



ODYSSEE-MURE

***ODYSSEE-MURE fit for 55 (2022-2025)***  
***First regional meeting, 24-25 April 2023, Zagreb***

## ***Energy Efficiency Indicators for Croatia***

Vlatka Kos Grabar Robina, EIHP

24th April 2023, Zagreb



# Energy Institute Hrvoje Požar

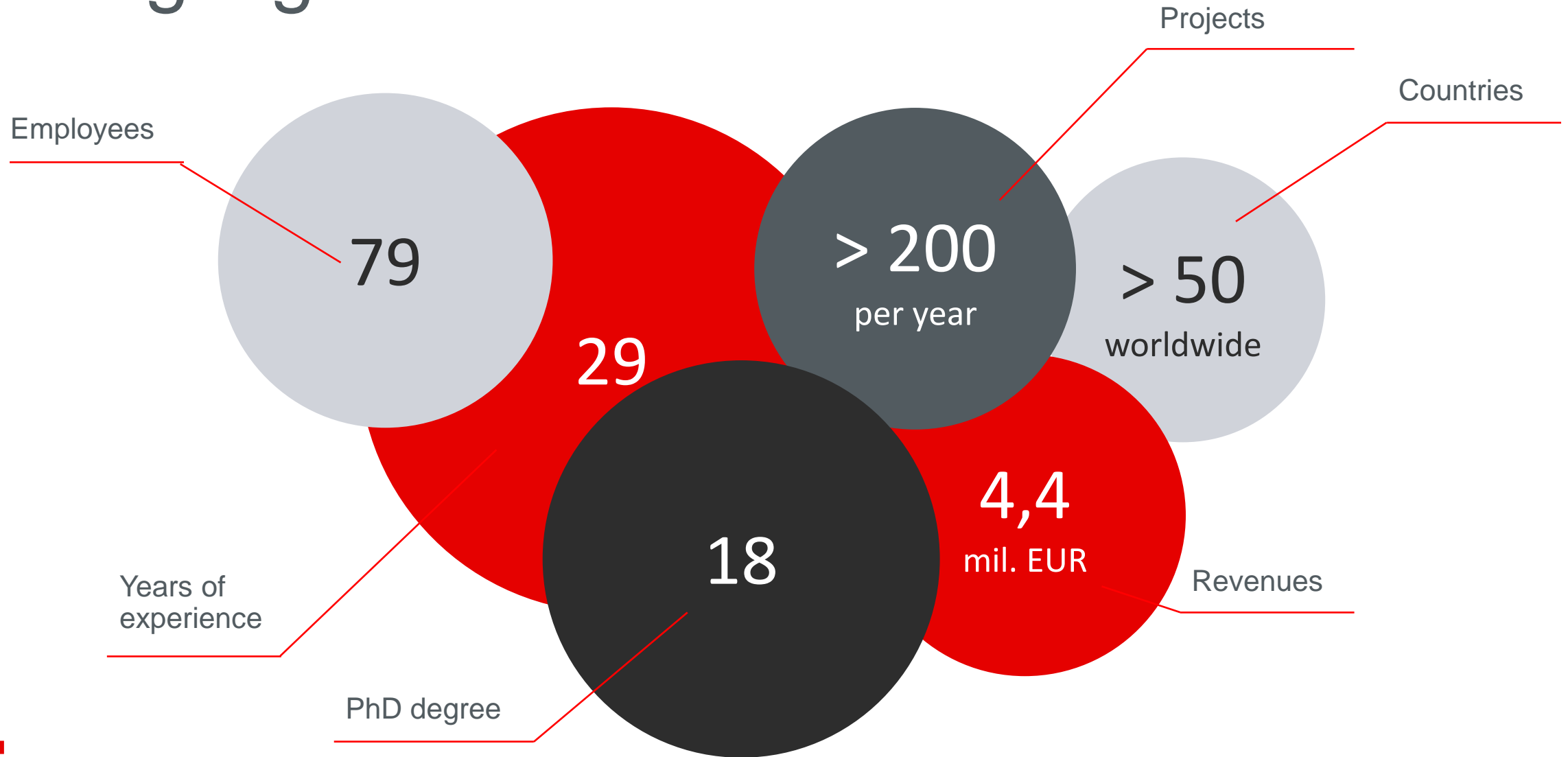
24th April 2023  
Zagreb

# About us

- Energy Institute Hrvoje Požar (EIHP) is an institution owned by the Republic of Croatia, self-financed by providing services to the public and business sectors.
- Our activities include:
  - Implementing scientific research in the energy field;
  - Providing professional support to public authorities;
  - Providing advisory services in the domestic and international markets.



# Highlights





# Areas of Activity



Energy balance and statistics

Energy production and markets

Renewable energy, climate and environmental protection

E-mobility

Energy and climate planning

Power grid planning and development

Energy regulations and economics

Energy efficiency

A photograph of several white wind turbines in a field under a clear sky. The turbines are positioned at various distances, with one large one in the foreground and several smaller ones in the background.

# Mission

EIHP contributes to Croatian, European, and global energy transition by multidisciplinary research, business consulting and knowledge transfer.

# Vision

EIHP intends to become a globally recognizable generator of changes of the energy sector toward climate neutrality and a low-carbon society

# Values

EIHP is a reliable partner with top experts. We encourage multidisciplinary, take care of the environment, and are committed to gender equality.

# Global Clients



# Energy Companies

**HEP** d.d.

**INA**

**plinacro**  
OPERATOR PLINSKOGA TRANSPORTNOG SUSTAVA

**NAF** d.d.

**epcg**

**lng**  
HRVATSKA

**EPC**  
Електропривреда Републике Српске

**ЕЛЕКТРОПРИВРЕДА СРБИЈЕ**

**EVN**  
macedonia

**OSHEE**  
OPERATORI I SHPERNDARJES SE ENERGJISE ELEKTRIKE

**kcstt**

**HEP** OPERATOR DISTRIBUCIJSKOG SUSTAVA d.o.o.

**KEDS**

JP "Komunalno Brčko" d.o.o.  
Brčko distrikt BiH  
JP "Komunalno Brčko" d.o.o.  
Brčko distrikt BiH

**EP**

**JP ELEKTROPRIVREDA**  
HRVATSKE ZAJEDNICE HERCEG BOSNE d.d. Mostar

**BH-GAS**

**HOPS**  
ЕЛЕКТРОПРИЈЕНОС ВІН  
ЕЛЕКТРОПРЕНОС ВІХ

**MEPCO**  
МАКЕДОНСКИ ЕЛЕКТРОПРЕНОСЕН СИСТЕМ ОПЕРАТОР

**DUBROVNIK PLIN**

**PETROZIM LINE (PVT) LTD**

**NOS**  
ВІН  
НОС

**KEK**  
KORPORATA ENERGETIKE E KOSOVES Sh.a.  
KOSOVO ENERGY CORPORATION J.S.C.  
ENERGETSKA KORPORACIJA KOSOVA D.D.

**Terna**  
Rete Elettrica Nazionale

AND NUMEROUS GOVERNMENTS, MINISTRIES, ENERGY REGULATORY AGENCIES, LOCAL AUTHORITIES...



# EU Projects



# EU Projects



Multidisciplinary **research**.  
Business **consulting**.  
**Knowledge** transfer.



# Contact

Energy Institute Hrvoje Požar

Savska cesta 163

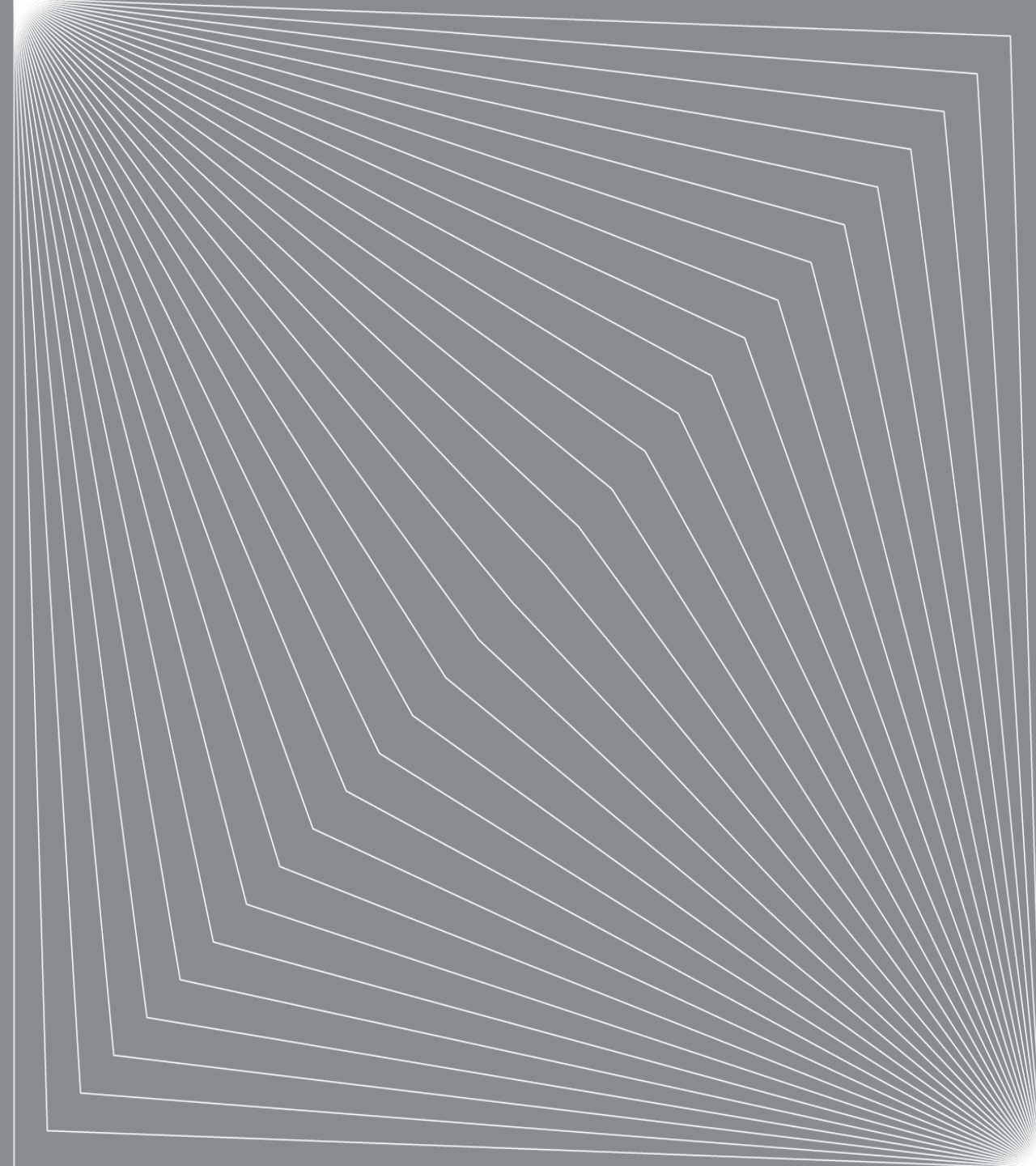
10000 Zagreb

Croatia

 [www.eihp.hr](http://www.eihp.hr)

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

 +385 1 6326 100







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## ***Energy Efficiency Indicators for Croatia***

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# Content

- Introduction
- Odyssee Mure project
- Energy in Croatia 2021
- Energy Efficiency Indicators
  - Industry
  - Transport
  - Households
- Conclusion

# Introduction

- energy efficiency
  - definition: the use of less energy to perform the same task or produce the same result
- energy savings
- energy efficiency targets
- how to measure savings and see the results
- results – help in making a decision in energy sector

# Odyssee Mure

ODYSSEE-MURE

- Odyssee-Mure project
  - European project coordinated by ADEME with the technical support of Enerdata and Fraunhofer
  - two complementary internet databases: Odyssee and Mure
- project objective:
  - a comprehensive monitoring of energy consumption and efficiency trends as well as an evaluation of energy efficiency policy measures by sector for EU countries, Switzerland and Energy Community countries
  - provide results in an interactive and attractive way to decision makers and actors involved in energy efficiency



## Macroeconomic data and energy balance

Socioeconomic Data	Gross inland consumption	Final energy consumption	D
Data control	Selection of main indicators	Eurostat data	G

Series code	Title	Country code	Unit	2013	2014	2015	2016	2017	2018	2019	2020
<b>1. Data</b>											
<b>1.1. Socioeconomic data</b>											
<b>Gross domestic product</b>											
pib	GDP in current national currency	cro	MEUR	44.329	43.919	45.186	47.246	49.889	52.689	55.571	50.189
pibxx	GDP at constant prices, national currency	cro	EUR201	44.226	44.073	45.186	46.782	48.380	49.783	51.516	47.342
<b>Exchange rate</b>											
txchgeuro	Exchange rate: national currency / € (1 for EU euro area after 1999)	cro	lc/EUR	7,58	7,63	7,61	7,53	7,46	7,42	7,42	7,54
txchgppp	Exchange rate in ppp: national currency / €	cro	lc/EUR	4,96	4,95	4,89	4,87	4,84	4,88	4,88	4,86
<b>Value added and private consumption</b>											
vadagr	VA at current prices of agriculture, fishing and forestry	cro	MEUR	1.536	1.298	1.344	1.450	1.445	1.558	1.594	1.614
vadind	VA at current prices of industry (Section B + C + D + E + F)	cro	MEUR	9.002	8.989	9.129	9.537	9.852	10.212	10.921	10.430
vadter	VA at current prices of tertiary sector	cro	MEUR	26.444	26.322	27.029	28.250	30.023	31.639	33.220	29.959
vadagrxx	VA at constant market prices of agriculture, fishing and forestry	cro	EUR201	1.525	1.313	1.344	1.430	1.398	1.484	1.511	1.566
vadindxx	VA at constant market prices of industry	cro	EUR201	8.809	8.928	9.129	9.648	9.844	10.006	10.579	10.402
vadterxx	VA at constant market prices of tertiary sector	cro	EUR201	26.341	26.318	27.029	27.798	28.762	29.583	30.411	27.950

