ASSESSMENT OF THE STATE OF ENERGY SUPPLY SECURITY IN CROATIA

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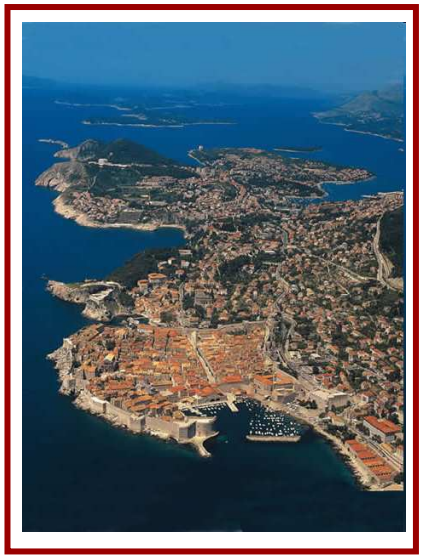


- **ELECTRICITY AND NATURAL GAS SECTOR:**

- INTRODUCTION
- LEGISLATIVE FRAMEWORK
- TOTAL PRIMARY ENERGY SUPPLY
- KEY PARTICIPANTS AND THEIR OBLIGATIONS
- PUBLIC SERVICE OBLIGATION
- EXISTING AND FUTURE GENERATION CAPACITY
- NETWORK CAPACITY
- ENERGY BALANCE
- MAIN INFORMATION ON SUPPLY BUSINESS
- KEY VULNERABILITY INDICATORS

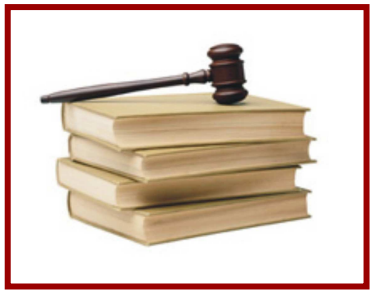
INTRODUCTION

- **Market opening could:**
  - increase security of supply for network energy due to larger number of market participants →higher energy system "flexibility"
  - increase risks, as well…
- **Every country should:**
  - take care of SoS; to be regulated to protect public interests
- **Definition: electricity and natural gas SoS** - system ability to supply final customers with electricity/natural gas of acceptable quality and price

INTRODUCTION

- ***SoS generally covers*:**
  - **Supply diversification**
  - **Technological safety**
  - **Geographical origin of imported fuels**

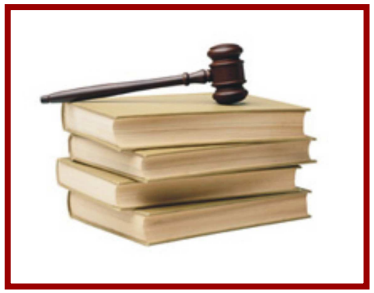
INTRODUCTION



***SoS in more details should cover*:**

- **Key participants and obligations on the energy market;**
- **Legislative framework (SoS as a part of PSO);**
- **Household security of supply;**
- **Supply continuity;**
- **Investment programmes;**
- **Regulatory framework;**
- **Measures in the cases of crises and emergencies;**
- **Cross-border cooperation…**

INTRODUCTION



…

- Energy balance policy;
- Demand growth trends;
- Generation diversity;
- Network operational security indicators;
- Integration of new technologies (RES and other);
- Long term Power Purchase Agreements,
- Natural gas storage operational capacities;
- Storage inlet and outlet capacities…

