

18th Session of the Steering Committee of the Energy Efficiency 21 Project  
9th Meeting, EE21 Ad Hoc Group of Experts on Energy Efficiency Investments

# ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES IN CROATIA

Željko Jurić



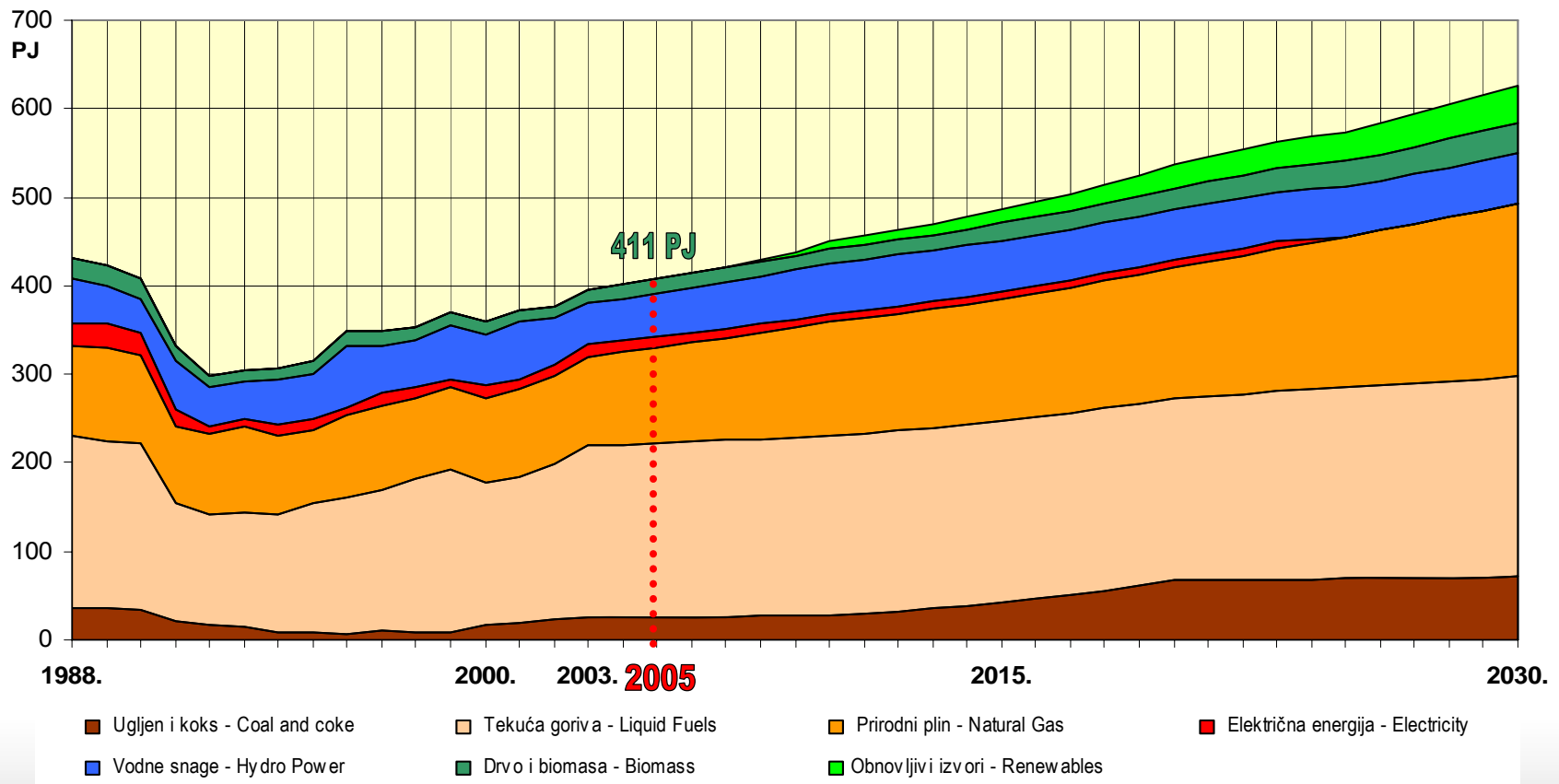
**Prepared by:**  
**Branka Jelavić PhD (Head of department for RES & EE), Filip Prebeg BSc, Željko Jurić MSc**  
**Energy Institute Hrvoje Požar**

# CROATIA'S PROFILE

- ❑ Area .....56 594 km<sup>2</sup>
- ❑ Population..... 4 437 000
- ❑ Territorial waters.....31 067 km<sup>2</sup>
- ❑ Length of coastline.....5 835 km
- ❑ Number of islands.....1 185 (66 inhabited)
- ❑ GDPpc (2005) .....6 241 US\$2000 (Ex.r.)  
.....11 699 US\$2000 (PPP)

