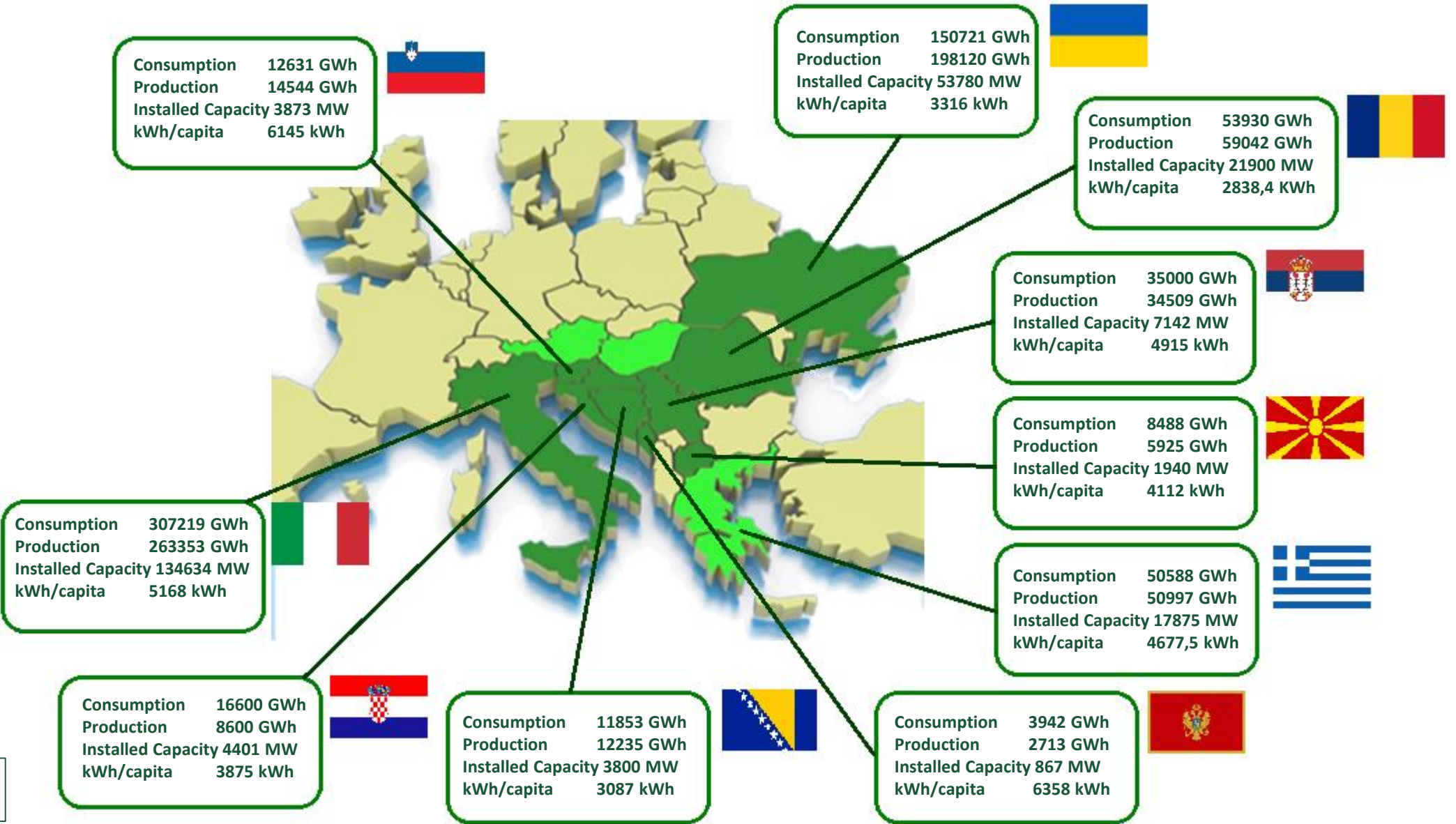


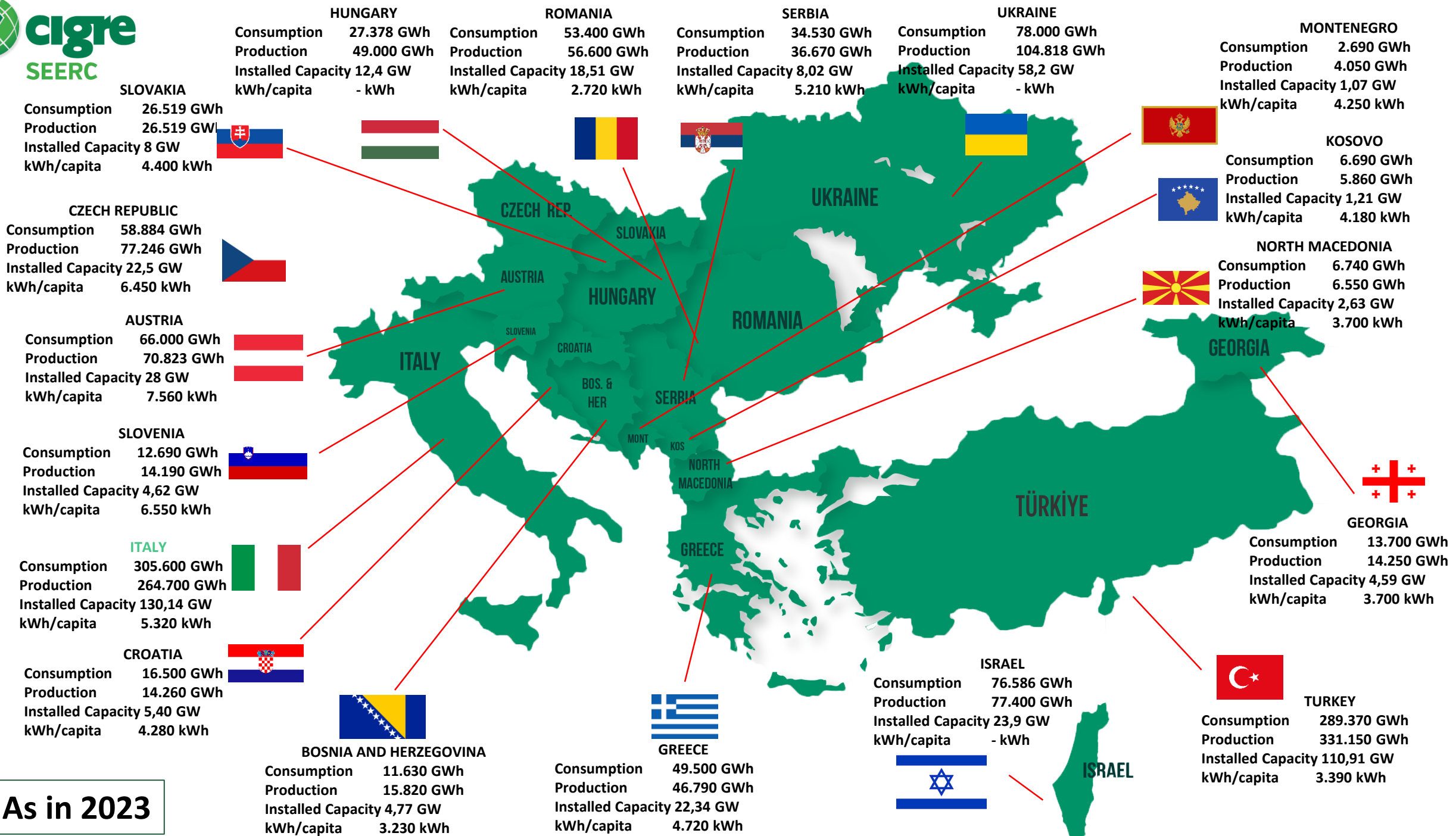


# 2024 Questionnaire Preliminary Results **cigre** SEERC

Massimo Pompili, University of Roma La Sapienza



As in 2012

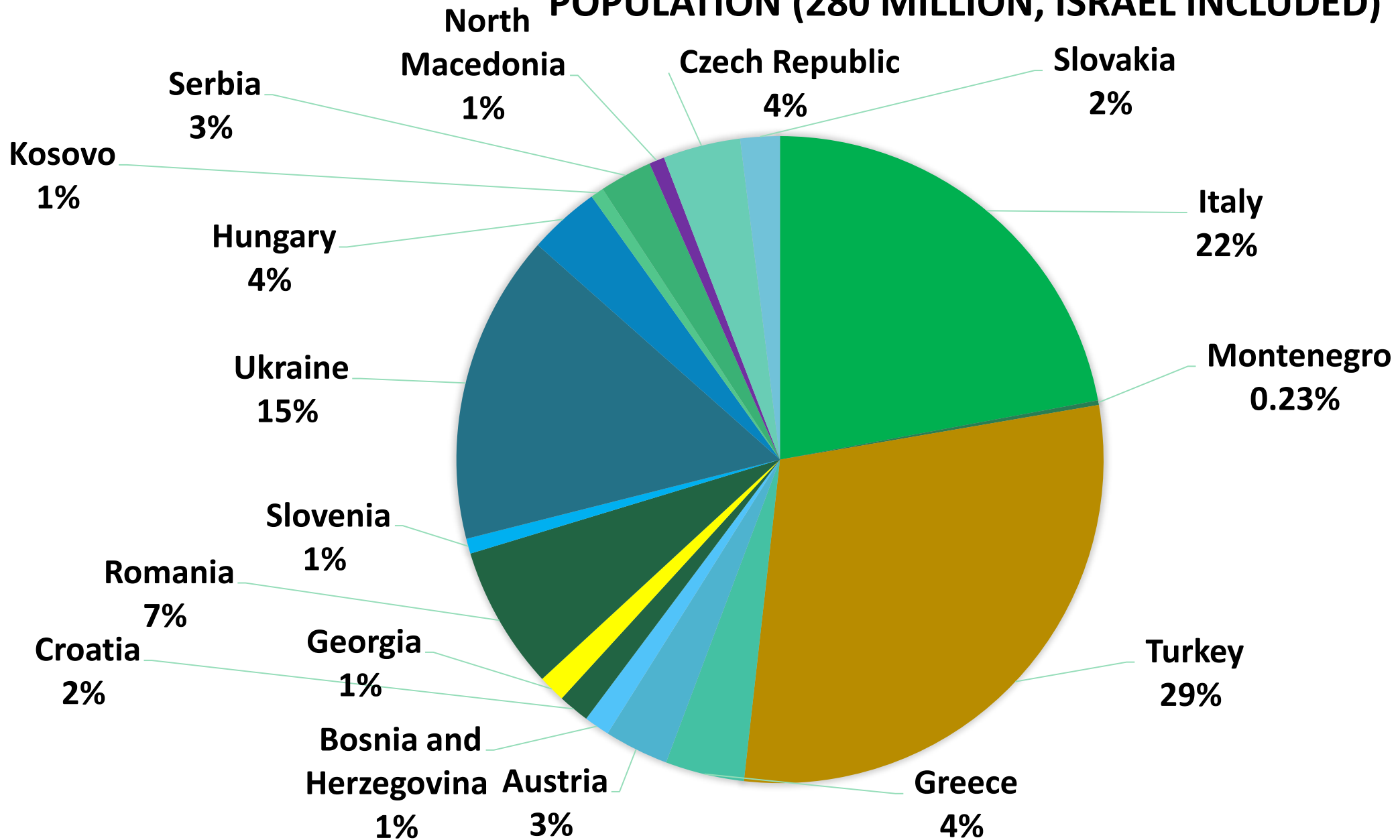


**As in 2023**

# Reiceived 2024 Questionnaire Results

	<u>NC</u>	<u>Status</u>
1.	Austria	<input type="checkbox"/>
2.	<b>Bosnia and Herzegovina</b>	<input checked="" type="checkbox"/>
3.	<b>Croatia</b>	<input checked="" type="checkbox"/>
4.	Czech R. /Slovakia	<input type="checkbox"/>
5.	<b>Georgia</b>	<input checked="" type="checkbox"/>
6.	<b>Greece</b>	<input checked="" type="checkbox"/>
7.	Hungary	<input type="checkbox"/>
8.	<b>Israel</b>	<input checked="" type="checkbox"/>
9.	<b>Italy</b>	<input checked="" type="checkbox"/>
10.	<b>Kosovo</b>	<input checked="" type="checkbox"/>
11.	<b>North Macedonia</b>	<input checked="" type="checkbox"/>
12.	<b>Montenegro</b>	<input checked="" type="checkbox"/>
13.	<b>Romania</b>	<input checked="" type="checkbox"/>
14.	<b>Serbia</b>	<input checked="" type="checkbox"/>
15.	<b>Slovenia</b>	<input checked="" type="checkbox"/>
16.	<b>Turkey</b>	<input checked="" type="checkbox"/>
17.	Ukraine	<input type="checkbox"/>