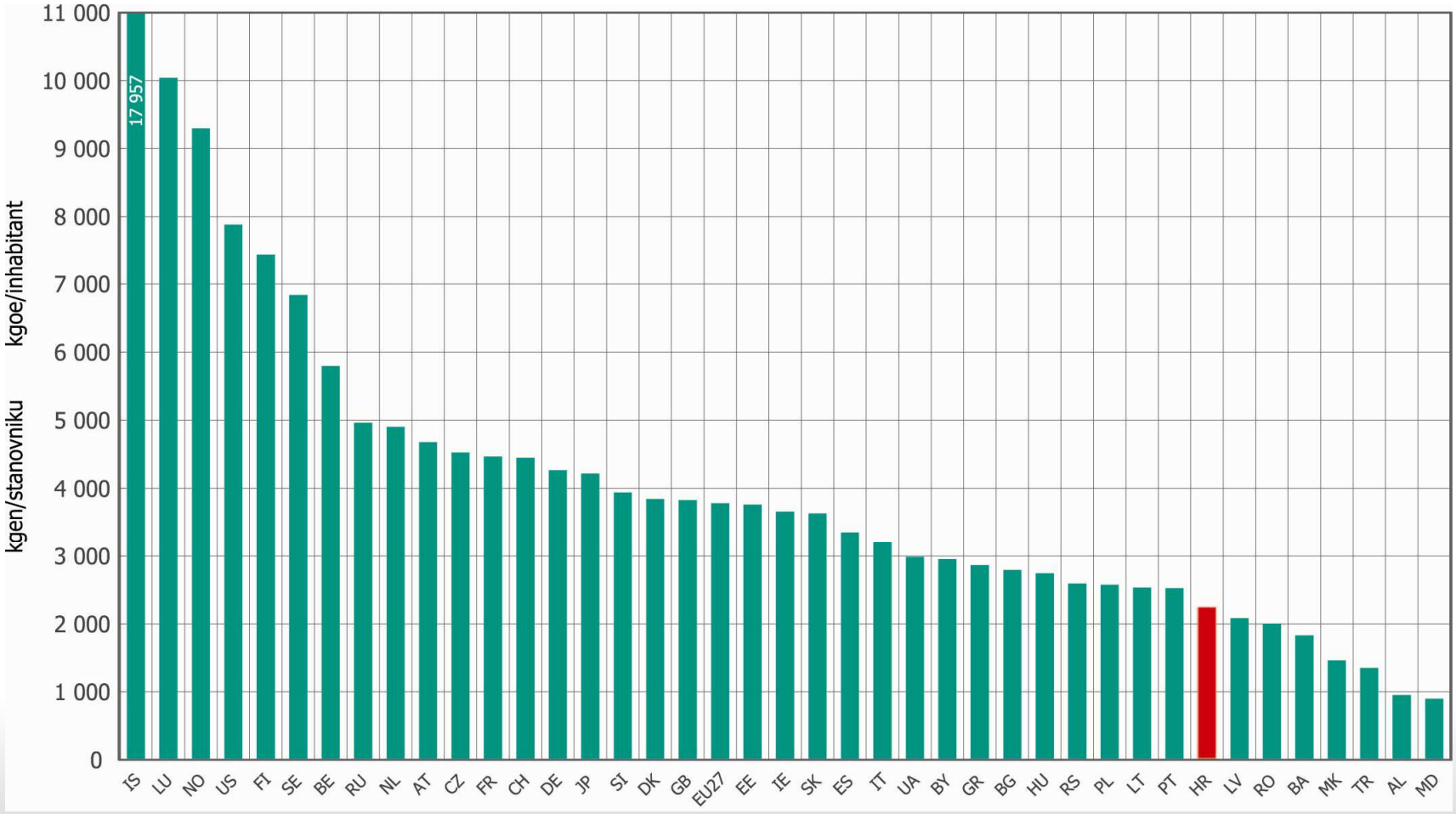
LEGISLATIVE FRAMEWORK

EU accession process & Treaty on Energy Community 2005 → aquis communitaire (energy, environment, RES, competetion)

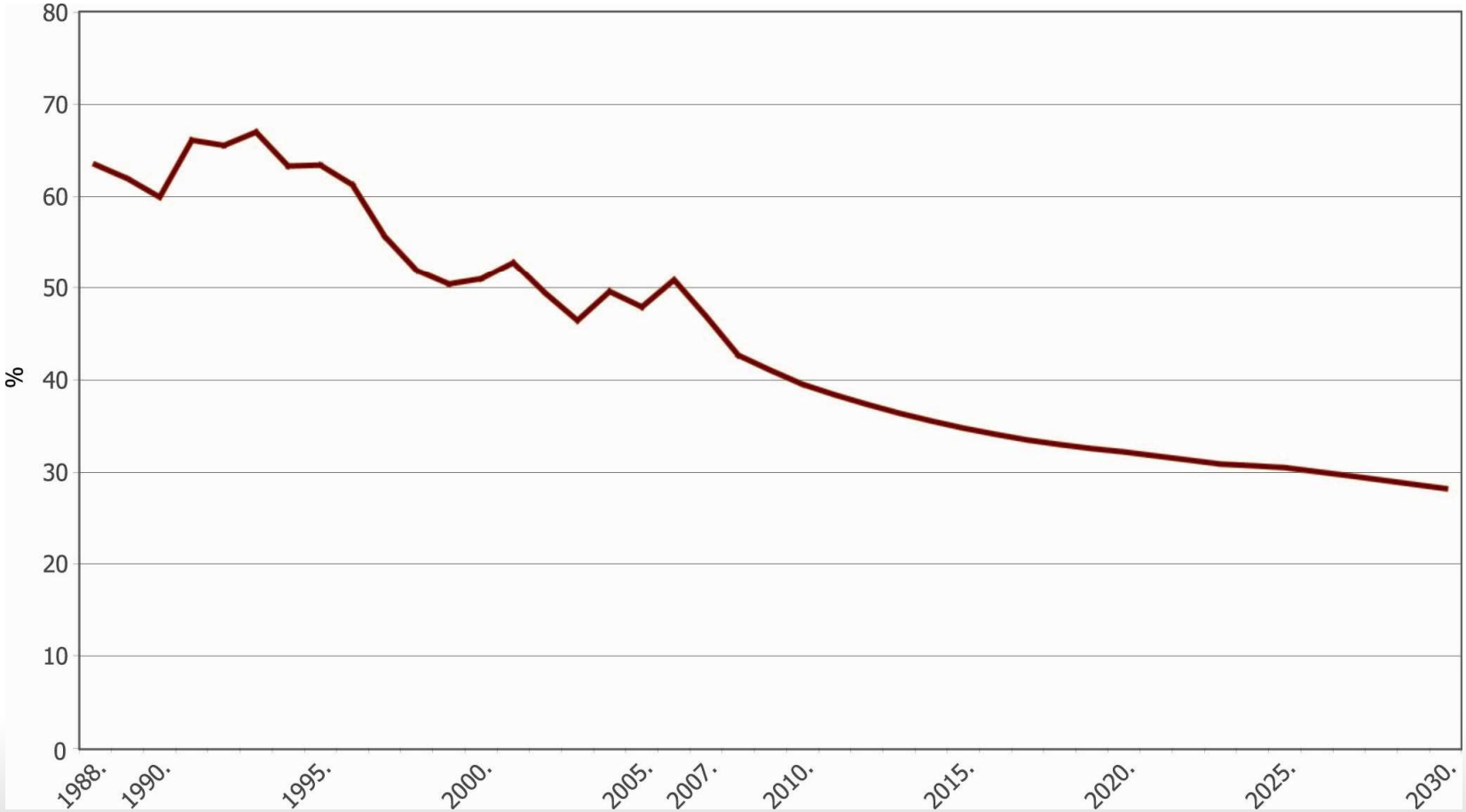
- ❑Directives 2003/54/EC and 2003/55/EC on electricity and gas market
- ❑Regulation (EC) 1228/2003 on conditions for access to the network for cross-border exchanges in electricity
- ❑Regulation(EC) 1775/2005 on conditions for access to the natural gas transmission networks
- ❑Directives 2005/89/EC and 2004/67/EC on SoS

EnC Treaty (art.29)- obligation to publish Statement on SoS (electricity and natural gas) biannually

TOTAL PRIMARY ENERGY SUPPLY PER CAPITA



TOTAL PRIMARY ENERGY SELF-SUPPLY OF CROATIA



ELECTRICITY SECTOR
Key SoS stakeholders

Public service obligation carriers:

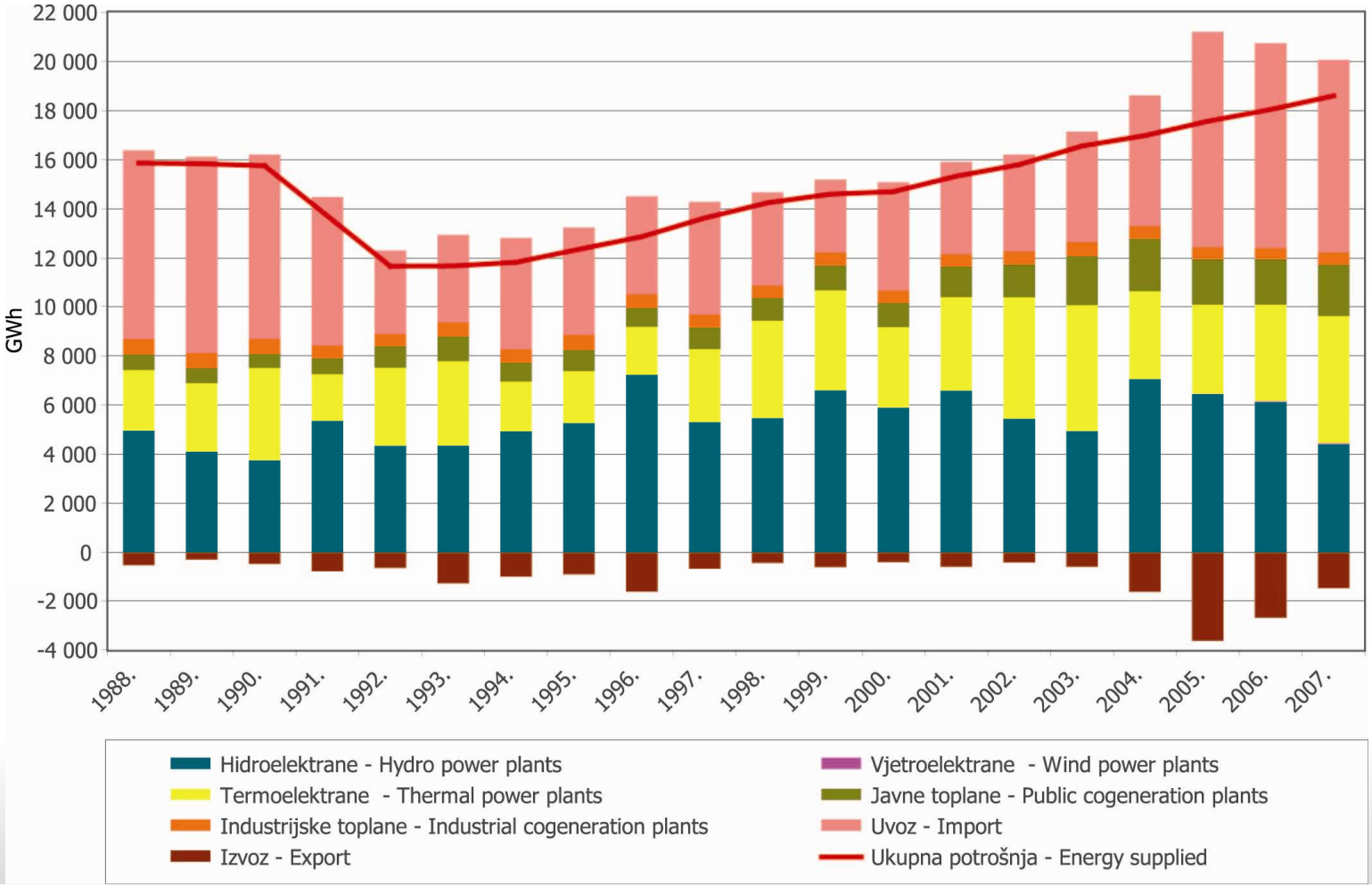
- Power generation for tariff customers (HEP Generation),
- Power transmission (HEP TSO),
- Power distribution (HEP DSO),
- Power supply of tariff customers (HEP d.d. & HEP DSO).

- Ministry - administrative supervision over the implementation of the relevant legislation, issues approvals for the construction of new production capacities, makes recommendations to the Government concerning tariffs…