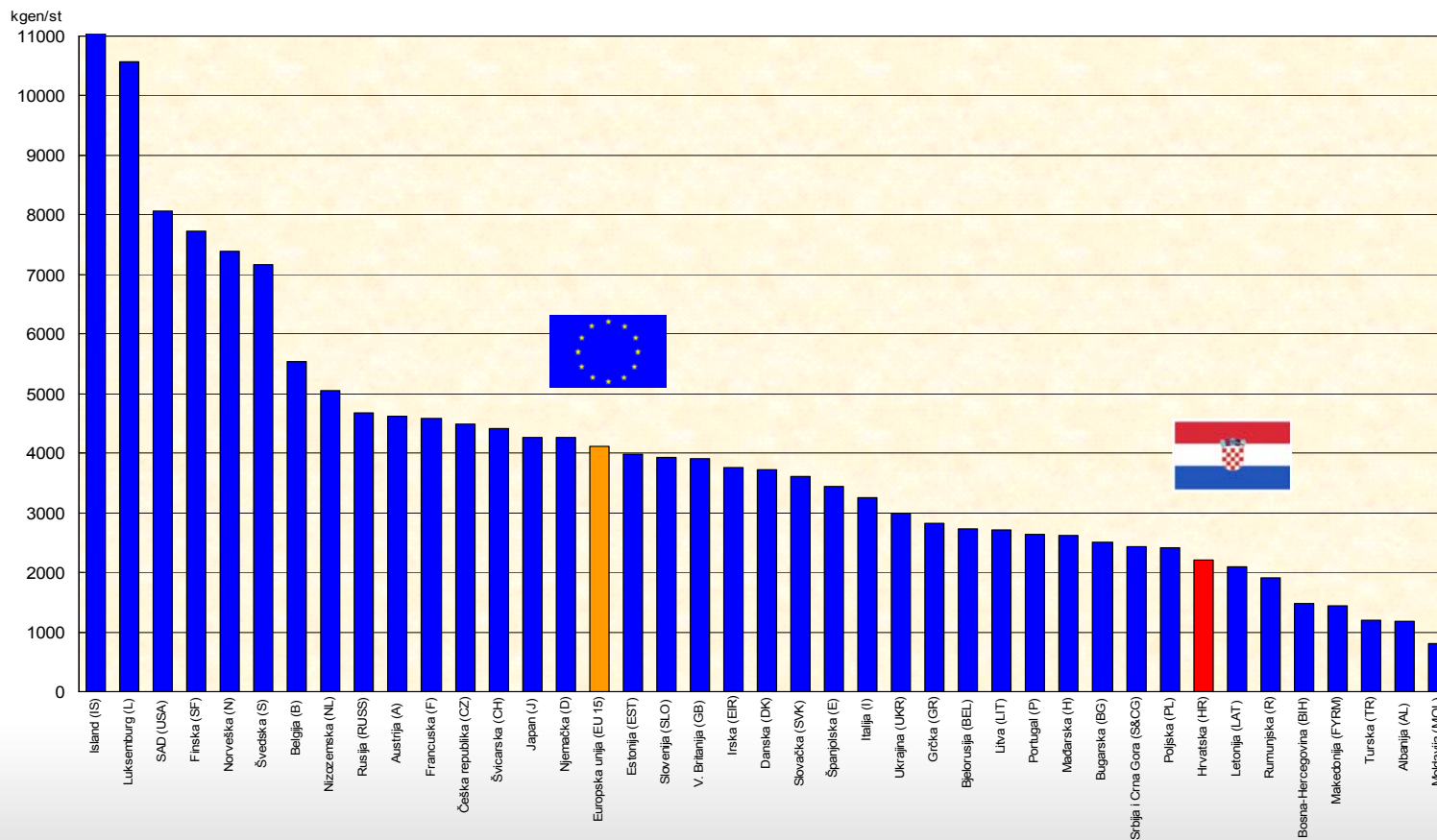


# TOTAL PRIMARY ENERGY SUPPLY IN CROATIA



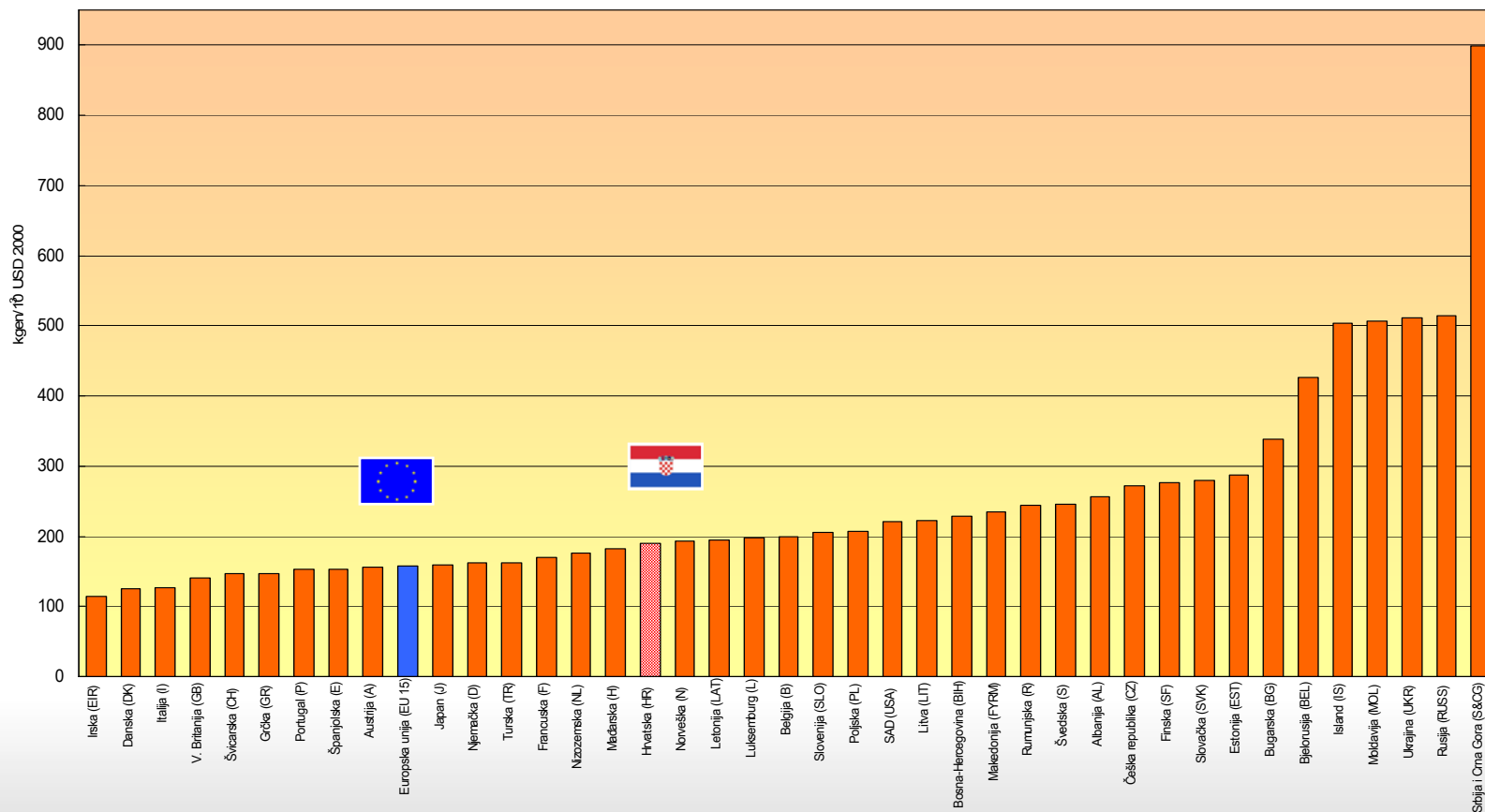
# TOTAL PRIMARY ENERGY SUPPLY PER CAPITA

kg/capita

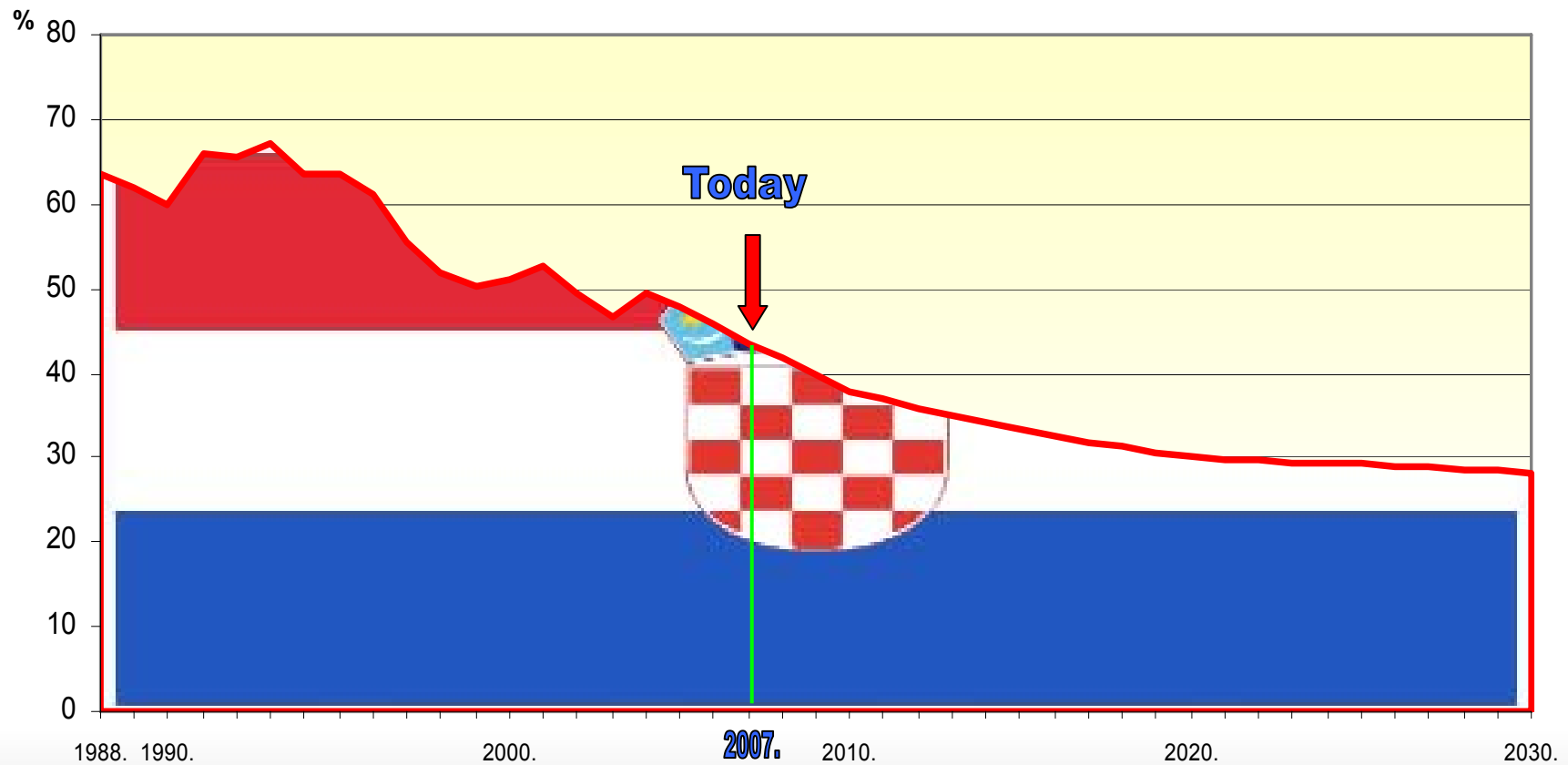


# TOTAL PRIMARY ENERGY SUPPLY INTENSITY

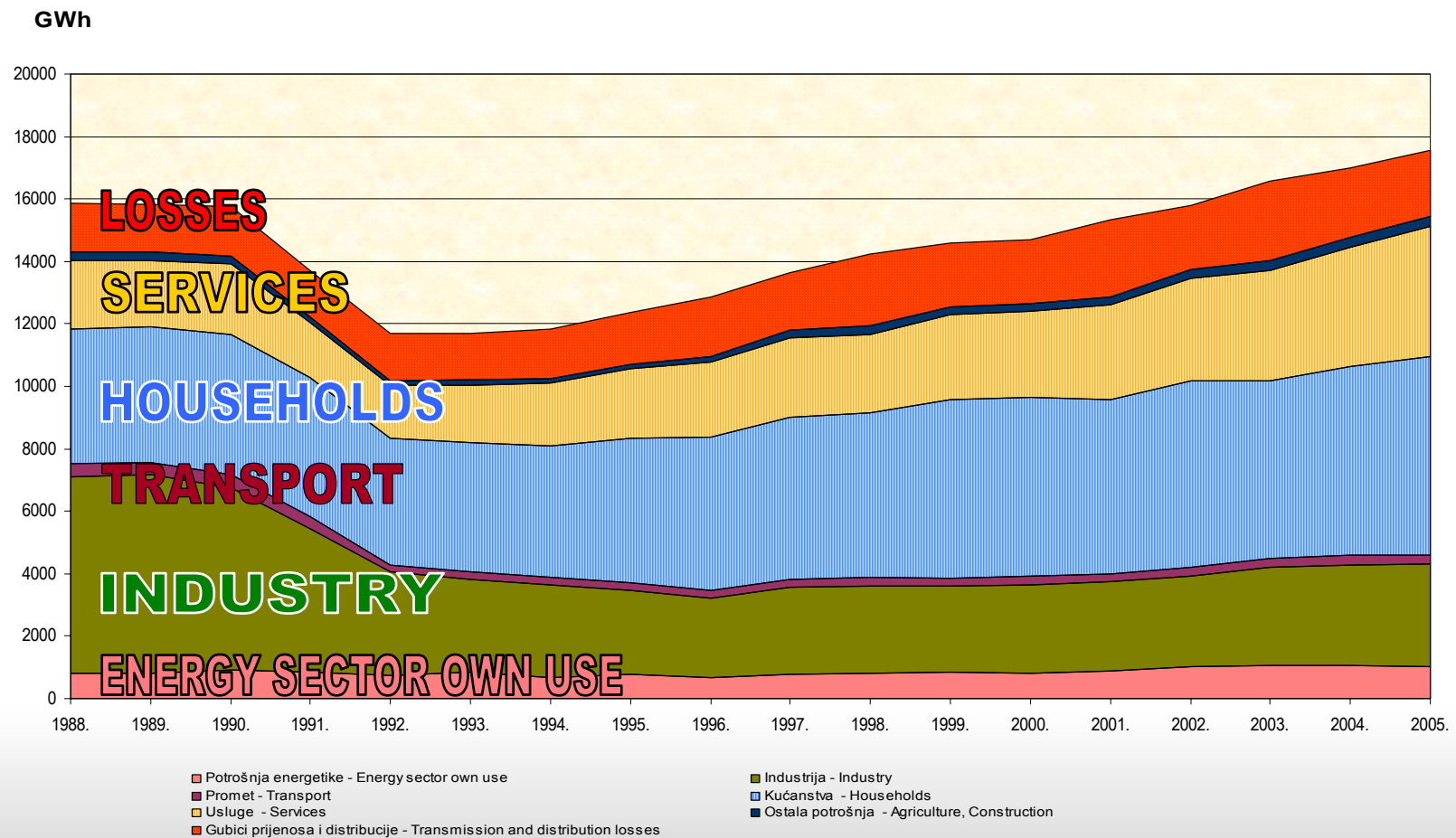
kgoe/1000 US\$ 2000



# PRIMARY ENERGY SELF SUPPLY IN CROATIA

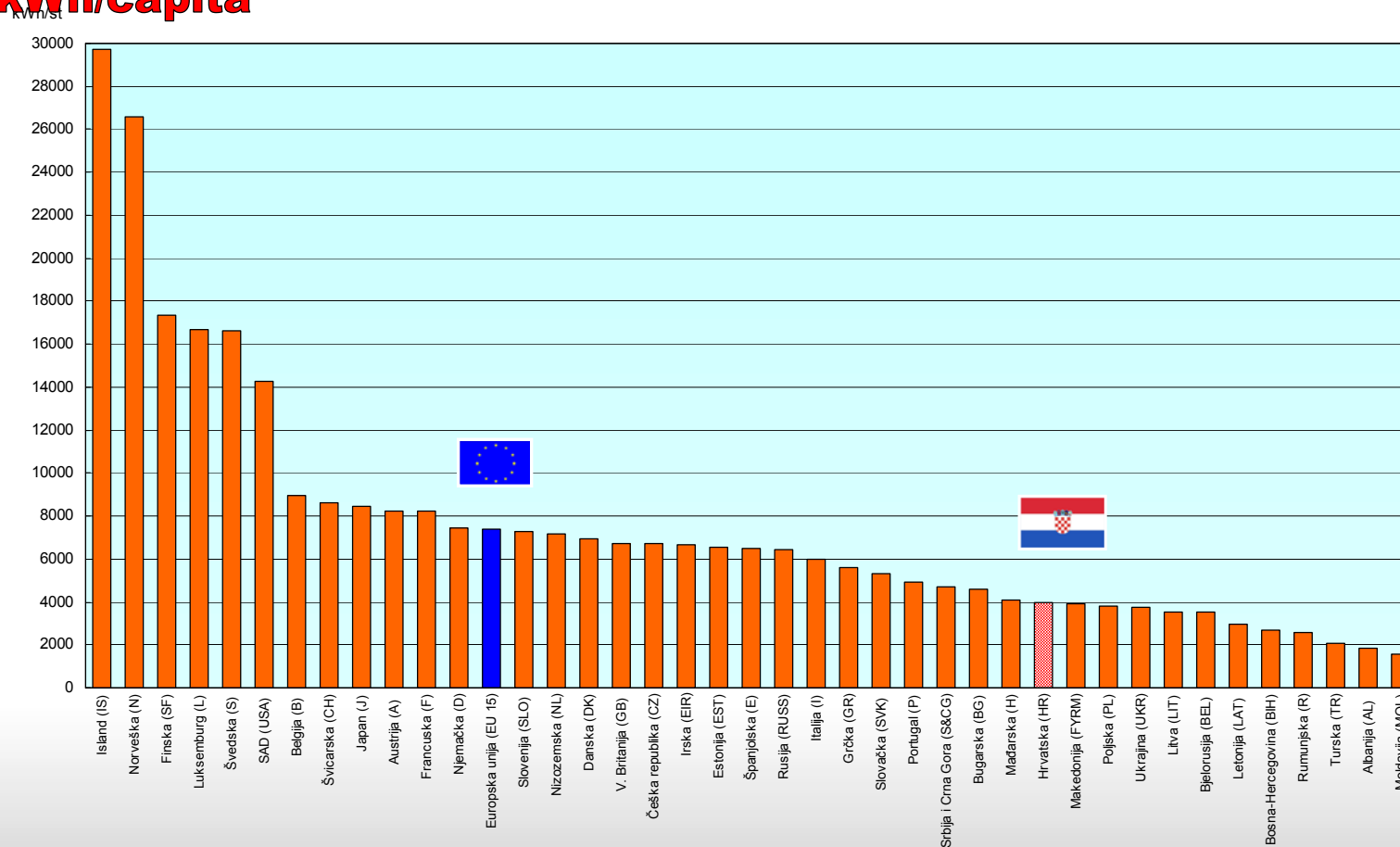