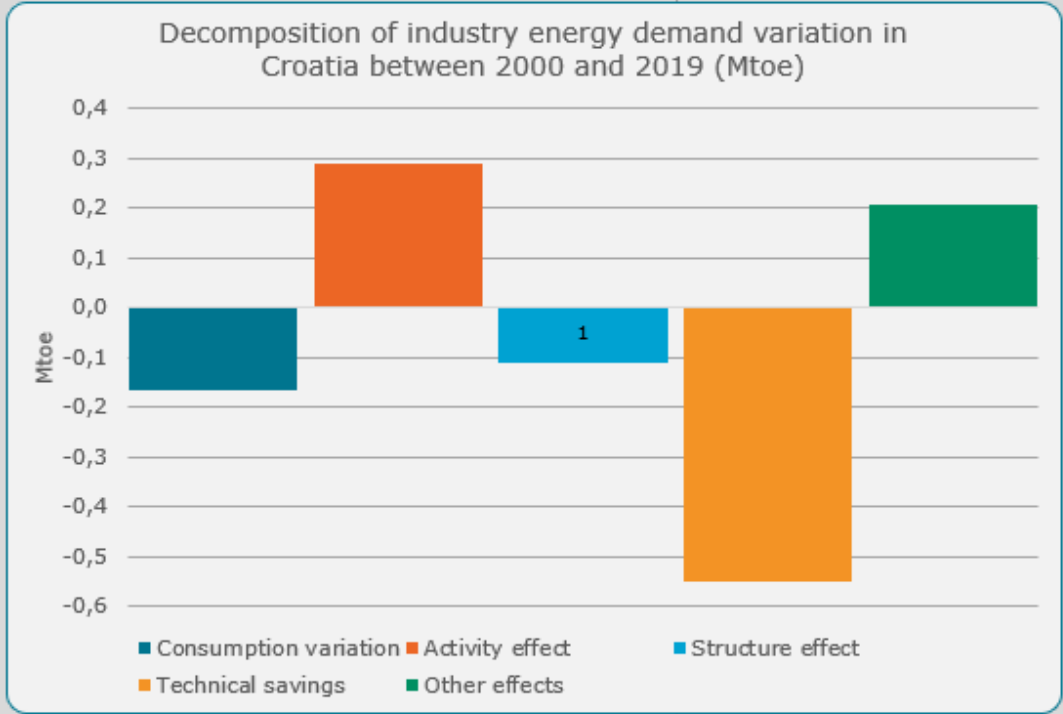
**Decomposition graphics**

- Decomposition of final consumption for industry
- Decomposition of final consumption for transport
- Decomposition of final consumption for
- Decomposition of final consumption for services
- Decomposition of final consumption for agriculture
- Primary decomposition

Decomposition period (please select start and end year) From **2000** to **2019**

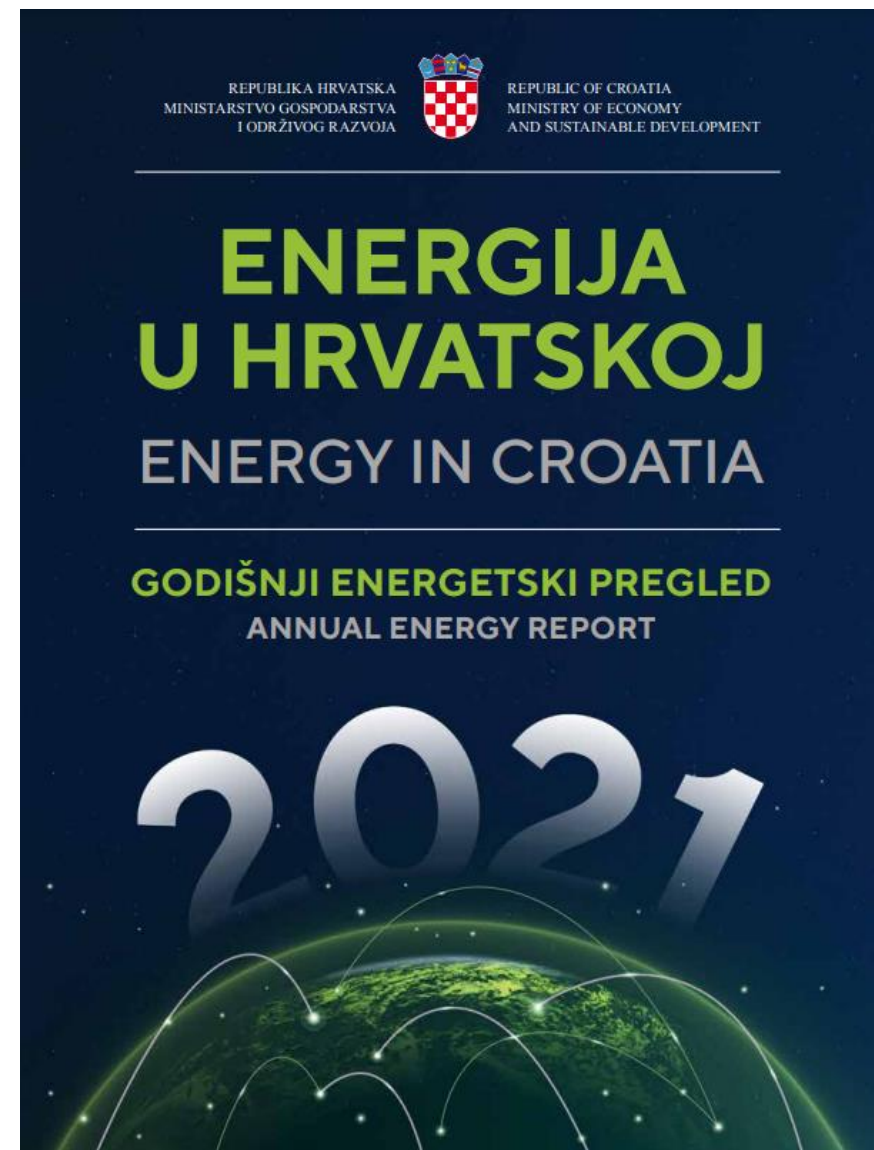
**Decomposition of industry energy demand variation**

Decomposition of industry energy demand variation in Croatia between 2000 and 2019 (Mtoe)	
<b>Consumption variation</b>	<b>-0,2</b>
Activity effect	0,3
Structure effect	-0,1
Technical savings	-0,6
Other effects	0,2

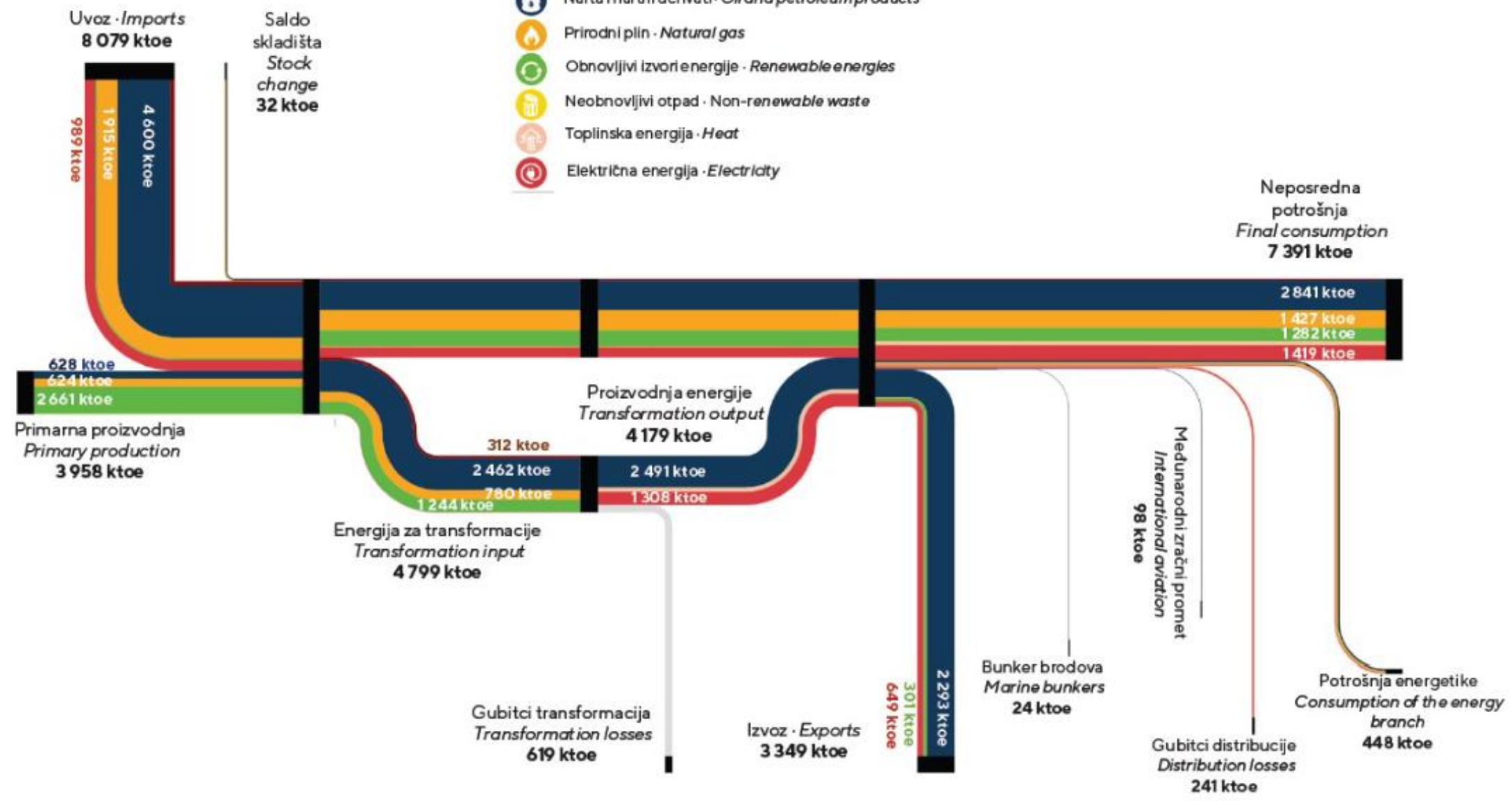


# Energy in Croatia 2021

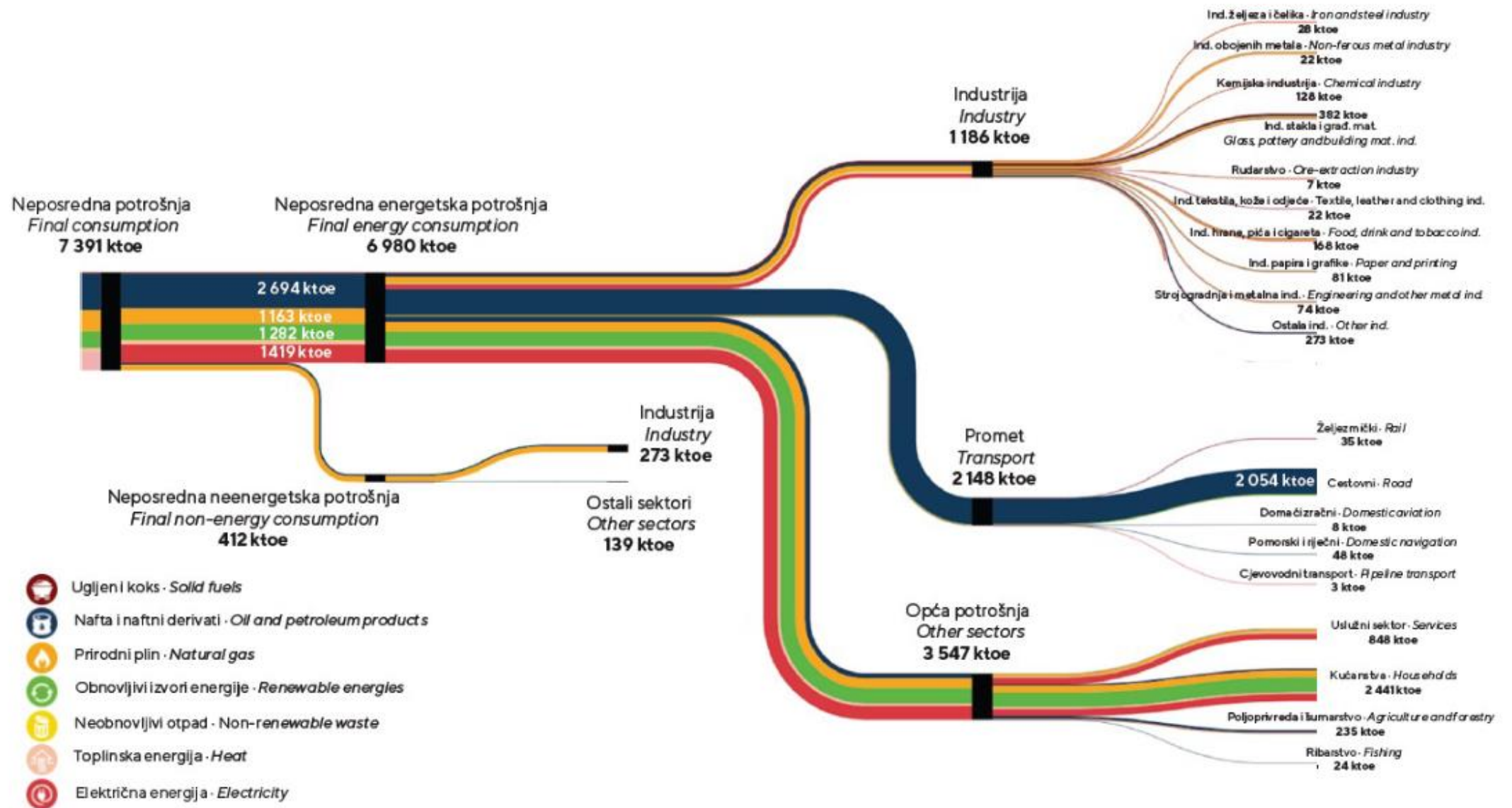
- energy review
  - relations and trends in the Croatian energy system
  - essential economic and financial indicators, air pollutant emissions, primary energy efficiency indicators, ODEX (monitors the long-term development of energy efficiency in the industry, transport, and household sectors)
- energy balance
  - the most complete statistical accounting of energy products and their flow in the economy