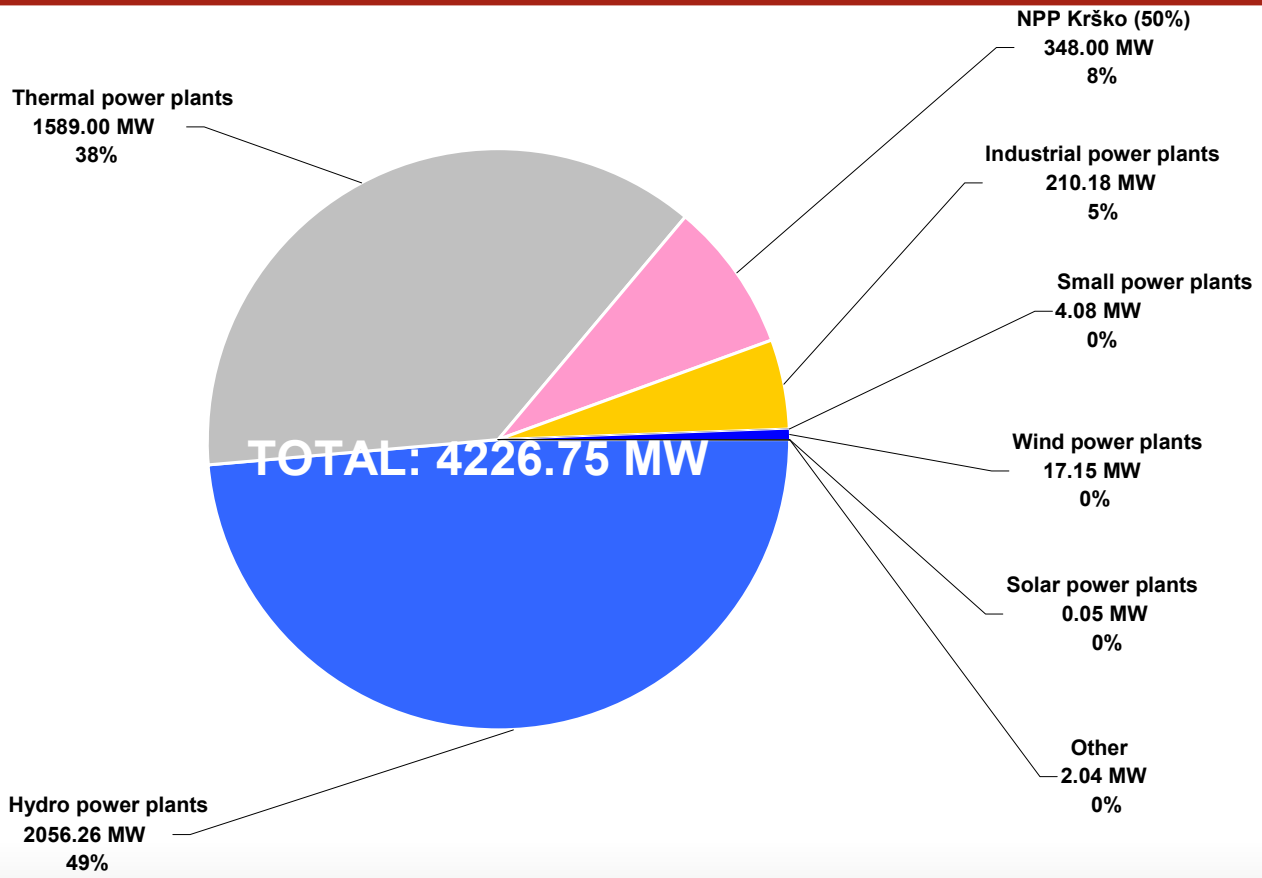
ELECTRICITY SECTOR
SoS procedures

- During limited gas supply periods – households are having top priority
- Implies gas supply reduction to power company - HEP
- SOLUTION: Dual fuel TPPs (natural gas / oil): TOTAL: 267 MW
- TPP oil supply obligation – HEP Generation

ELECTRICITY SECTOR
Electricity balance 1988-2007



ELECTRICITY SECTOR
Existing generation capacities



BIH–TPP Gacko;300 MW;coal;(1/3 of power for 25 yrs),
Serbia – TPP Obrenovac; 305 MW, coal; (loan based property)

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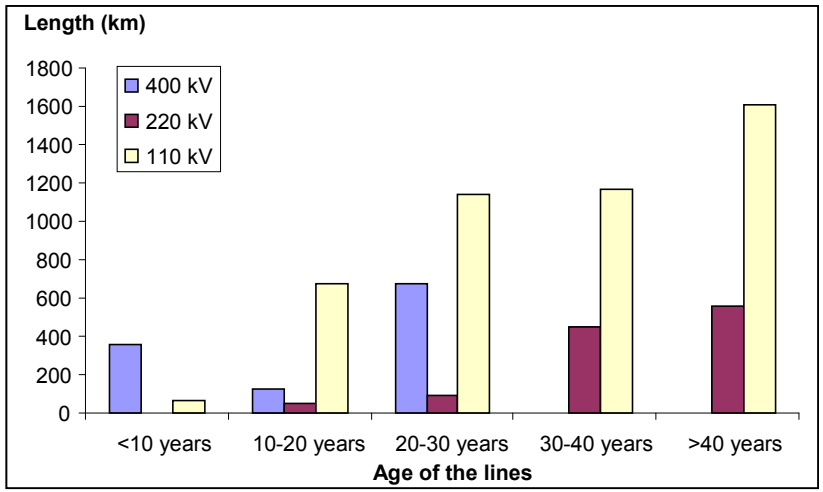
ELECTRICITY SECTOR
Planned generation capacities

Plant	Type/fuel	Installed power		Comments
		MW_e	MW_t	
HPP Lešće	hydro	42	-	Under construction; start up in 2010
CHP TE-TO Zagreb blok L	cogenerational/natural gas	100	80	Under construction; start up 2009
TPP Sisak blok C	natural gas	230	50	Waiting for approval; start up end of 2010
Windpower plants (various locations)	wind powered	360	-	various stages of preparation and construction; this level of power expected by end of 2012

Draft Energy Strategy 2020 : TPP 2400 MW, RES 1500 MW, HPP 300 MW, NPP?

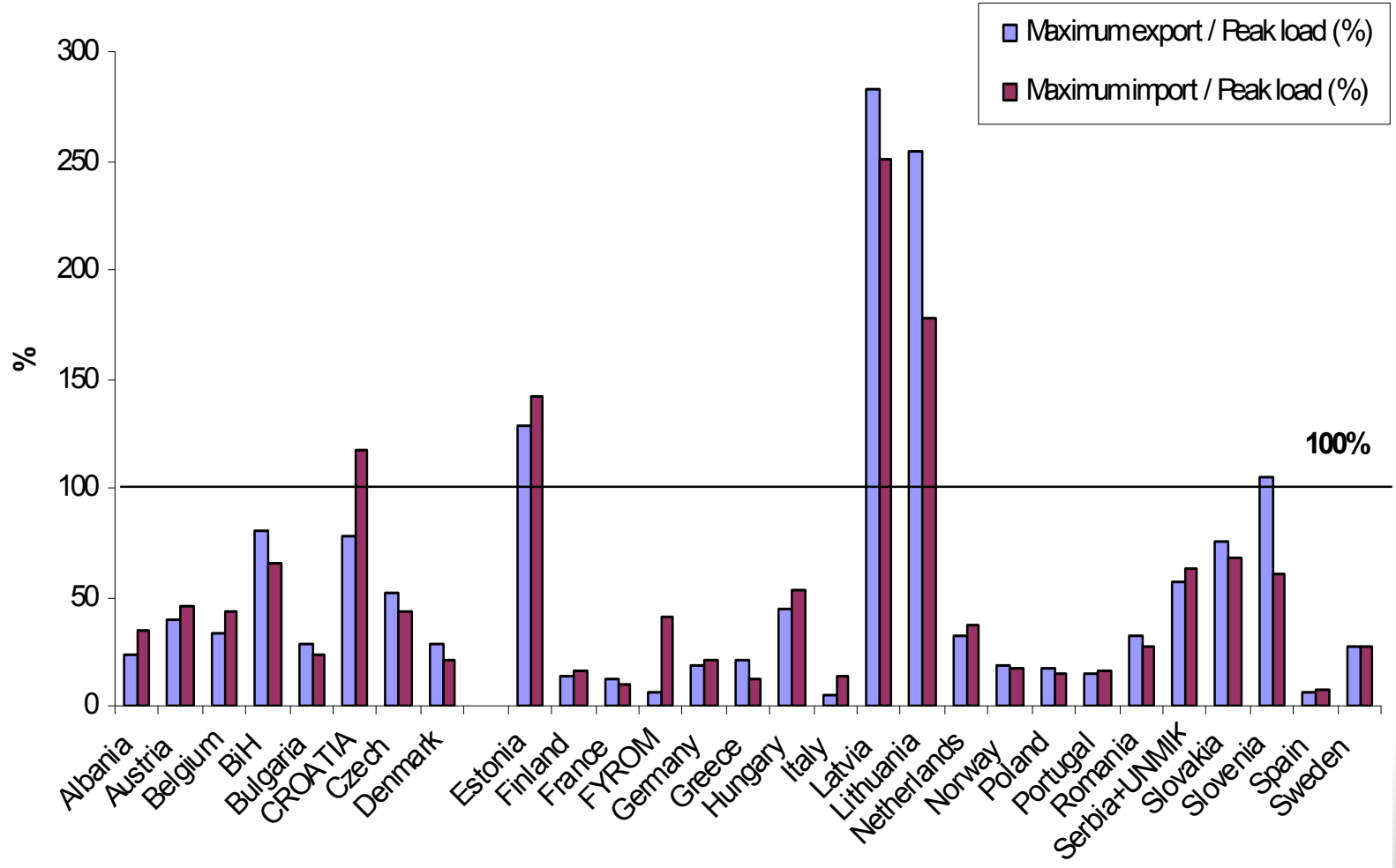
For the purpose of SoS–tendering procedure for new generation capacity– HERA (<50 MW), Government (>50 MW).No detailed tendering procedure defined

