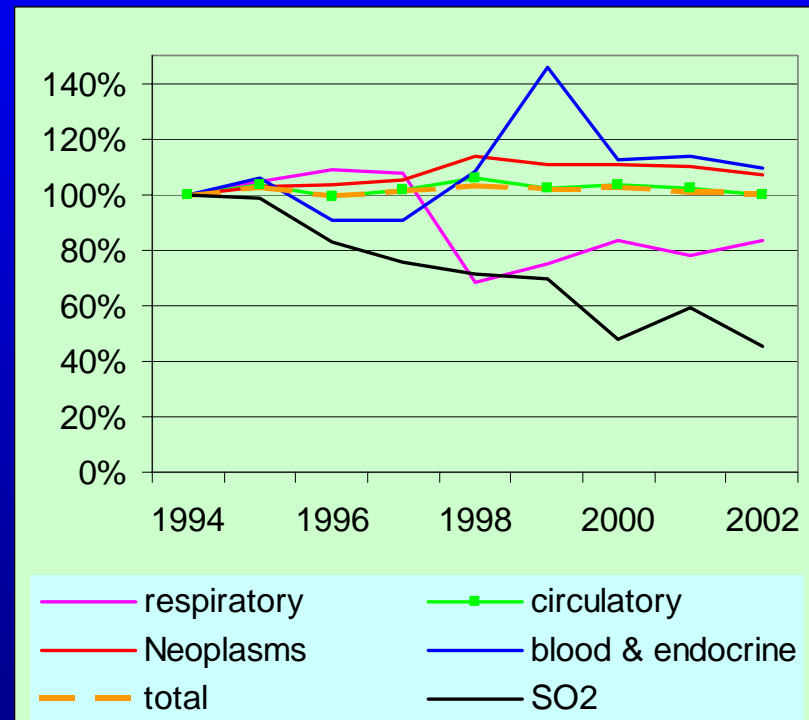


Emission and mortality

Causes of death



Causes of death trends in relation of SO2 emission



THANK YOU

HAVE A NICE DAY