-  Ugljen i koks · *Solid fuels*
-  Nafta i naftni derivati · *Oil and petroleum products*
-  Prirodni plin · *Natural gas*
-  Obnovljivi izvori energije · *Renewable energies*
-  Neobnovljivi otpad · *Non-renewable waste*
-  Toplinska energija · *Heat*
-  Električna energija · *Electricity*







# Energy Efficiency Indicators

- used to assess the progress in energy efficiency and to measure energy savings
- specific consumption
- energy intensities
- calculated in total, and for sectors:
  - industry
  - transport
  - households

# ODEX

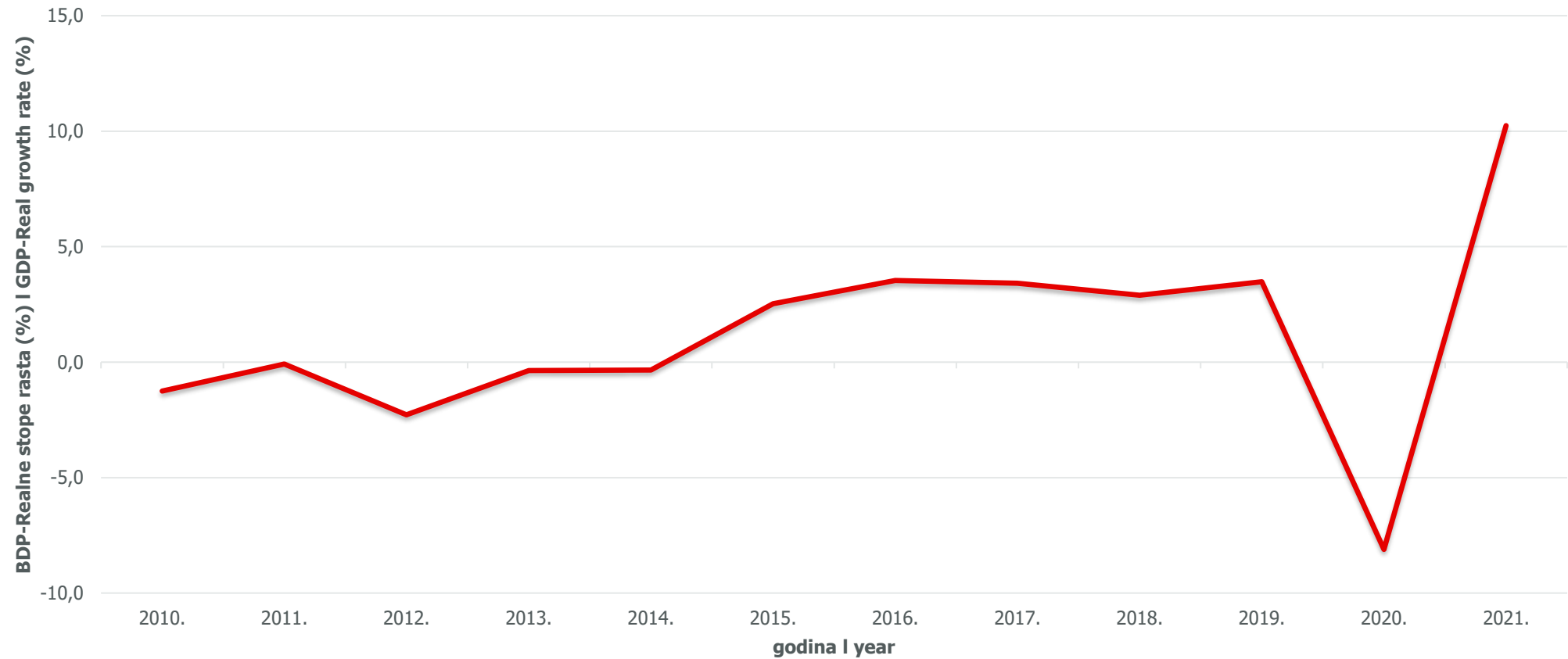
- the energy efficiency improvement index
- represents the weighted average of a specific energy consumption index for selected groups of energy consumers
- consists of two parts: the aggregate index and the technical index
- the index year – 2000
- determined for individual sectors – industry, transport, households, as well as for the total economy
- also calculated in the Odyssee base

# Indicators – Energy in Croatia 2021

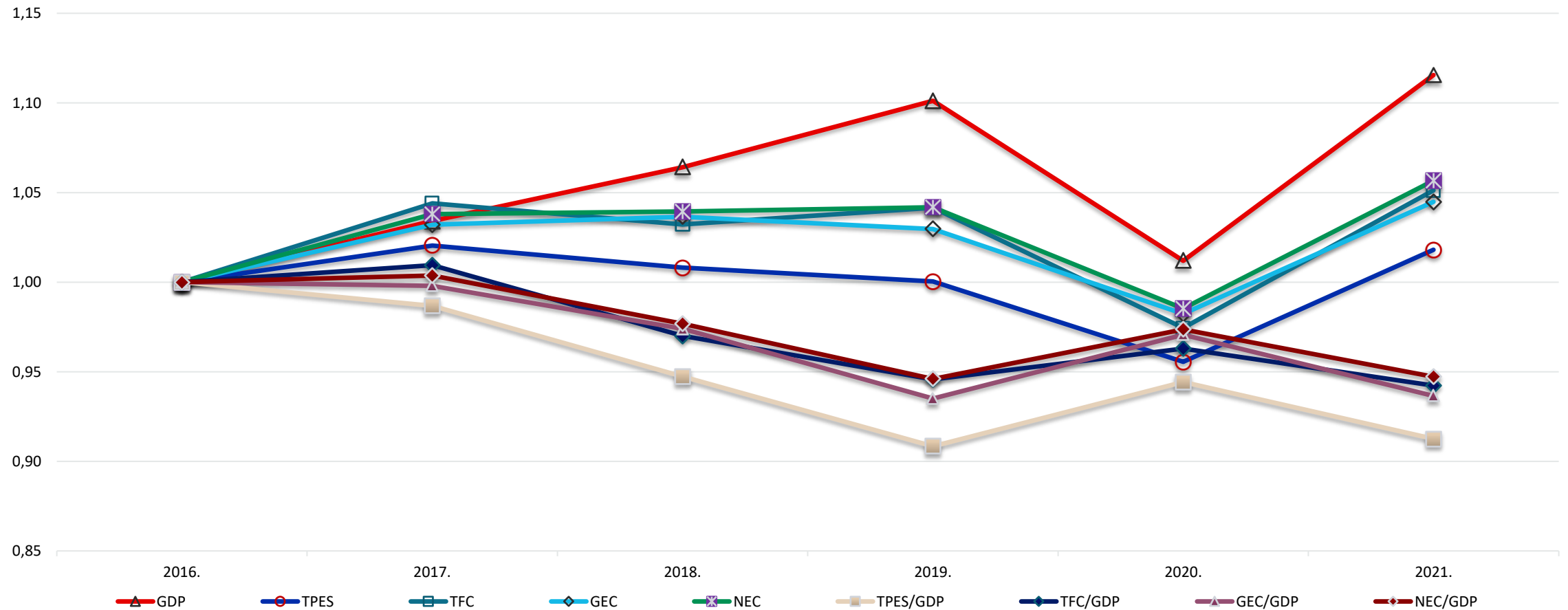
- GDP – Real growth rates (%), 2010 – 2021
- Main development indicators
- Total primary energy supply
- Electricity consumption
- GDP per capita – PPP
- Total primary energy supply intensity – PPP
- Gross consumption electricity intensity – PPP
- Total primary energy supply per capita
- Primary energy self-supply in Croatia
- Electricity consumption by sector
- Gross electricity consumption per capita



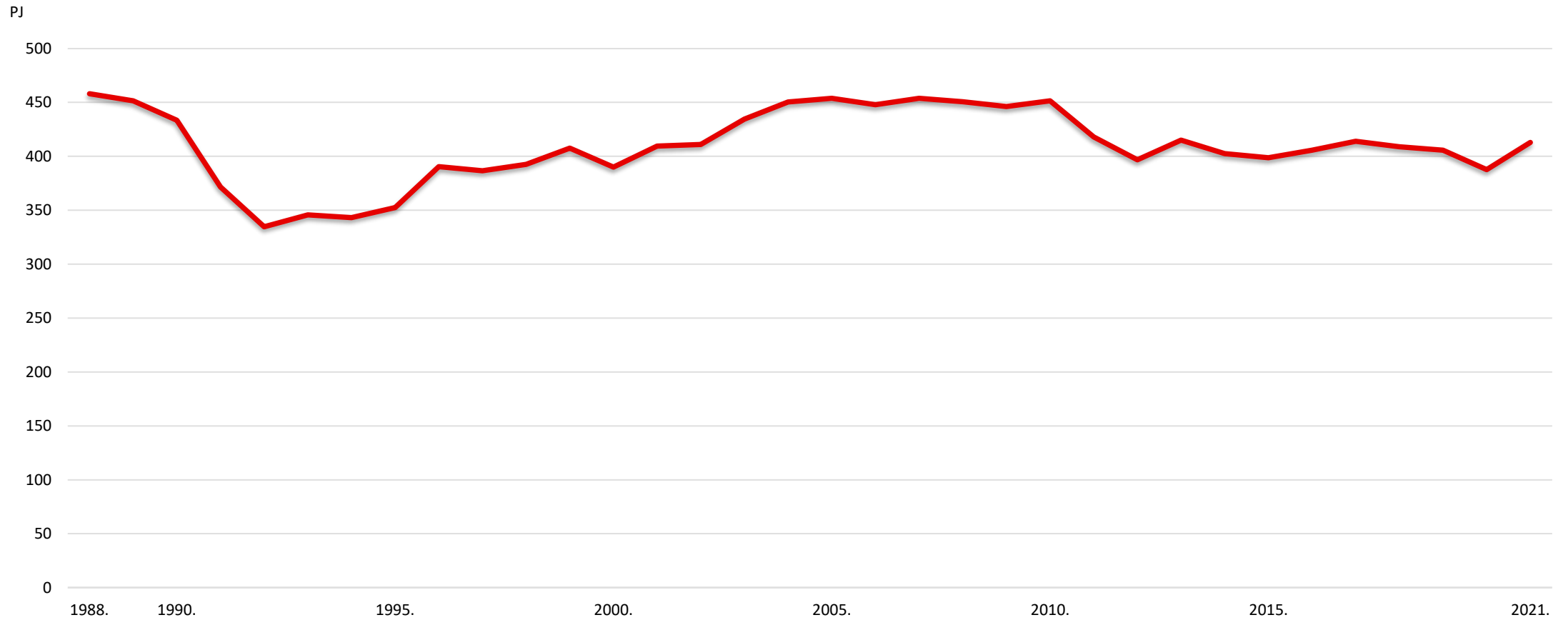
# GDP – Real growth rates (%), 2010 – 2021