ELECTRICITY SECTOR
Network capacities

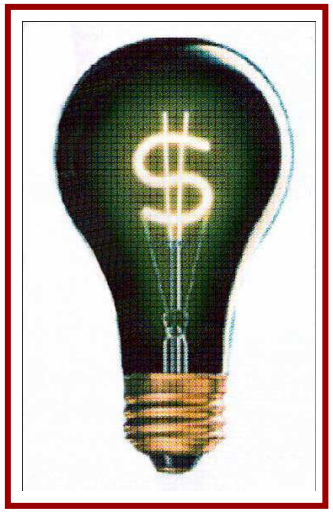


- **Network capacities adequate for local consumer needs**
- **High availability (by voltage levels ranges from 0.84% to 3.21%)**
- **Obsoletness**
- **Very high installed cross-border capacity**
- **Since 03/2007 auction mechanism for CB capacity allocation**

ELECTRICITY SECTOR
Network capacities



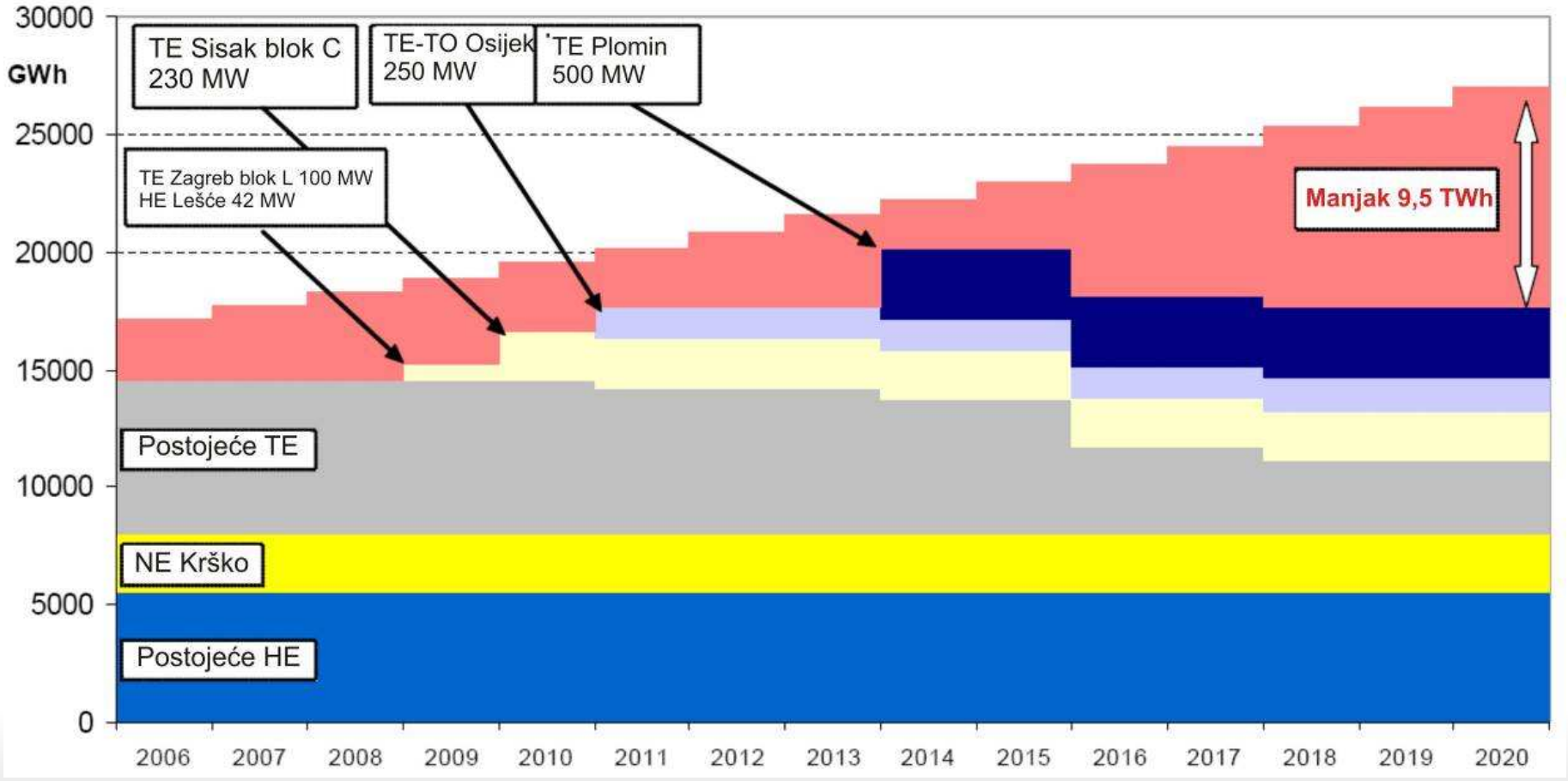
ELECTRICITY SECTOR
Power supply



Power supply:

- 100% open market since July 1, 2008
- 2.2 mil.customers
- 5 licenced power suppliers
- No supplier switching
- Single active supplier (HEP Supply)
- 100% market power

ELECTRICITY SECTOR
Illustrative future till 2020



NATURAL GAS SECTOR
Key SoS stakeholders

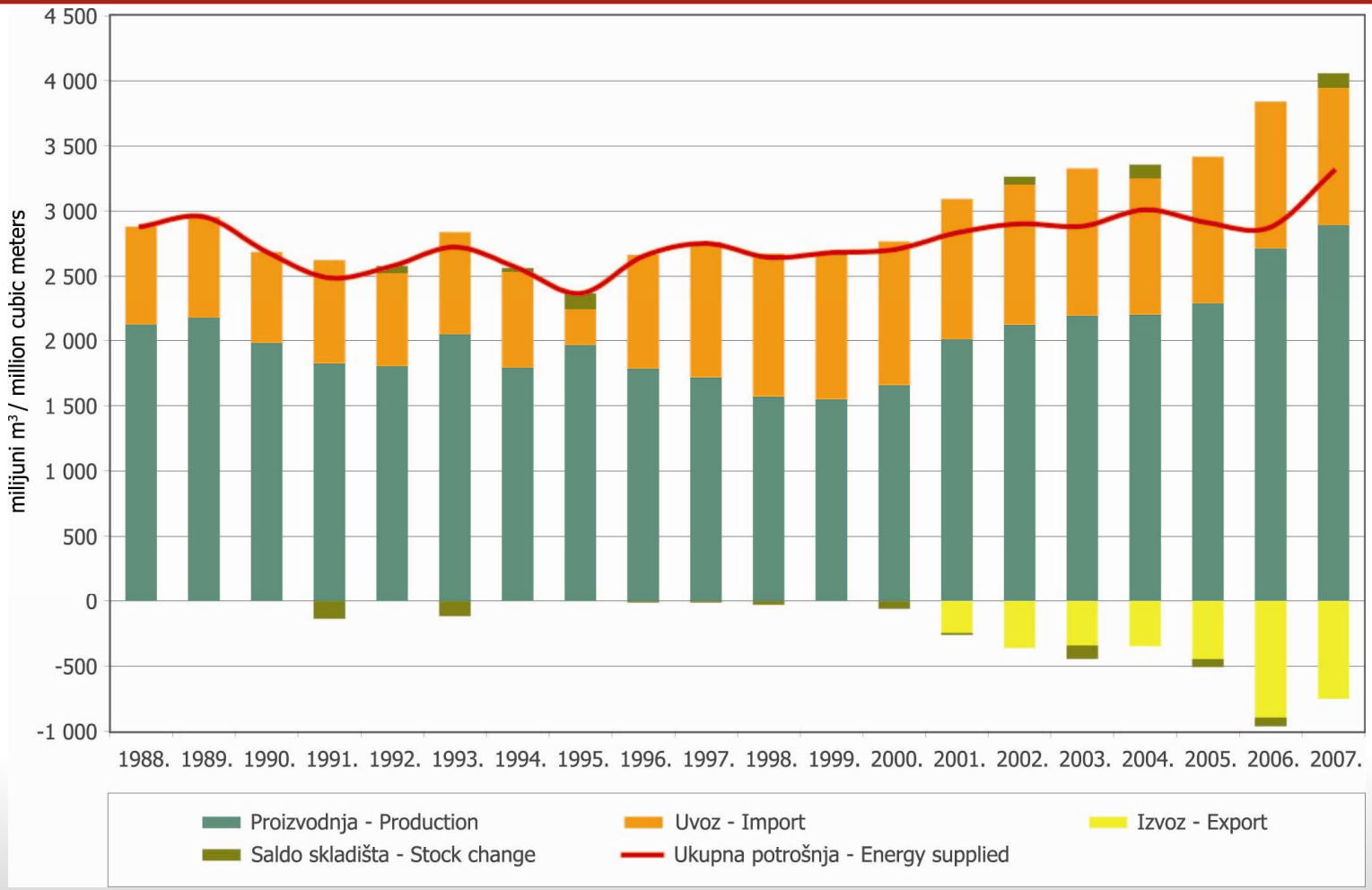
Gas fields

Public service obligation carriers:

- Gas storage (INA / PLINACRO),
- Gas transport (PLINACRO),
- Gas distribution (36 distributors),
- Gas supply of households (36 distributors).