# ELECTRICITY CONSUMPTION



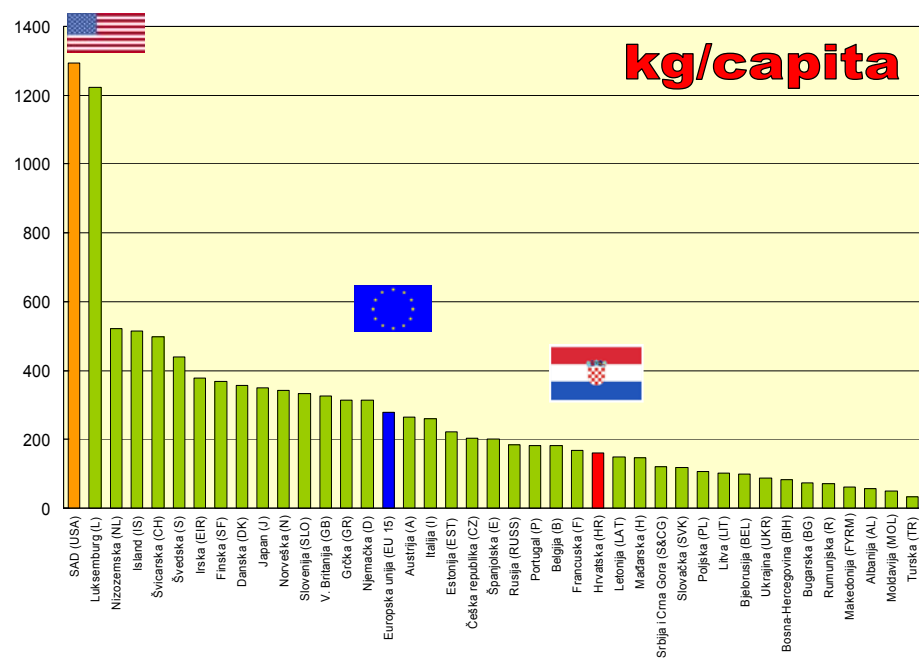
# ELECTRICITY CONSUMPTION PER CAPITA

**kWh/capita**

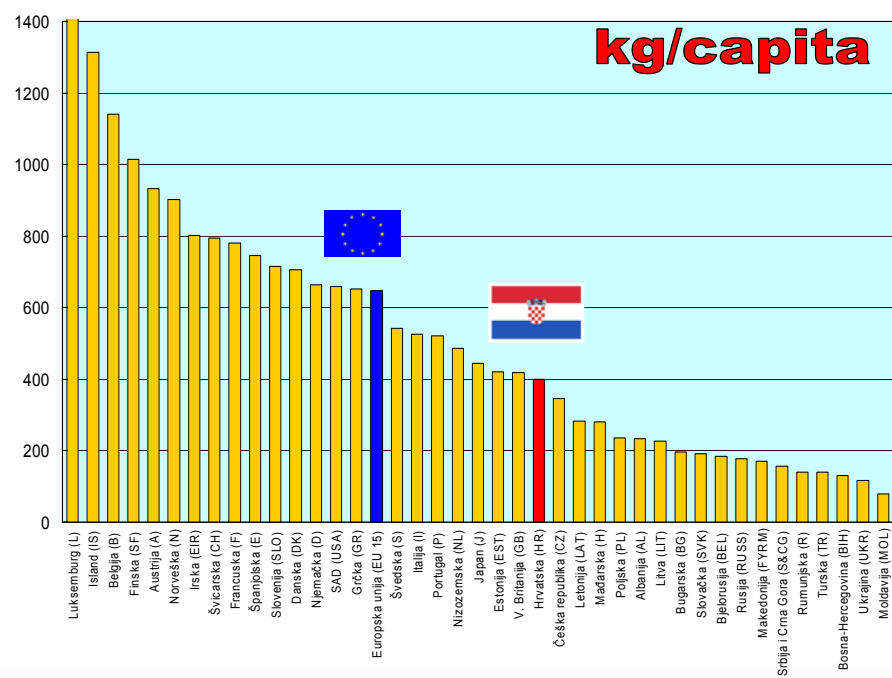


# GASOLINE AND DIESEL CONSUMPTION PER CAPITA

kg/stanovniku



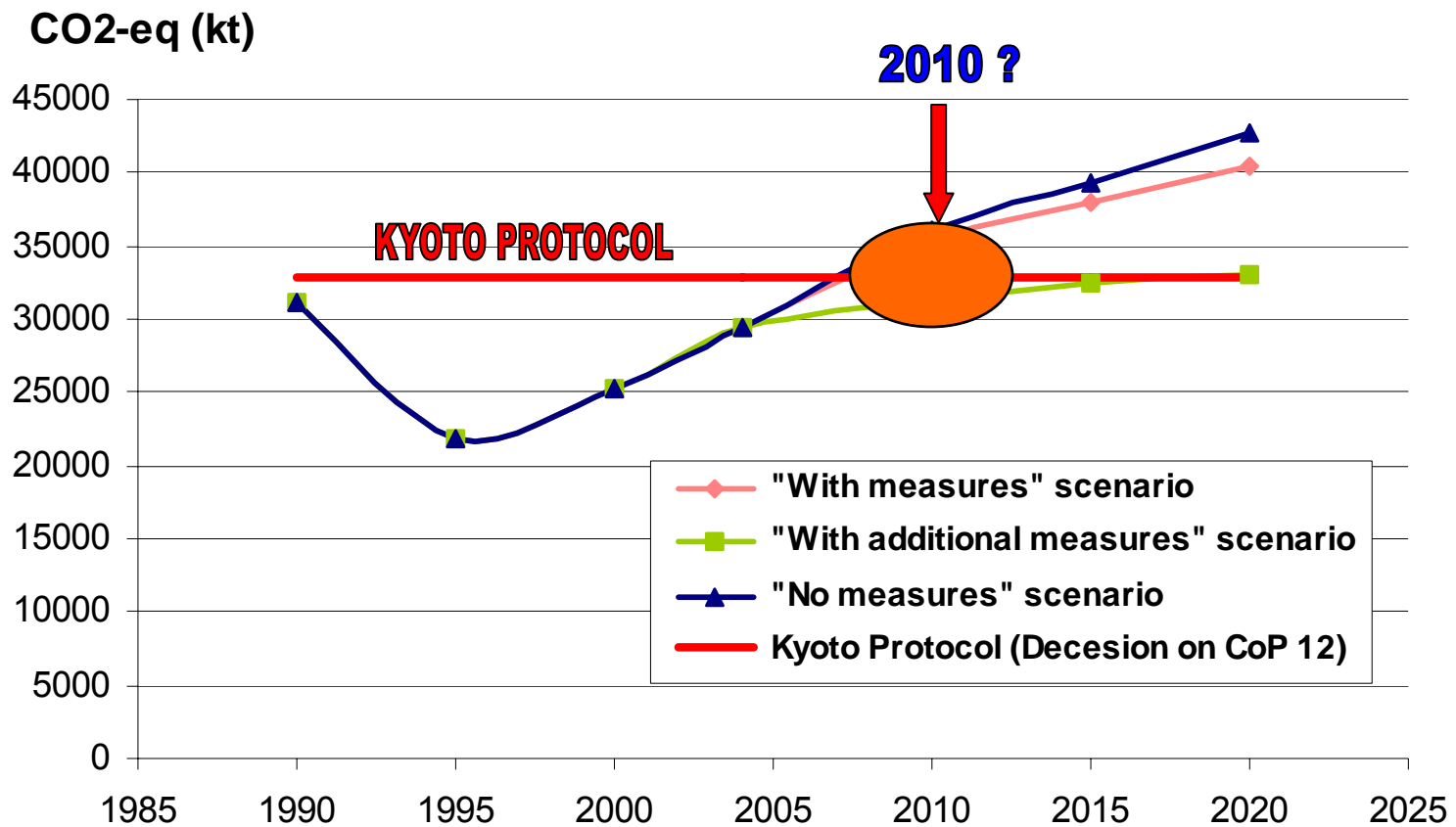
kg/stanovniku



# RENEWABLE ENERGY SOURCES, 2005

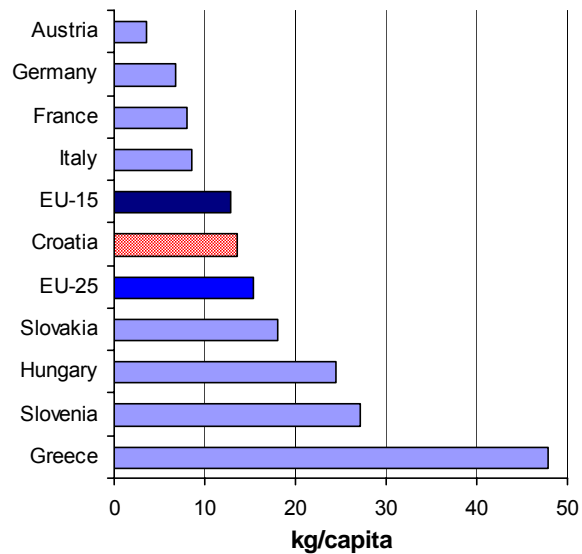
	Installed thermal capacity	Installed electrical capacity	Electricity production	Thermal energy production