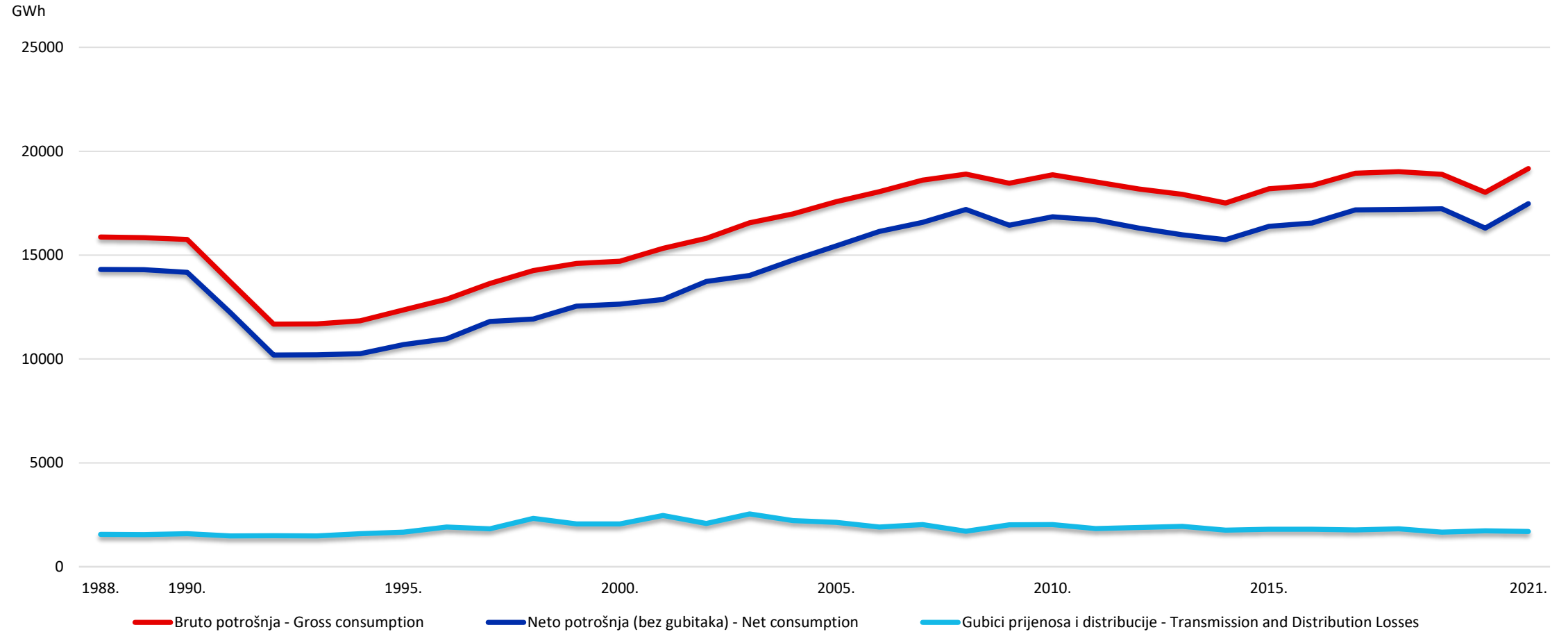
# Main development indicators



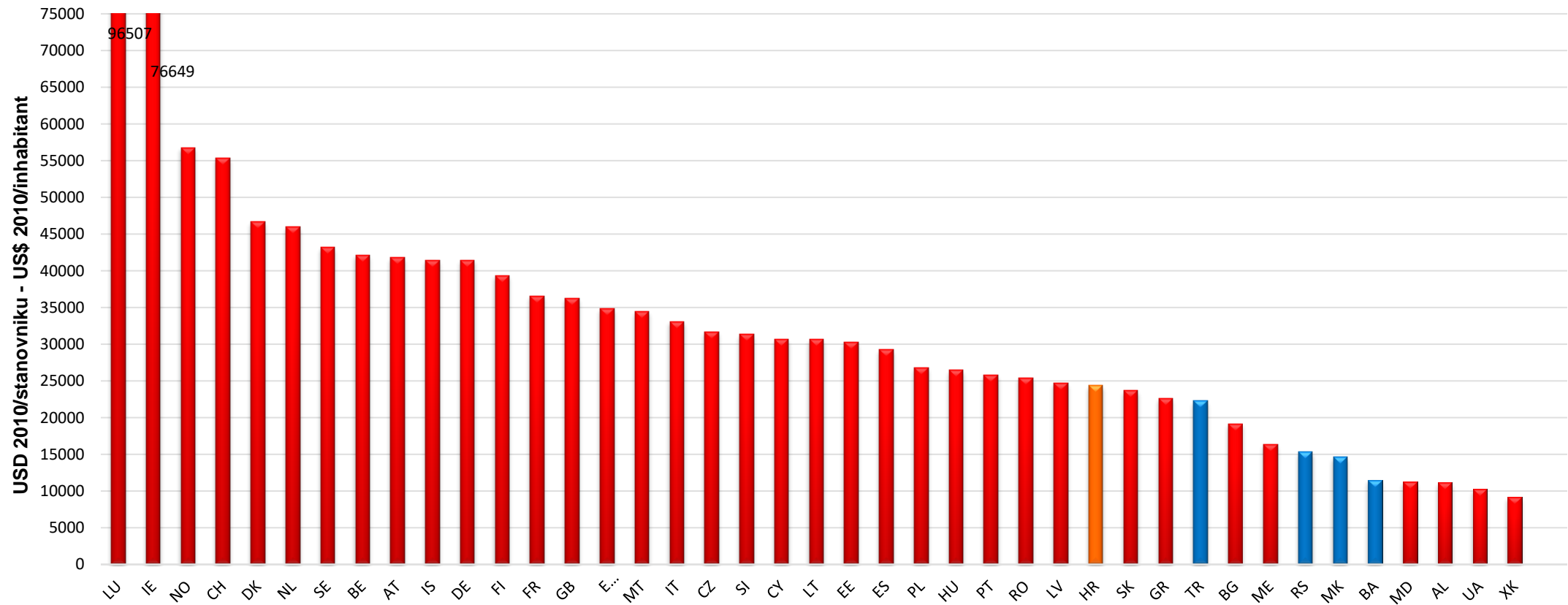
# Total primary energy supply



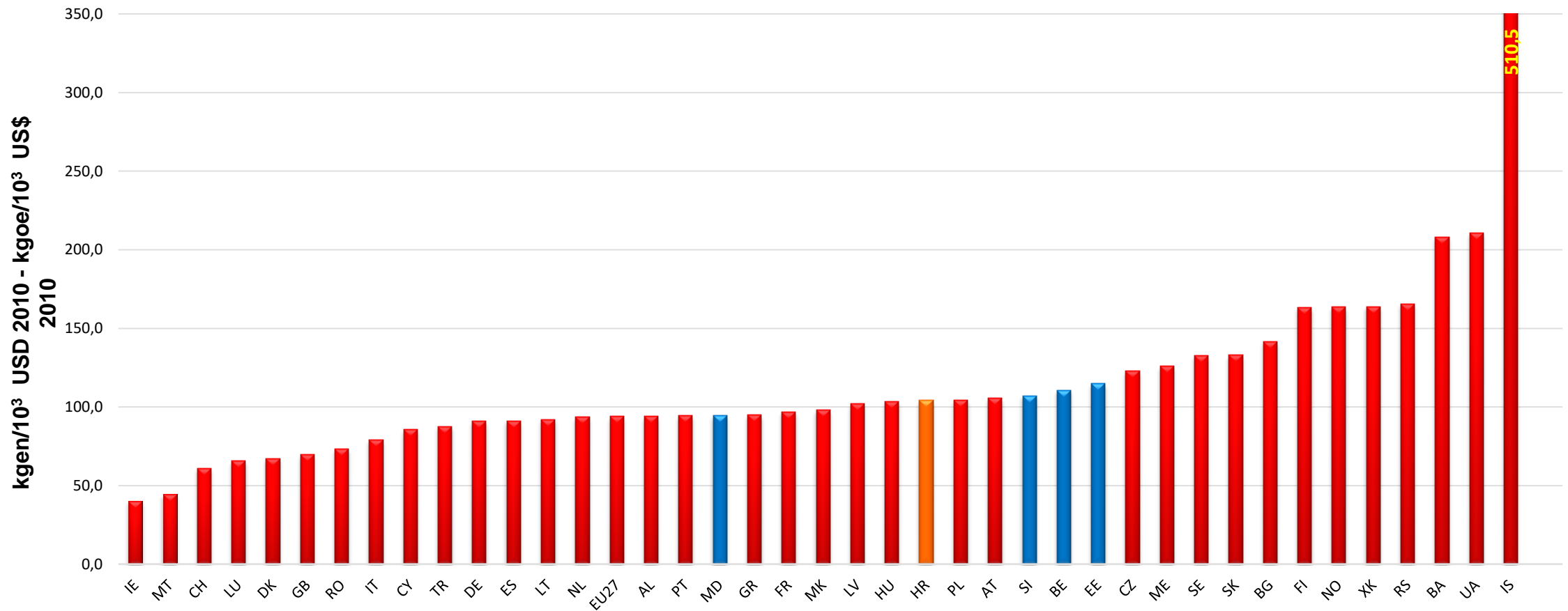
# Electricity consumption



# GDP per capita – PPP

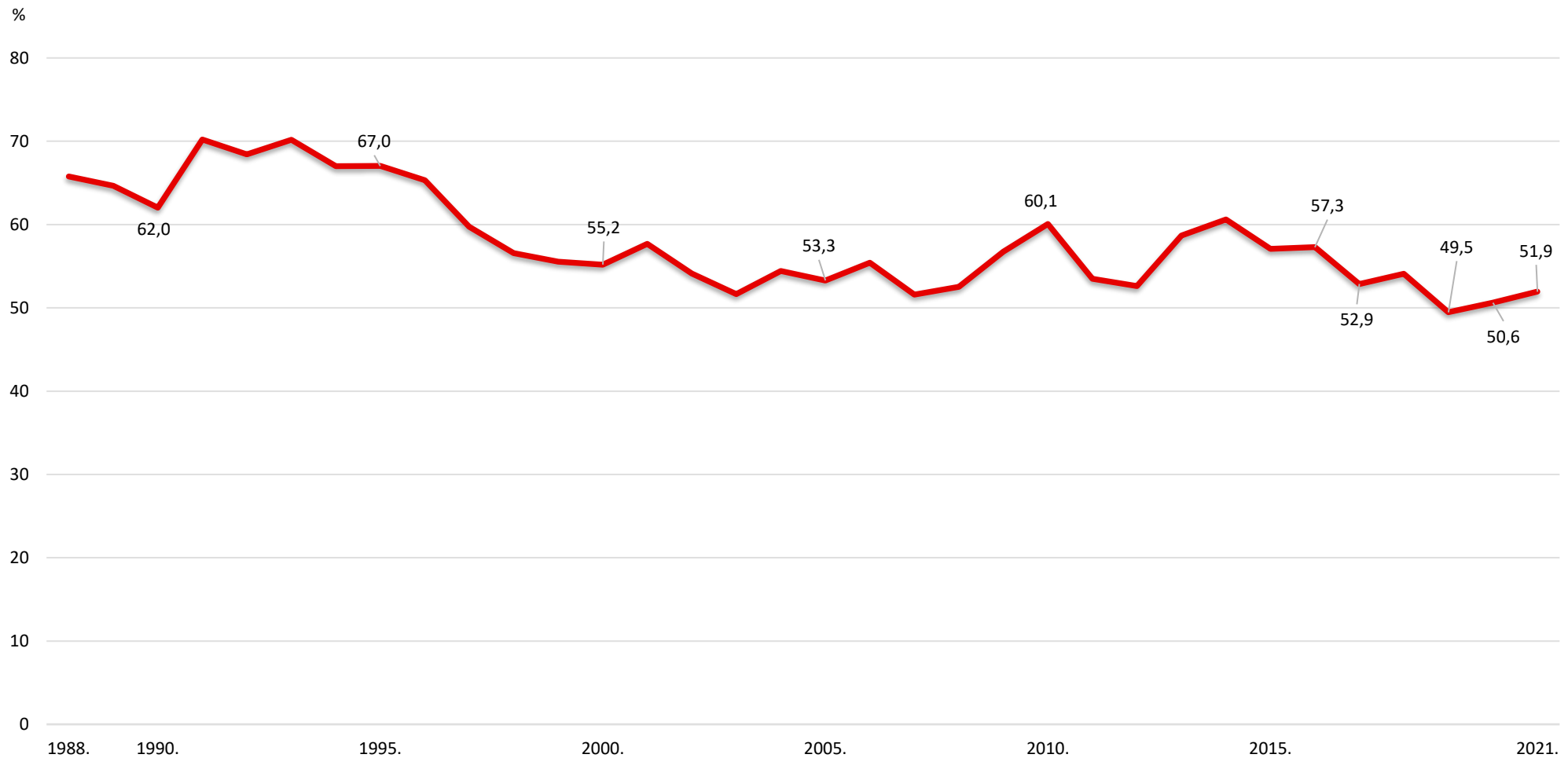


# Total primary energy supply intensity – PPP

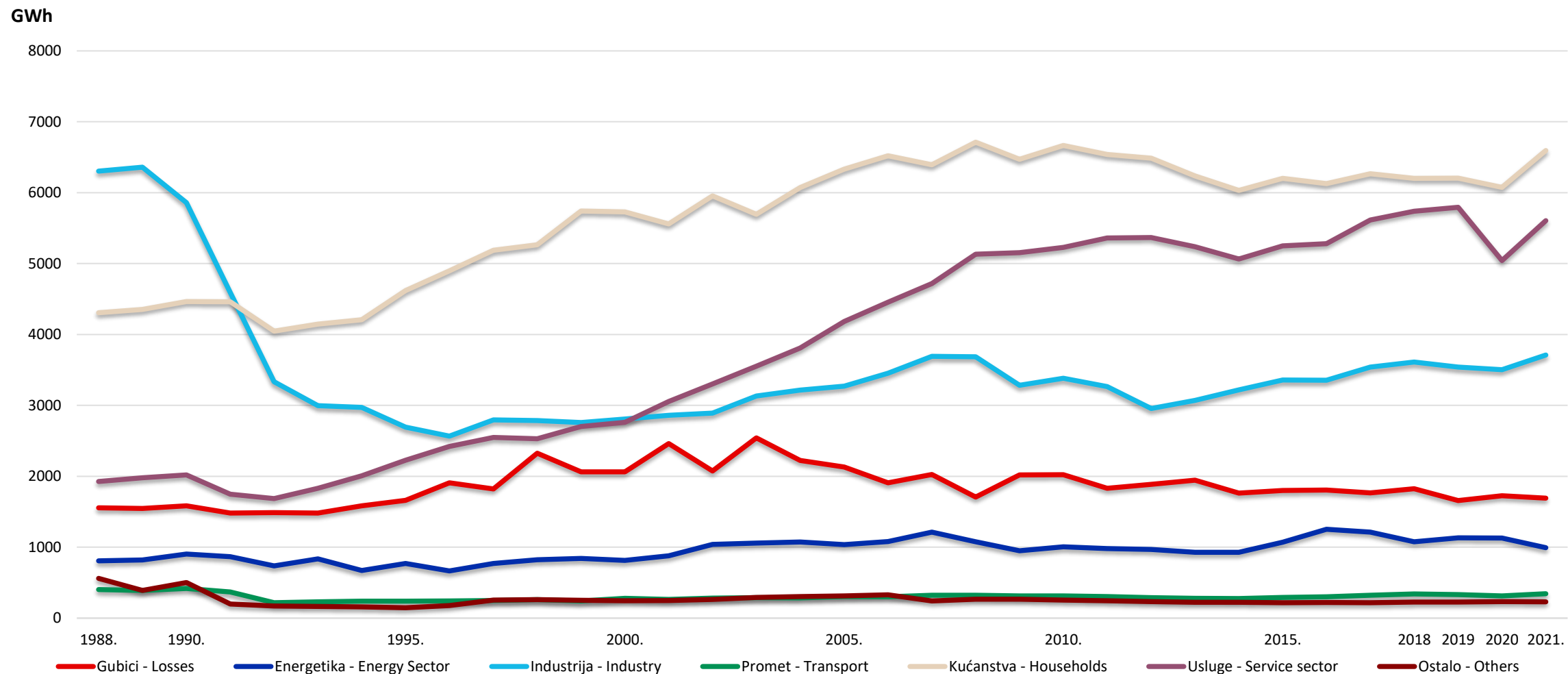