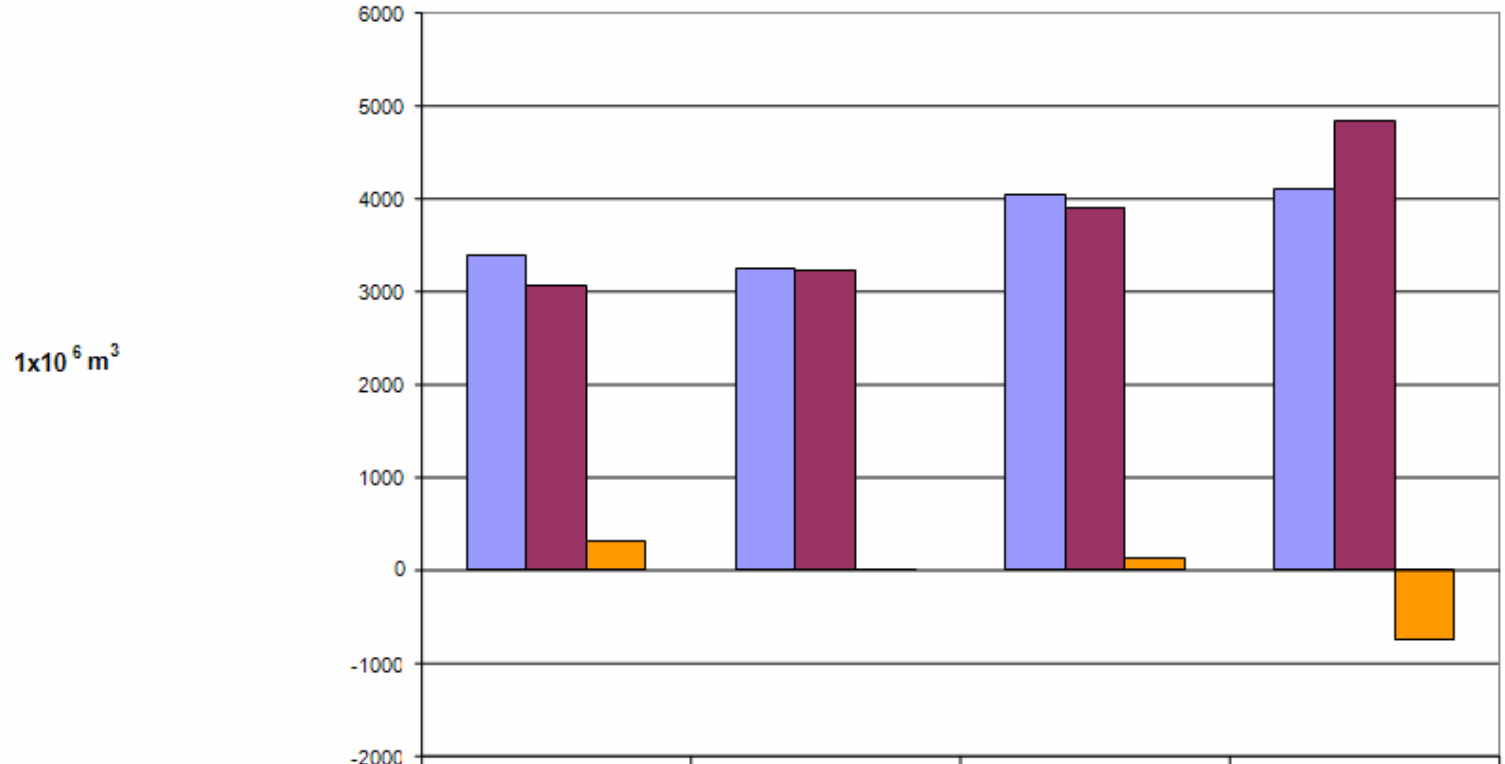
•Ministry - administrative supervision over the implementation of the relevant legislation, makes recommendations to the Government concerning tariffs on regulated activities…

NATURAL GAS SECTOR
Natural gas balance 1988-2007



NATURAL GAS SECTOR
Existing and planned natural gas system

NATURAL GAS SECTOR
Demand & Supply Projections



	2007	2008	2009	2010
Availability of natural gas in Croatia	3389	3238	4040	4097
Total demand of natural gas	3069	3227	3900	4833
Difference	320	11	140	-737

NATURAL GAS SECTOR
Potential supply

Potential supply directions of natural gas in Croatia (schedule is arbitrary and does not represent priority):

- Adria LNG terminal;
- Connection to the Hungarian gas system - later connections to the Nabucco and Caspian:
- Connection to the Romanian system via Serbia
- Expanding capacities of existing import routes (Baumgarten/TAG /SOL-Ceršak-Rogatec)
- Supply of required quantities of Russian gas via Slovenia through the Volta pipeline
- Long term connection to the IGI pipeline (Italy – Greece Interconnector) or TAP (Trans Adriatic Pipeline) through Montenegro

NATURAL GAS SECTOR
Underground Storage

- The operational capacity of the existing underground natural gas storage Okoli (PSP Okoli) is 550 mil. m3, with 50 mil. m3 reserved for the Slovenian based Geoplin company.

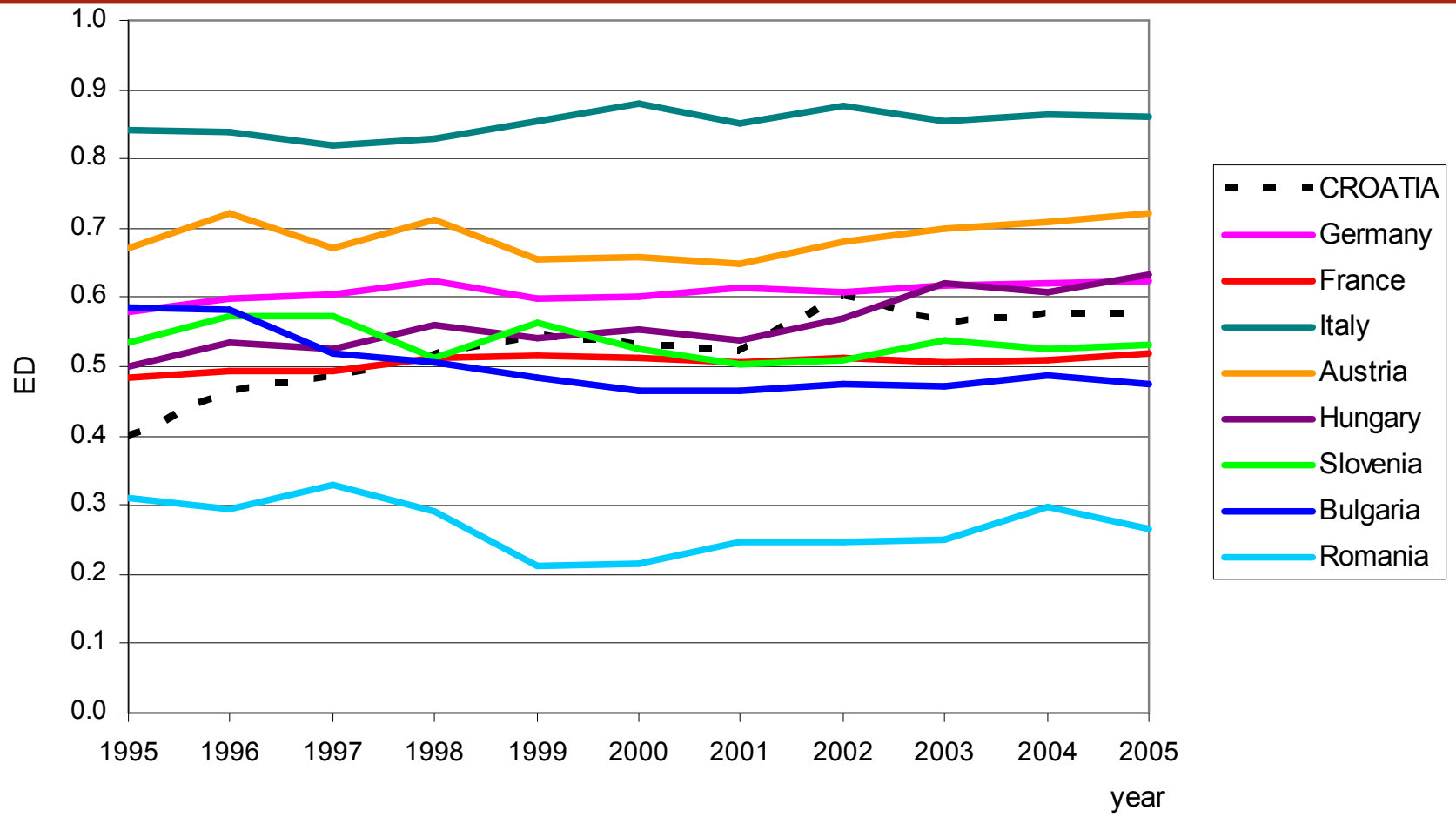
- by 2011 Croatia intends to construct another underground natural gas storage – OKOLI 2