<b>SOLAR</b>	N/A	48.8 kW	50.1 MWh	N/A
<b>WIND</b>	0	5.95 MW	9.5 GWh	0
<b>BIOMASS</b>	512.0 MW	2.0 MW	10.9 GWh	14.77 PJ
<b>SMALL HIDRO</b>	0	26.7 MW	108.3 GWh	0
<b>GEOTHERMAL</b>	113.9 MW	0	0	0.55 PJ
<b>TOTAL</b>	<b>623.9 MW</b>	<b>34.7 MW</b>	<b>128.7 GWh</b>	<b>15.32 PJ</b>

# GHG EMISSION PROJECTION

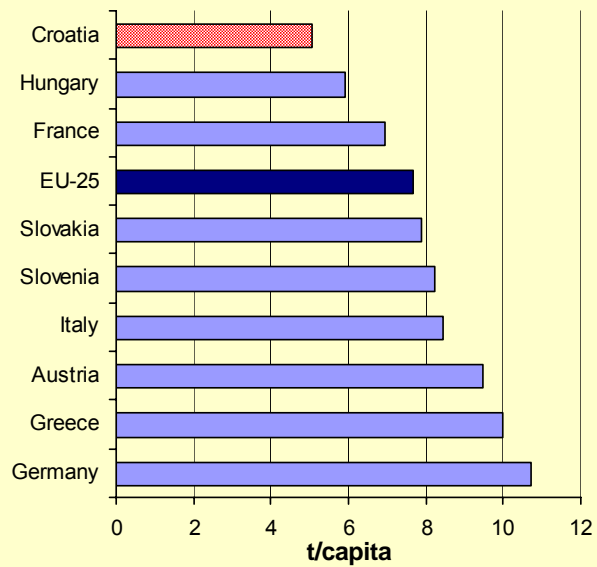