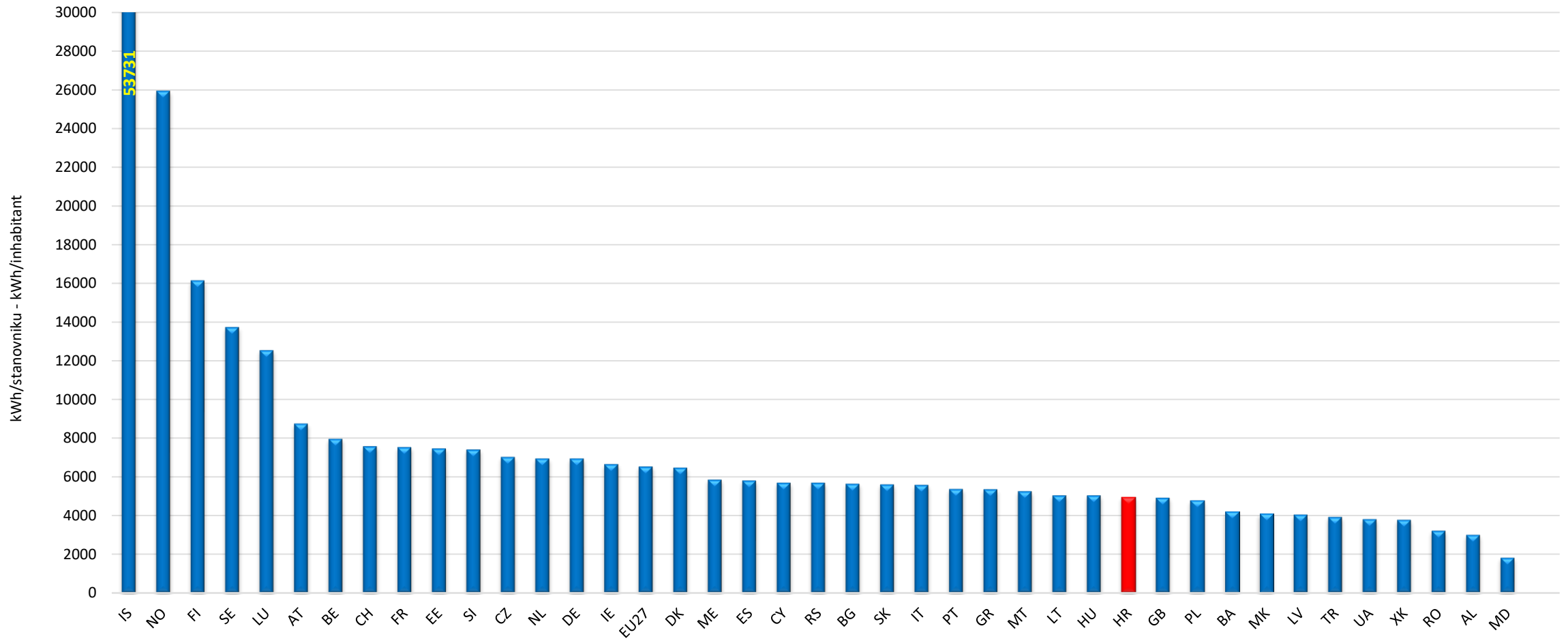
# Primary energy self-supply in Croatia



# Electricity consumption by sector

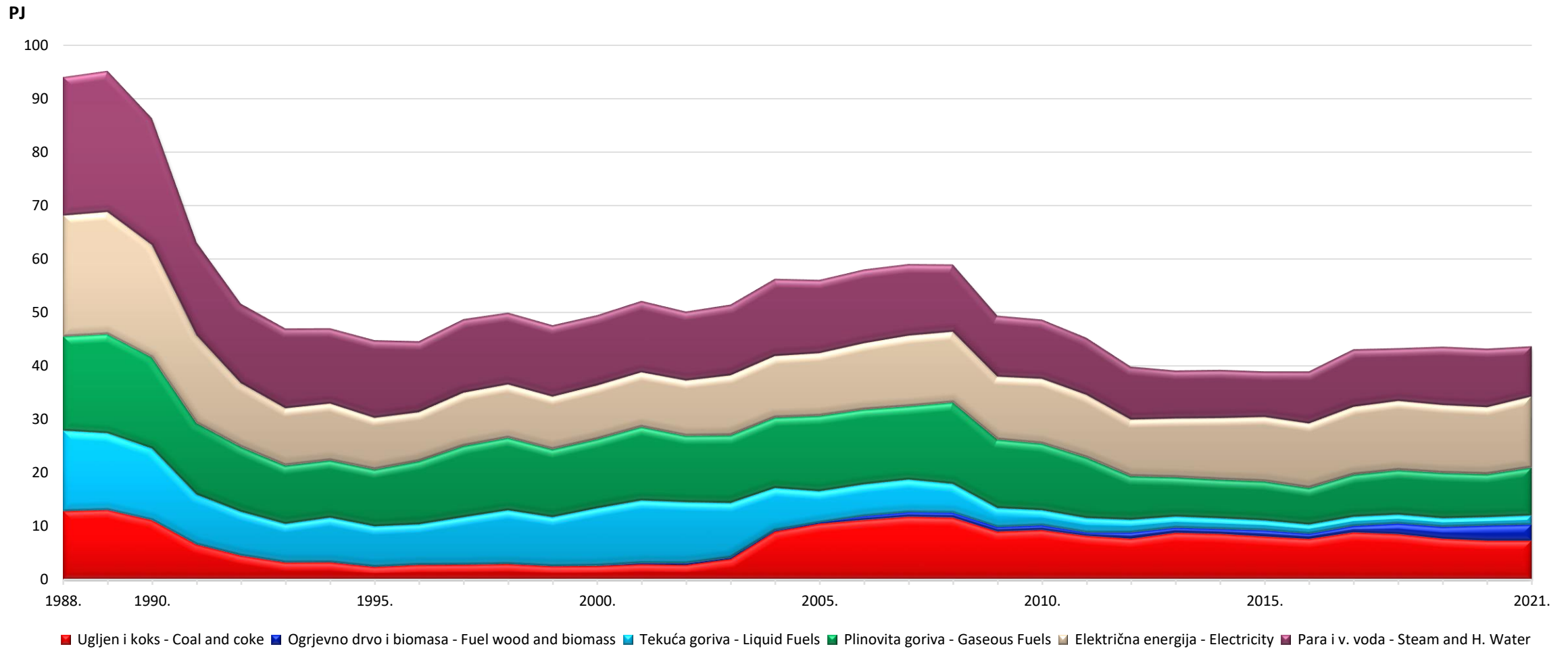


# Gross electricity consumption per capita



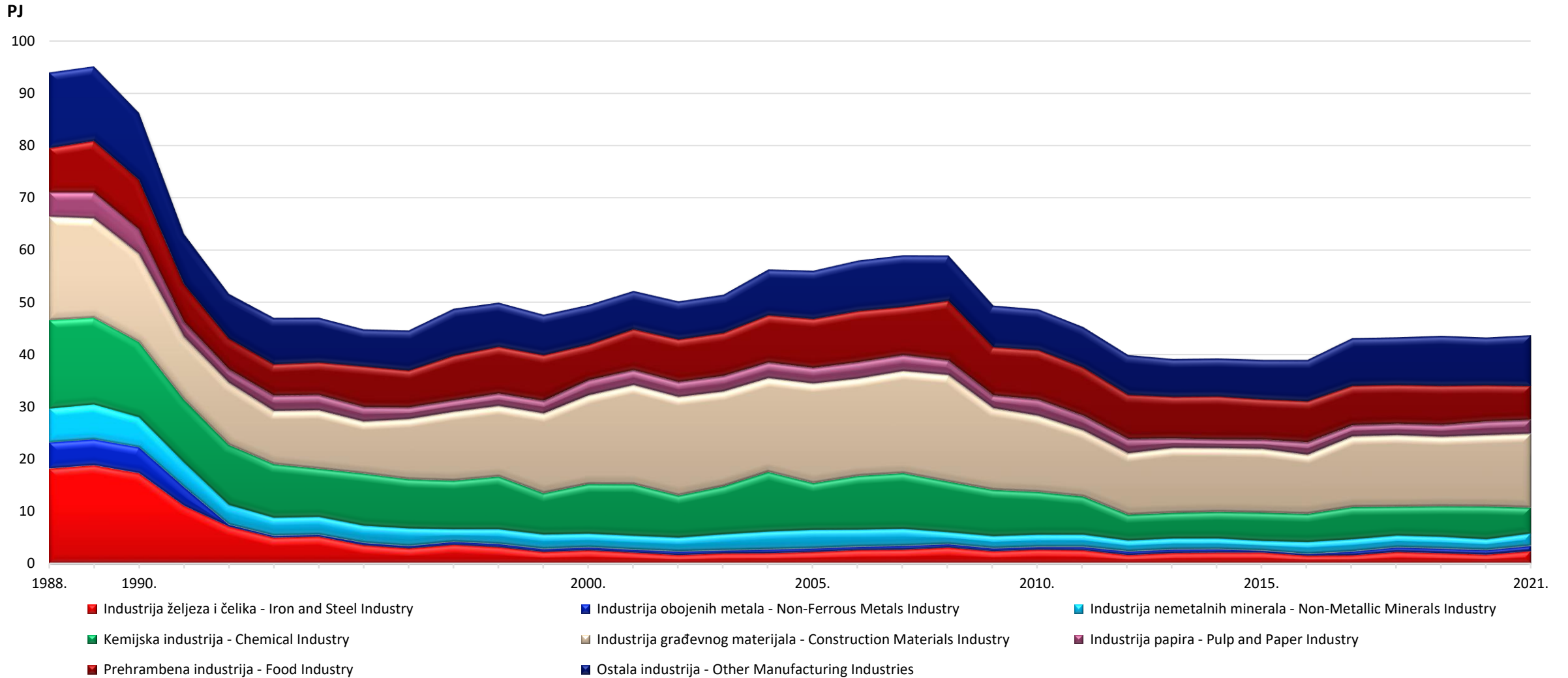
# Industry

- Final energy consumption in industry by energy form



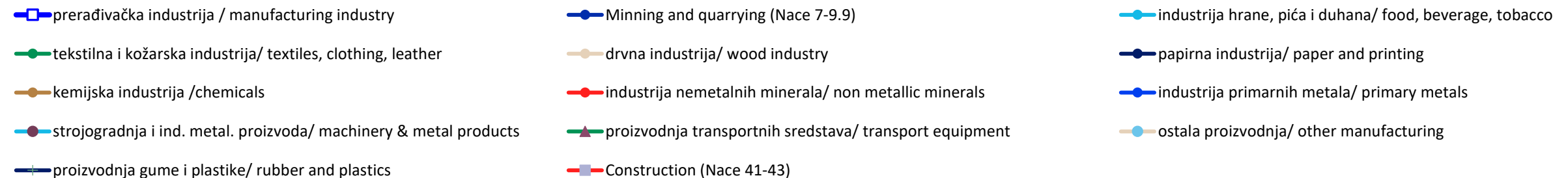
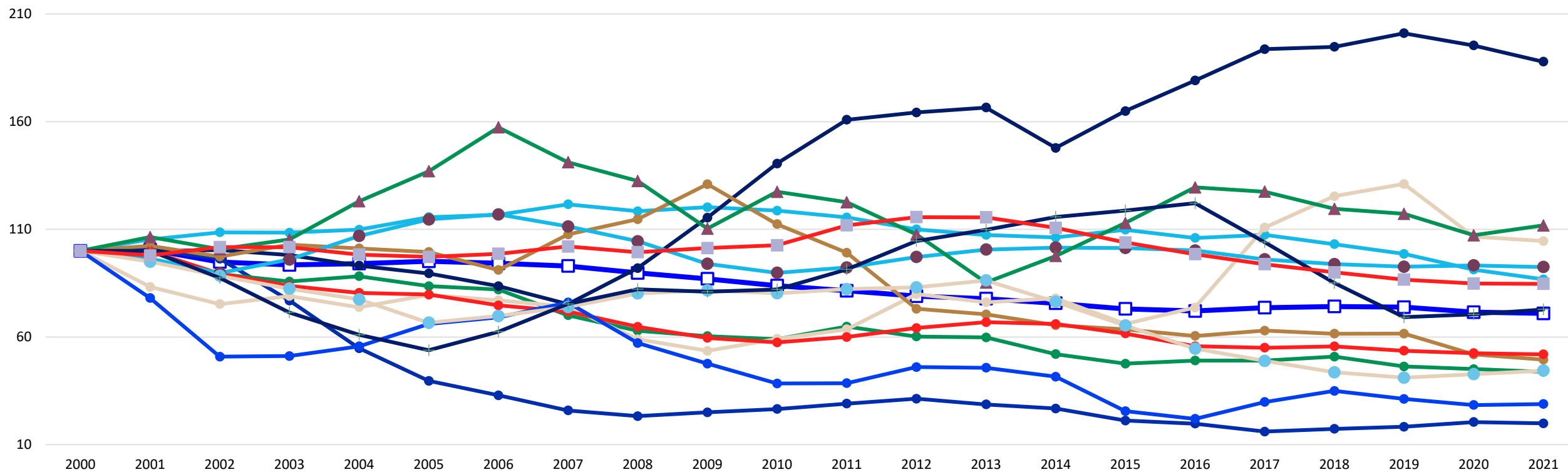
# Industry