- another one at BENIČANCI with an exceptionally large capacity of ~ 2 bill. m3/annum.

ENERGY SECTOR VULNERABILITY INDICATORS

- Hirschman-Herfindahl indicator (import indicator),
- Shannon-Wiener indicator (indicator od supply diversity),
- Energy intensity,
- Specific energy consumption,
- Carbon intensity,
- CO2 emission per capita,
- Energy dependency,
- National economy dependence on oil,
- National economy dependence on gas,
- Energy count.

VULNERABILITY INDICATORS
Energy dependency



ED - ratio between net energy import and total energy consumption

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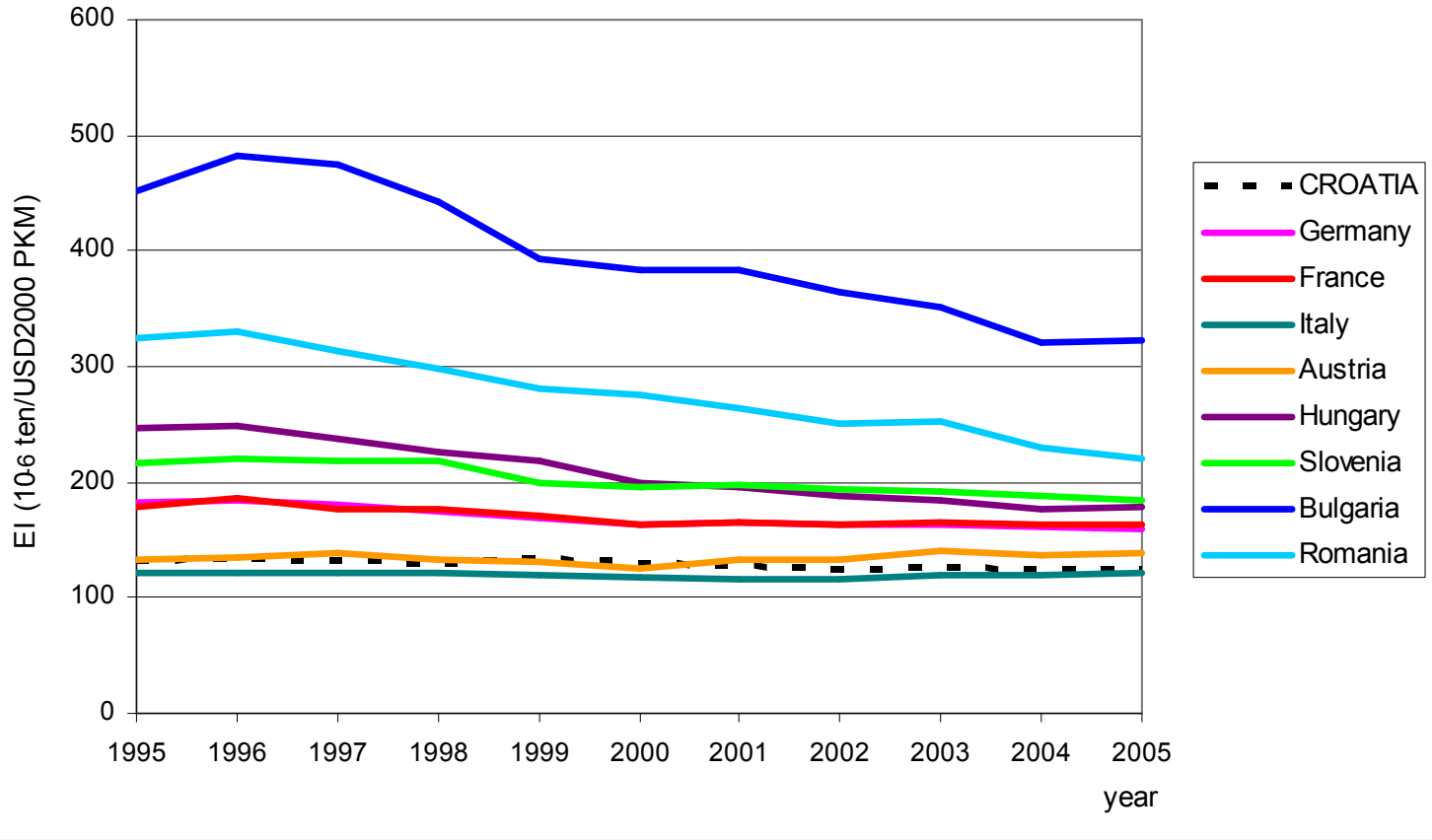
VULNERABILITY INDICATORS
Energy intensivity



EI - ratio between Total Primary Energy Supply and Gross Domestic Product

CONCLUSIONS

- Obligations on SoS adopted through EU accession process and EnC Treaty
- SoS regulatory framework in Croatia defined
- Key SoS stakeholders roles assigned
- Electricity and natural gas sectors development plans regularly updated
- Power system very well interconnected, gas system is developing in the same direction

CONCLUSIONS

- Existing networks combined with:
  - Relatively favourable generation capacitiy mix (large share of HPPs) and
  - future gas supply direction diversification

Electricity and gas sectors are able to reach SATISFACTORY LEVEL OF SoS despite increasing energy import dependency.

THANK YOU FOR YOUR ATTENTION

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