# COMPARISON OF NATIONAL EMISSIONS

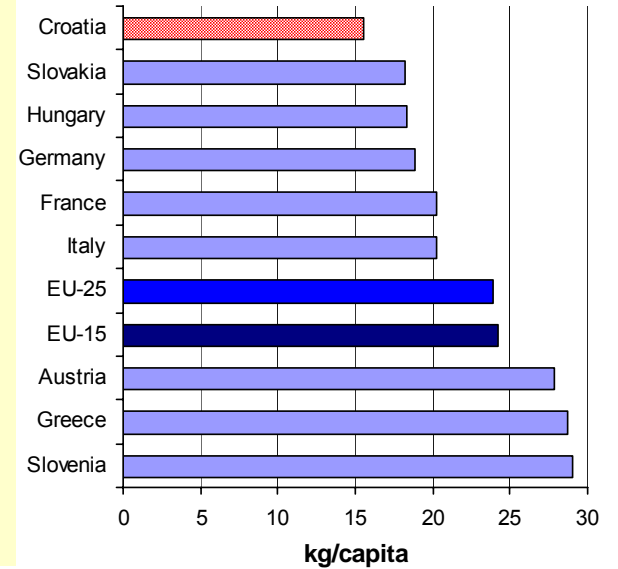
SO<sub>2</sub> emission per capita, 2004



CO<sub>2</sub> emission per capita, 2004



NO<sub>x</sub> emission per capita, 2004



# CHRONOLOGY

- 1994 - Energy Sector Development and Organisation Program – PROHES**
- 1997 - National Energy Programs – NEP (7 energy efficiency programs + 5 renewable energy programs)**
- 1998 - Strategy of Energy Sector Development**
- 2000 - Concept of Energy Sector Reform**
- 2001 - Energy Laws (Energy Law, Law on Regulating Energy Activities, Electricity Energy Market Law, Oil and Oil Derivates Market Law, Gas Market Law)**
- 2002 - New Energy Strategy – Croatia in 21 Century (adopted by Parliament)**
- 2003 - Fund for Environmental Protection and Energy Efficiency**
- 2004/7 - Amendments to Energy Legislation (Law on Generation, Distribution and Supply of Thermal Energy)**
- 2007 - New By-laws for Renewable Energy Sources (incentives for renewables - feed-in tariffs)**

## OBJECTIVES OF ENERGY STRATEGY

- Energy efficiency increase**
- Security of energy supply
- Diversification of energy sources
- Utilisation of renewable energy sources**
- Realistic energy prices, energy market and private enterprise development
- Environmental protection**