- Final energy consumption by the industrial sector



# Industry

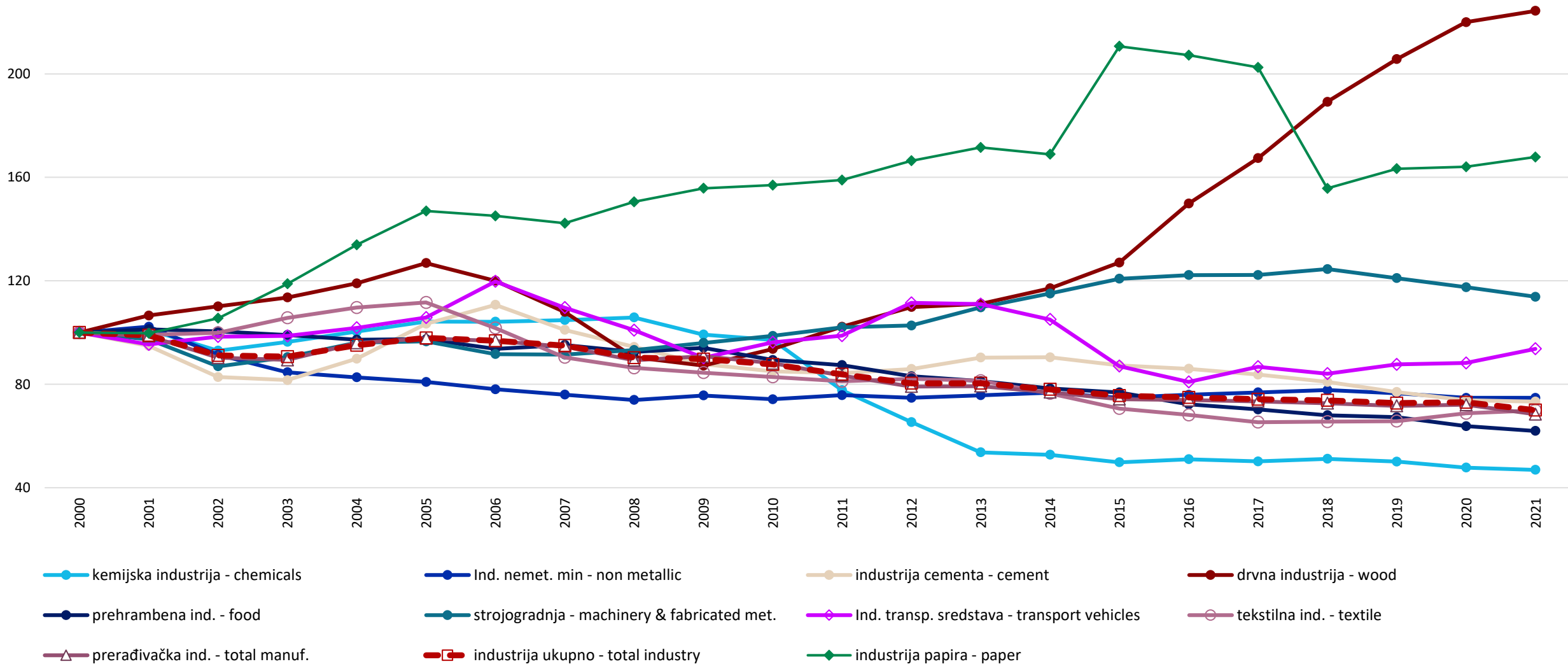
- Energy intensities of manufacturing industry branches, 2000 – 2021





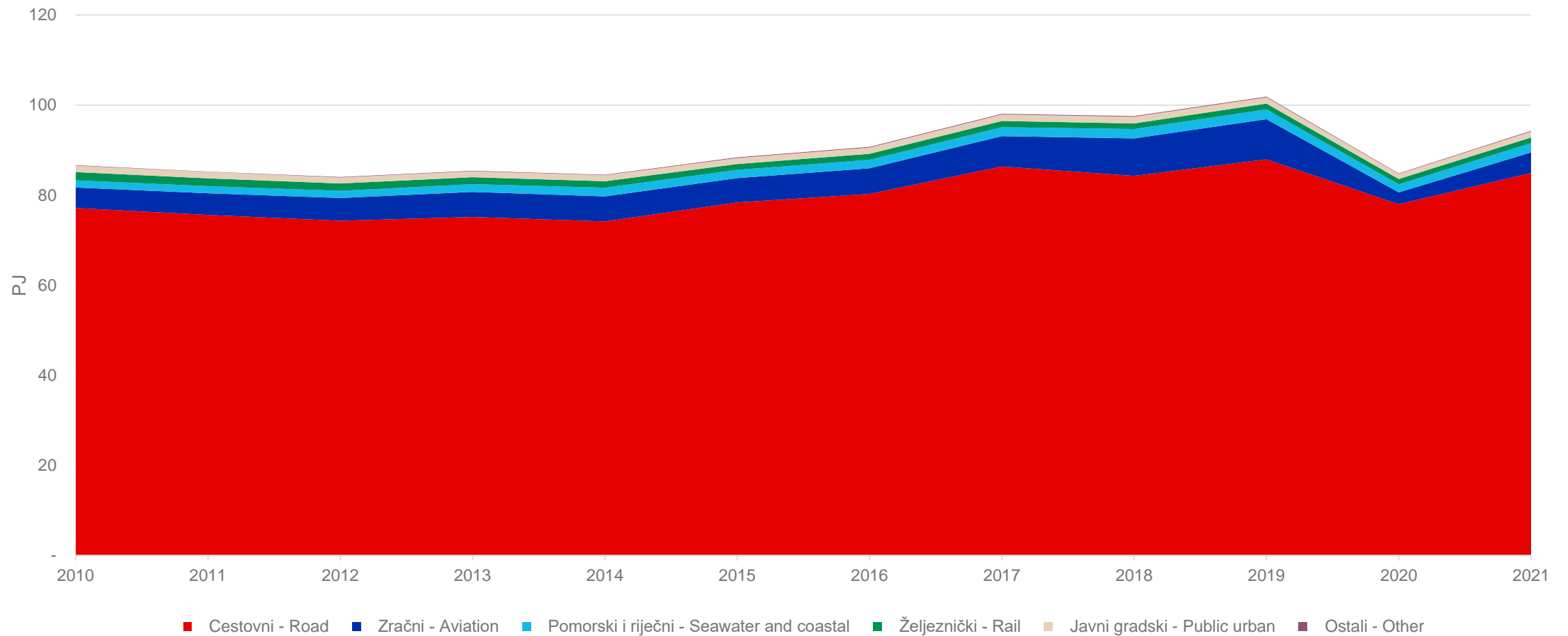
# Industry

- Energy efficiency index ODEX for the industry, 2000 – 2021



# Transport

- Structure of energy consumption in the transport sector



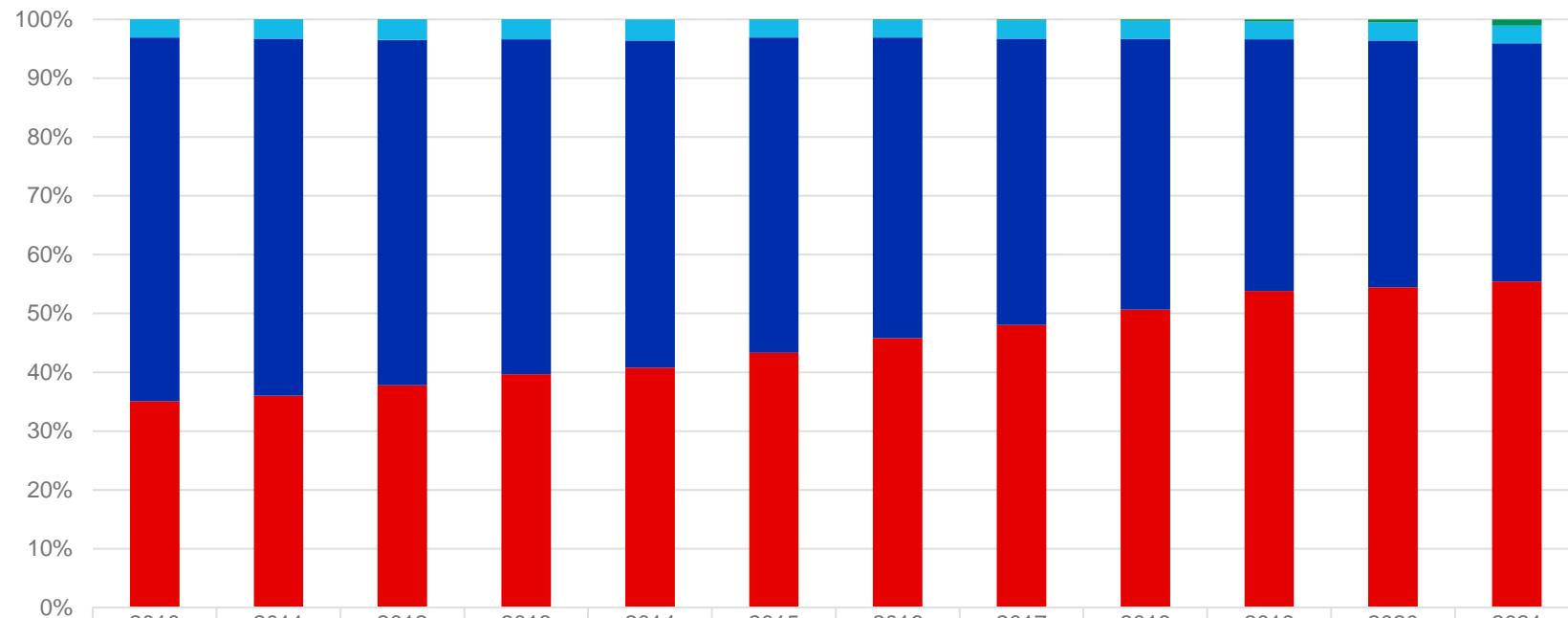
# Transport

- Structure of energy consumption in road transport in 2021



# Transport

- Structure of passenger cars by type of fuel

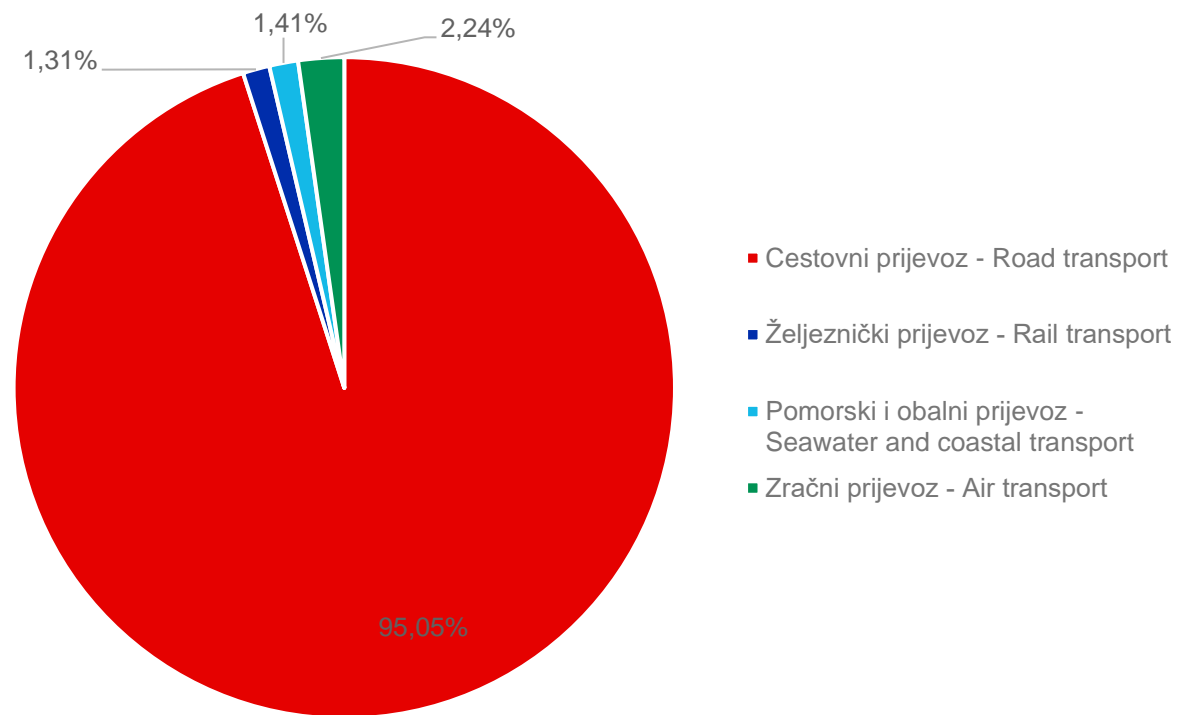
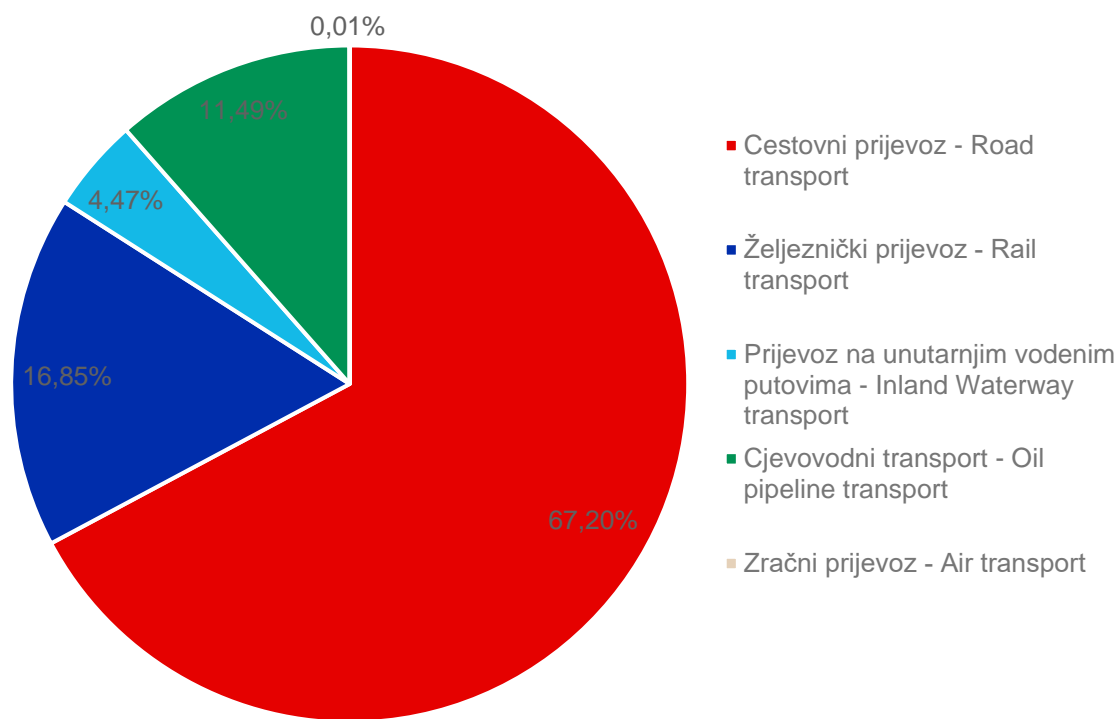


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
■ Ostali / Other	0,0%	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%	0,2%	0,2%	0,4%	0,5%	1,1%
■ UNP automobili / LPG cars	3,1%	3,3%	3,5%	3,3%	3,5%	3,0%	3,0%	3,1%	3,1%	3,0%	3,1%	3,0%
■ Benzinski automobili / Gasoline cars	61,8%	60,7%	58,7%	57,0%	55,6%	53,6%	51,1%	48,7%	46,0%	42,8%	41,9%	40,5%
■ Dizelski automobili / Diesel cars	35,1%	36,0%	37,8%	39,7%	40,8%	43,3%	45,8%	48,1%	50,6%	53,8%	54,4%	55,4%

■ Dizelski automobili / Diesel cars    
 ■ Benzinski automobili / Gasoline cars    
 ■ UNP automobili / LPG cars    
 ■ Ostali / Other

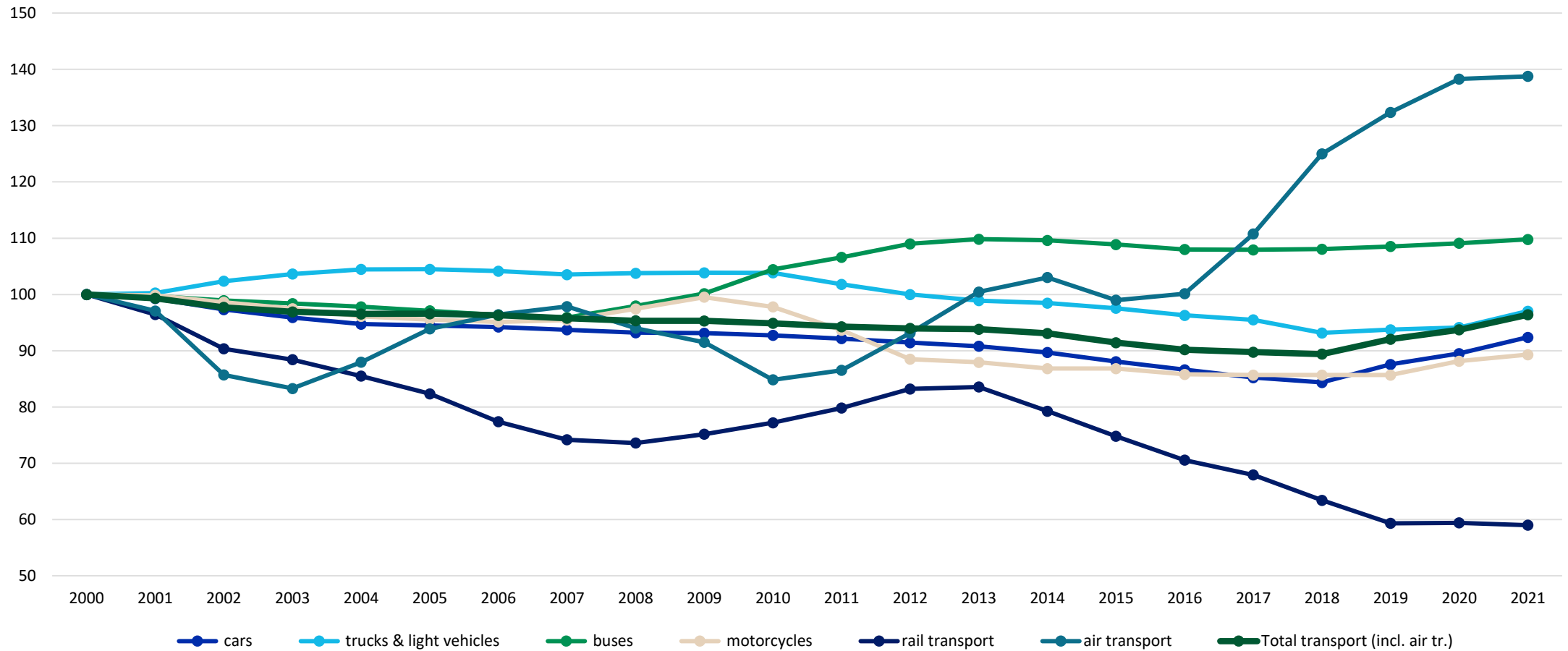
# Transport

- Modal structure of tonne and passenger kilometres in 2021



# Transport

- ODEX for transport, 2000 – 2021





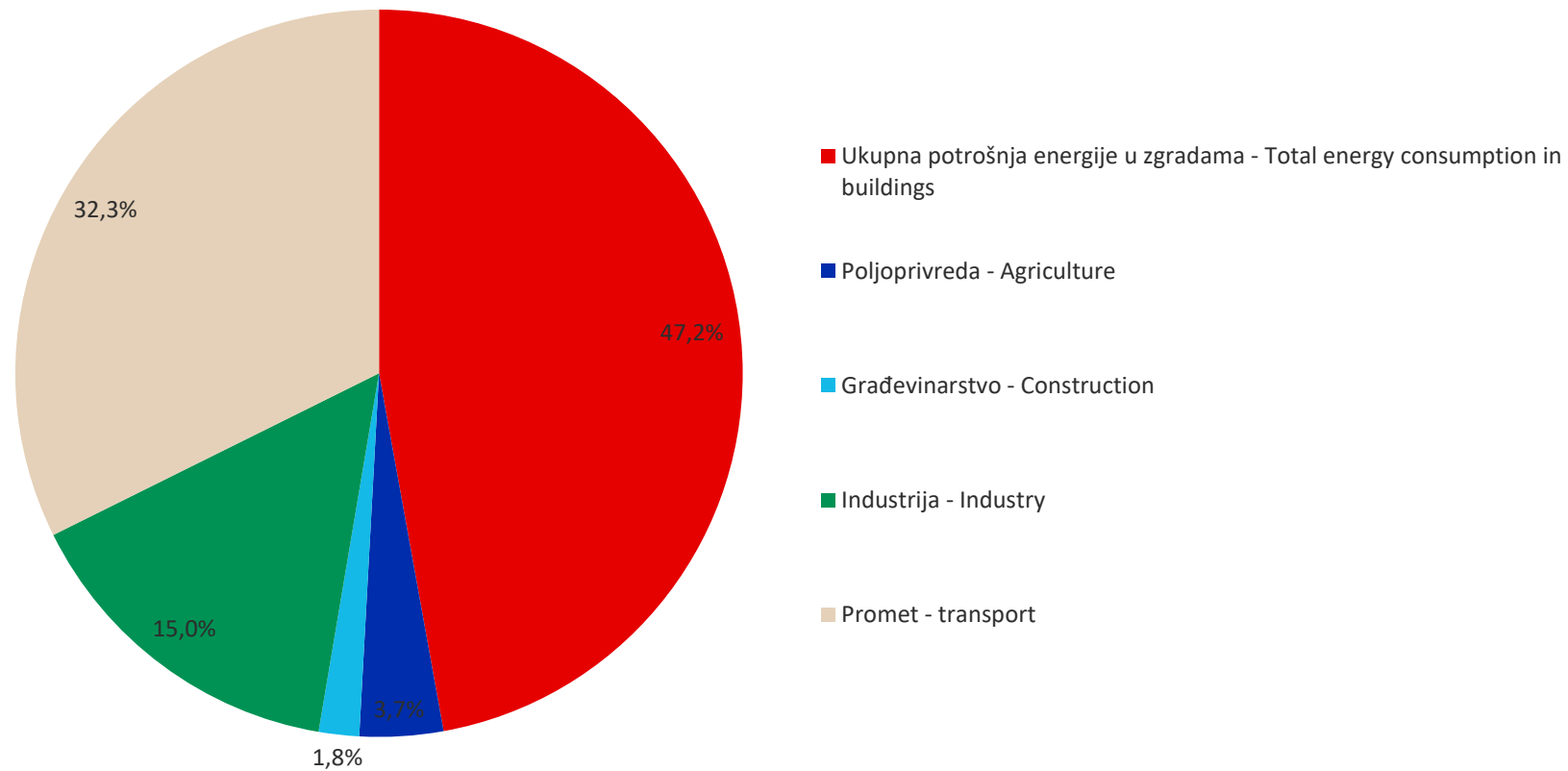
# Buildings

- Total useful heated area of the buildings

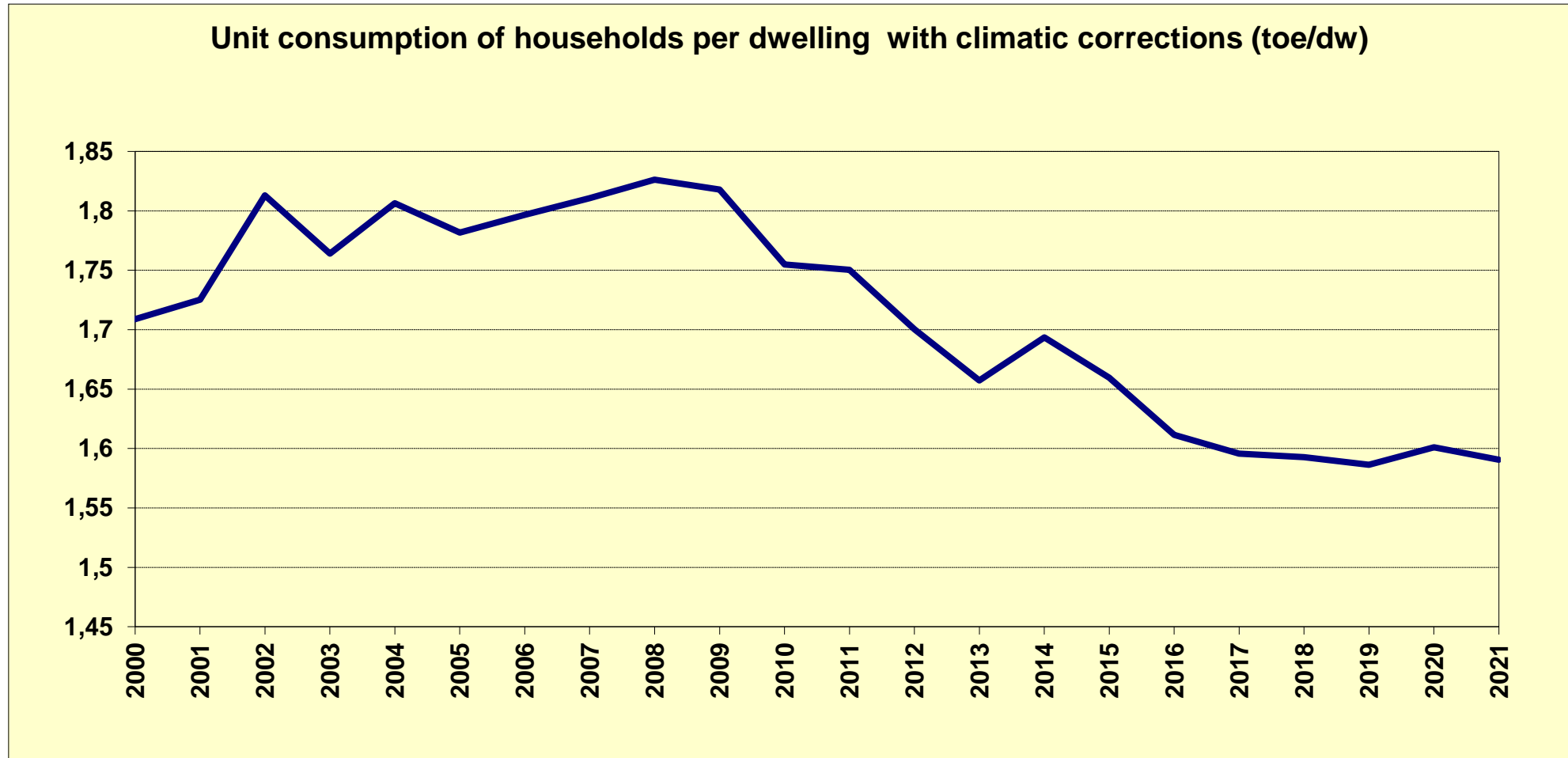
Vrsta zgrade / Building type	Ukupna ploština korisne površine grijanog dijela zgrada / Total useful heated area (m <sup>2</sup> )	Udio u ukupnom fondu zgrada / Share in total building stock (%)
<b>Stambene zgrade / Residential buildings</b>	130 482 936	76,92
<b>Obiteljske kuće / Single family buildings</b>	84 107 893	49,58
<b>Višestambene zgrade / Multiapartment buildings</b>	46 375 043	27,34
<b>Nestambene zgrade / Non-residential buildings</b>	39 140 794	23,08
<b>UKUPNO / TOTAL</b>	<b>169 623 730</b>	<b>100</b>