# NATIONAL ENERGY PROGRAMS

- EE -

PLINCRO

Program of the  
gasification of Croatia

KUEN<sub>zgrada</sub>

Energy Efficiency in  
Buildings

KUEN<sub>cts</sub>

Energy Efficiency in  
centralized thermal  
systems

CROTOK

National Programme  
on Energy  
Development on  
Islands

KOGEN

Program of  
cogeneration

MIEE

Industrial Energy  
Efficiency Network

TRANCRO

Energy Efficiency in  
Transport

# NATIONAL ENERGY PROGRAMS

## - RES -

BIOEN

Program of the use of  
bioenergy

GEOEN

Program of the use of  
geothermal energy

MAHE

Program of  
construction of small  
hydro power plants

ENWIND

Program of the use of  
wind power

SUNEN

Program of the solar  
energy use

# ENVIRONMENTAL PROTECTION AND ENERGY EFFICIENCY FUND

- ❑ Fund was established in 2003 to finance programs, projects and other activities in the field of environmental protection, energy efficiency and renewable energy sources.
- ❑ For 2006, Fund allocated **13.6 million EUR** for projects and programs of energy efficiency and renewable energy sources, as follow:
  - 6.0 million EUR for energy efficiency projects (national energy programs),
  - 4.4 million EUR for renewable energy sources,
  - 2.1 million EUR for sustainable buildings,
  - 0.7 million EUR for clean transport,
  - 0.3 million EUR for studies and
  - 0.3 million EUR for other purposes.
- ❑ For 2007, Fund allocated **19.4 million EUR** (43% more).

# ONGOING PROJECTS RELATED TO EE AND RES IN CROATIA

- ❑ **Renewable Energy Resources Project (started: 2005)**
  - International Bank for Reconstruction and Development - IBRD (GEF implementing agency) awarded a grant (**5.5 million USD**) to the Croatia. Fund for Environmental Protection and Energy Efficiency (EPEEF) co-finance the project in amount of **2.5 million USD**.
- ❑ **Croatian Energy Efficiency Project (started: 2003)**
  - Total value of the Project, with participation of domestic banks, is estimated at **40 million USD** (loan by the World Bank in the amount of **4.4 million EUR** and a GEF grant in the amount of **5 million USD**) over a six-year period.
- ❑ **Removing barriers for improving energy efficiency of the residential and service sectors (started: 2005)**
  - The overall Project budget provided by UNDP-GEF is **4.39 million USD** (possible additional **7.9 million USD** in co-financing). The project will run for 4 years.

# RENEWABLE ENERGY RESOURCES PROJECT

- ❑ The project is financed by IBRD/GEF (EPEEF - co financier).
- ❑ Croatian Reconstruction and Development Bank (HBOR) is Implementing Agency for administering the grant funds.
- ❑ Objectives:
  - develop an economically and ecologically sustainable market of renewable sources of energy in Croatia,
  - reduce the dependence of the Croatian economy on the imports of electricity and fossil fuels,
  - reduce GHG emission,
  - create conditions necessary for attracting private investments in renewable energy sources,
  - promote the development of industry at the local level,
  - promote employment.

# ENERGY EFFICIENCY PROJECT

- ❑ Project was initiated by the World Bank and GEF in collaboration with Croatian Electric Utility Company (HEP) and HBOR. For this purpose HEP ESCO was established.
- ❑ HEP ESCO currently manages more than 50 projects in the areas of public lighting, buildings, industry and energy supply systems. The projects are in various stages of development, execution or financing.
- ❑ Objectives:
  - save electricity and heating energy by financing the reconstruction and modernisation of facilities,
  - create of an energy efficiency market,
  - reduce GHG emissions,
  - make Croatia's economy more competitive,
  - reduce dependence on energy imports,
  - increase the demand for, and supply of, energy efficiency projects and services,
  - improve the affordability of energy services,
  - generate employment.

# REMOVING BARRIERS FOR IMPROVING ENERGY EFFICIENCY OF THE RESIDENTIAL AND SERVICE SECTORS

- ❑ The Project is implemented according to the UNDP NEX (National Execution) model. Ministry of Economy is an Executing Agency. Project Management and Technical Support Unit (PMTSU) has been established as a project implementing agency.
- ❑ Two energy efficiency pilot projects started in 2006 (“A Systematic Energy Management in Towns – Sisak town” and “Put Your House in Order”).
- ❑ Objectives:
  - enhance capacity of the regional authorities to promote EE,
  - increase public awareness of the available EE technologies,
  - reduce GHG emission,
  - replication of similar projects on other regions and technologies,
  - enhance capacity of the local stakeholders to initiate/support the implementation of EE measures in the service sector,
  - pipeline of "bankable" EE investment proposals for the service sector facilities,
  - creation of system for monitoring the GHG emission reductions.

## FURTHER ACTIVITIES

- Harmonisation of Croatia's legislations with EU
- More intensive cooperation with local communities (regional energy centres and offices)
- Intensive international cooperation (best practice exchange)
- Promotion and education
- Increase of climate change awareness

# Thank You for Your Attention!



**Energy Institute Hrvoje Požar**  
**[www.eihp.hr](http://www.eihp.hr)**

**[zjuric@eihp.hr](mailto:zjuric@eihp.hr)**

**[bjelavic@eihp.hr](mailto:bjelavic@eihp.hr)**

**[fprebeg@eihp.hr](mailto:fprebeg@eihp.hr)**