# Buildings

- Share of total consumption in buildings in final energy consumption in 2021

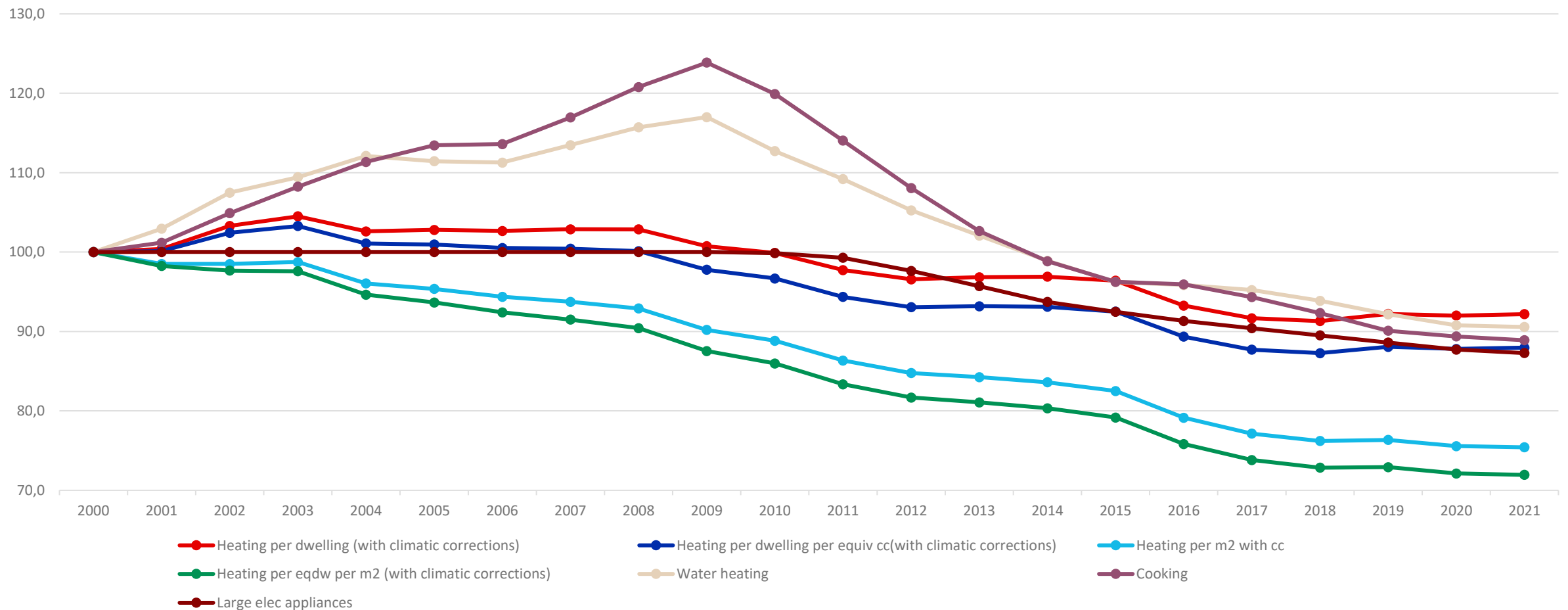


# Households



# Households

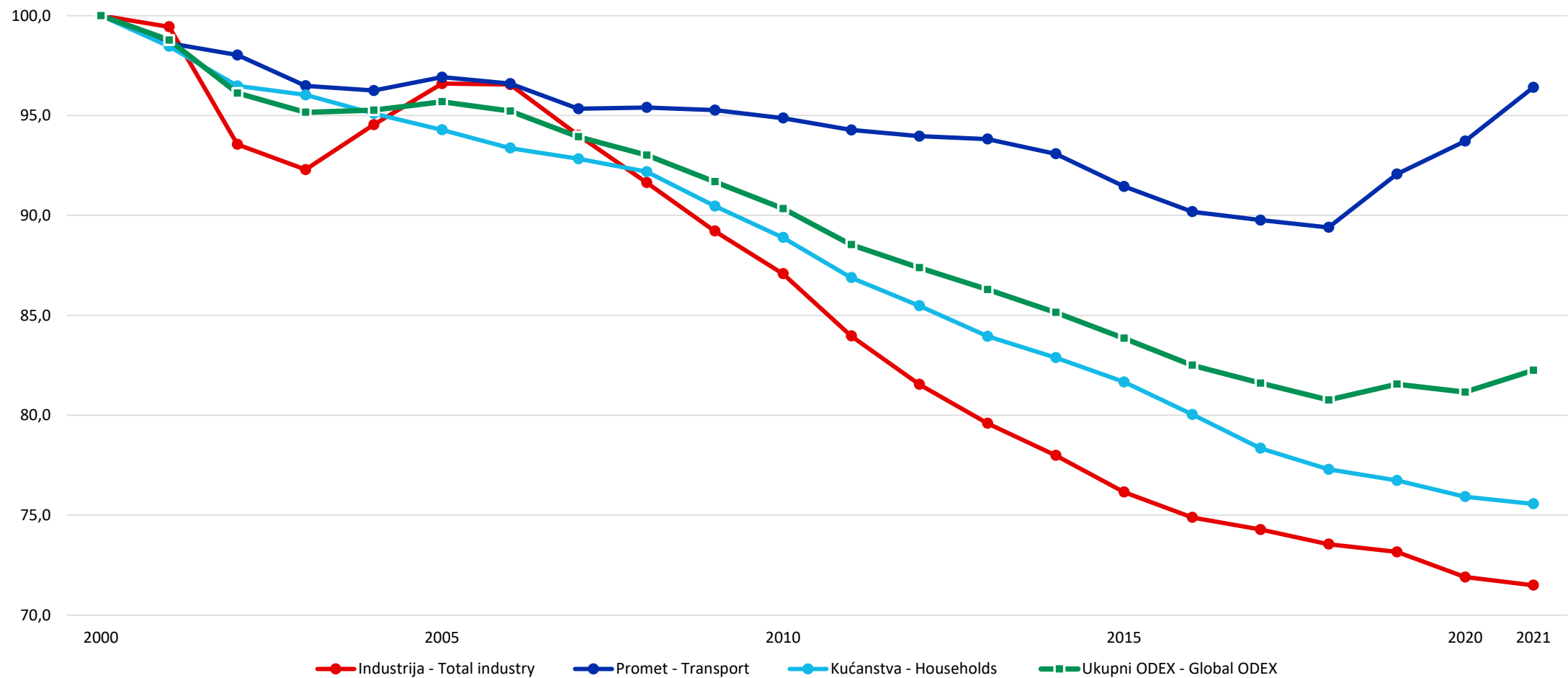
- ODEX for households, 2000 – 2021



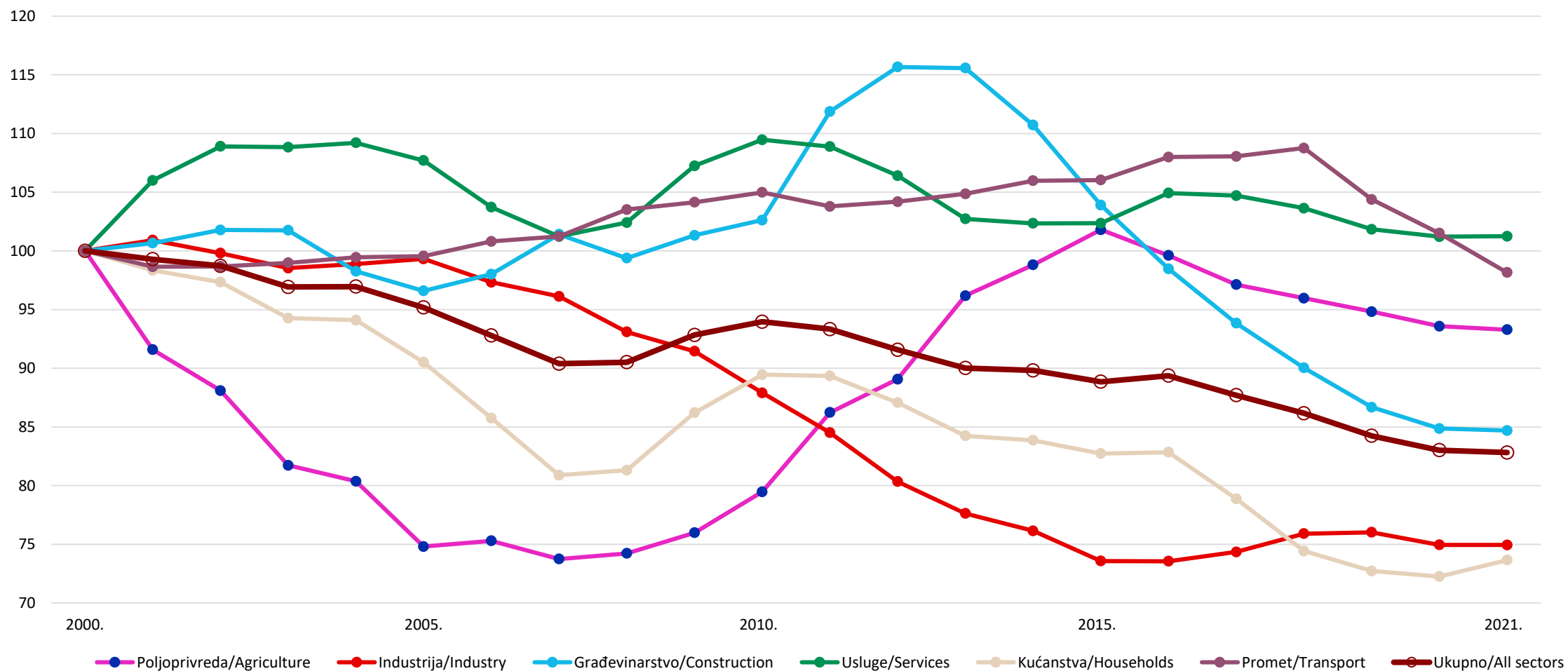
# Energy efficiency – Indices and trends – Total



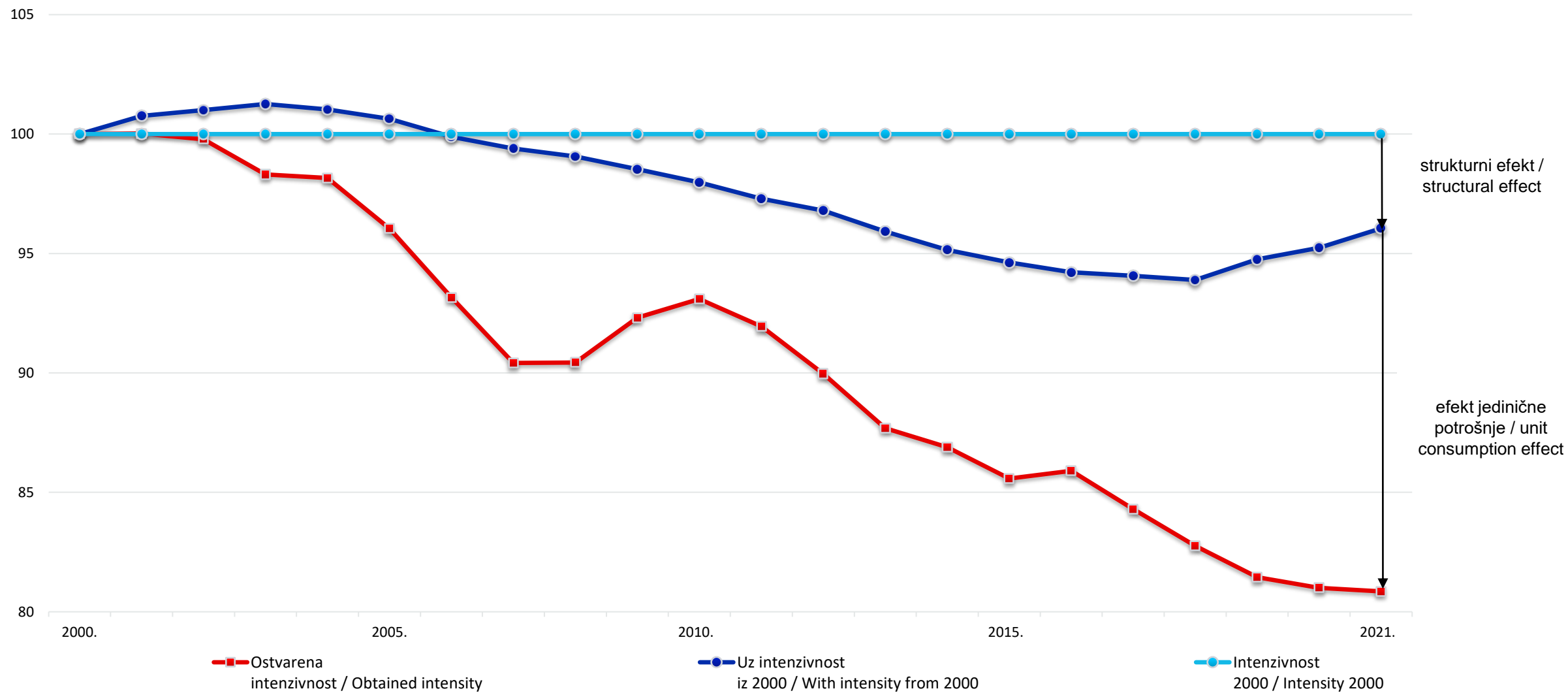
# Energy efficiency index ODEX, 2000 - 2021



# Energy intensity indices, 2000 - 2021



# Energy intensity and structural macroeconomic effect, 2000 - 2021



# Conclusion

- importance of:
  - collecting data, as well as calculating the ratios
  - energy efficiency indicators
  - Odyssee Mure project (databases)
- results for decision makers and actors involved in energy efficiency, and in energy sector as a whole in a strategy making process

# Thank you!



**Energy Institute  
Hrvoje Požar**

Savska cesta 163  
10000 Zagreb  
Croatia

**Vlatka Kos Grabar Robina**

Senior researcher  
Department for energy and climate planning

**m:** +385 99 532 6277

**e:** [vrobina@eihp.hr](mailto:vrobina@eihp.hr)

**w:** [www.eihp.hr](http://www.eihp.hr)