# POPULATION (280 MILLION, ISRAEL INCLUDED)



# Climate change and energy transition

## 2030 climate and energy framework - existing ambition

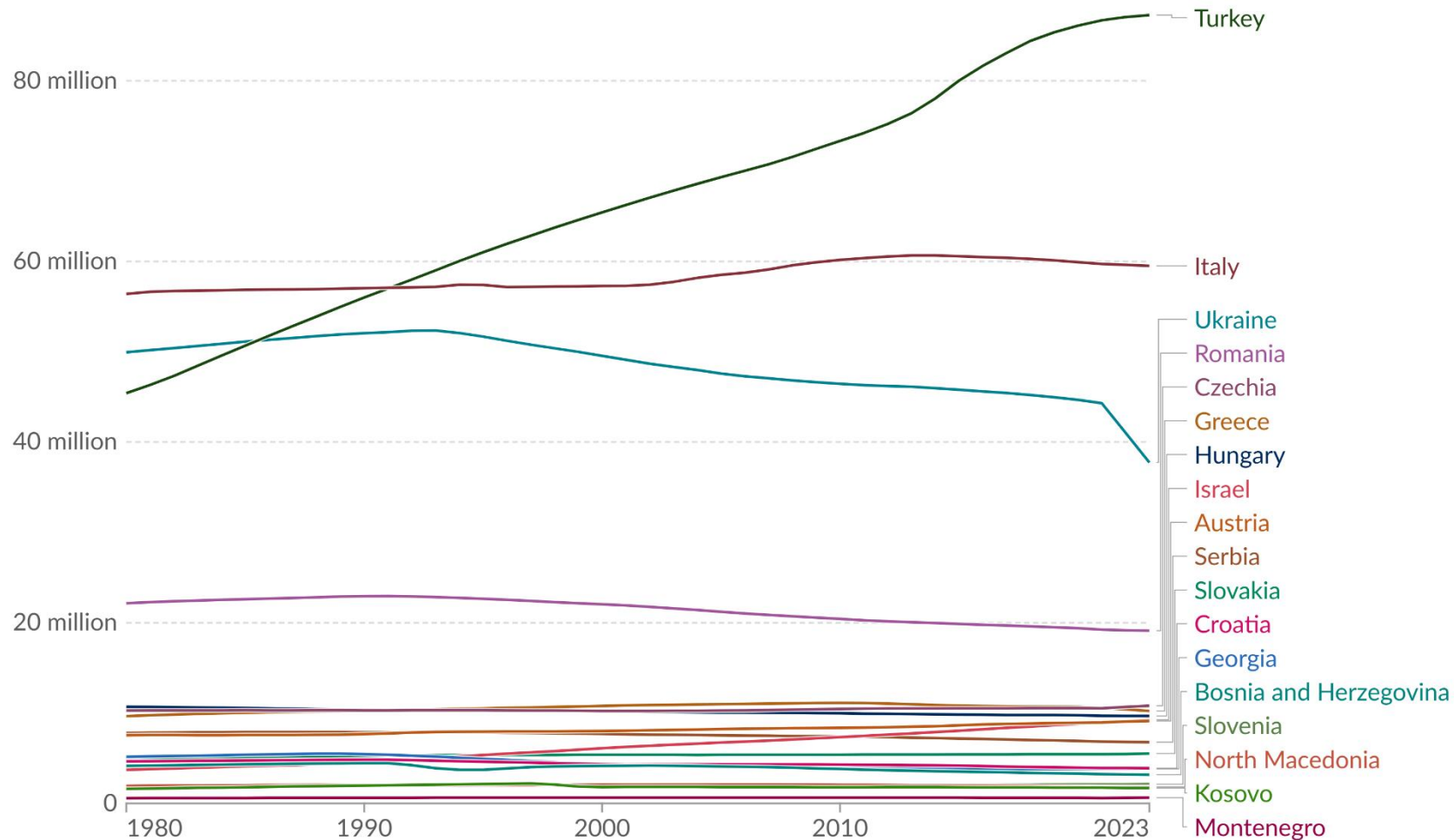
Key targets for 2030:

- At least 40% cuts in **greenhouse gas emissions** (from 1990 levels)
- At least 32% share for [renewable energy](#)
- At least 32.5% improvement in [energy efficiency](#)
- The 40% greenhouse gas target is implemented by the [EU Emissions Trading System](#) the [Effort Sharing Regulation](#) with Member States' emissions reduction targets and the [Land use, land use change and forestry Regulation](#)

In this way, all sectors will contribute to the achievement of the 40% target by both reducing emissions and increasing removals.

All three pieces of climate legislation will now be updated with a view to implement the proposed at least 55% net greenhouse gas emissions reduction target. The Commission will come forward with the proposals by July 2021.

# General Outlook – Population 1980 to 2023 (WB data)

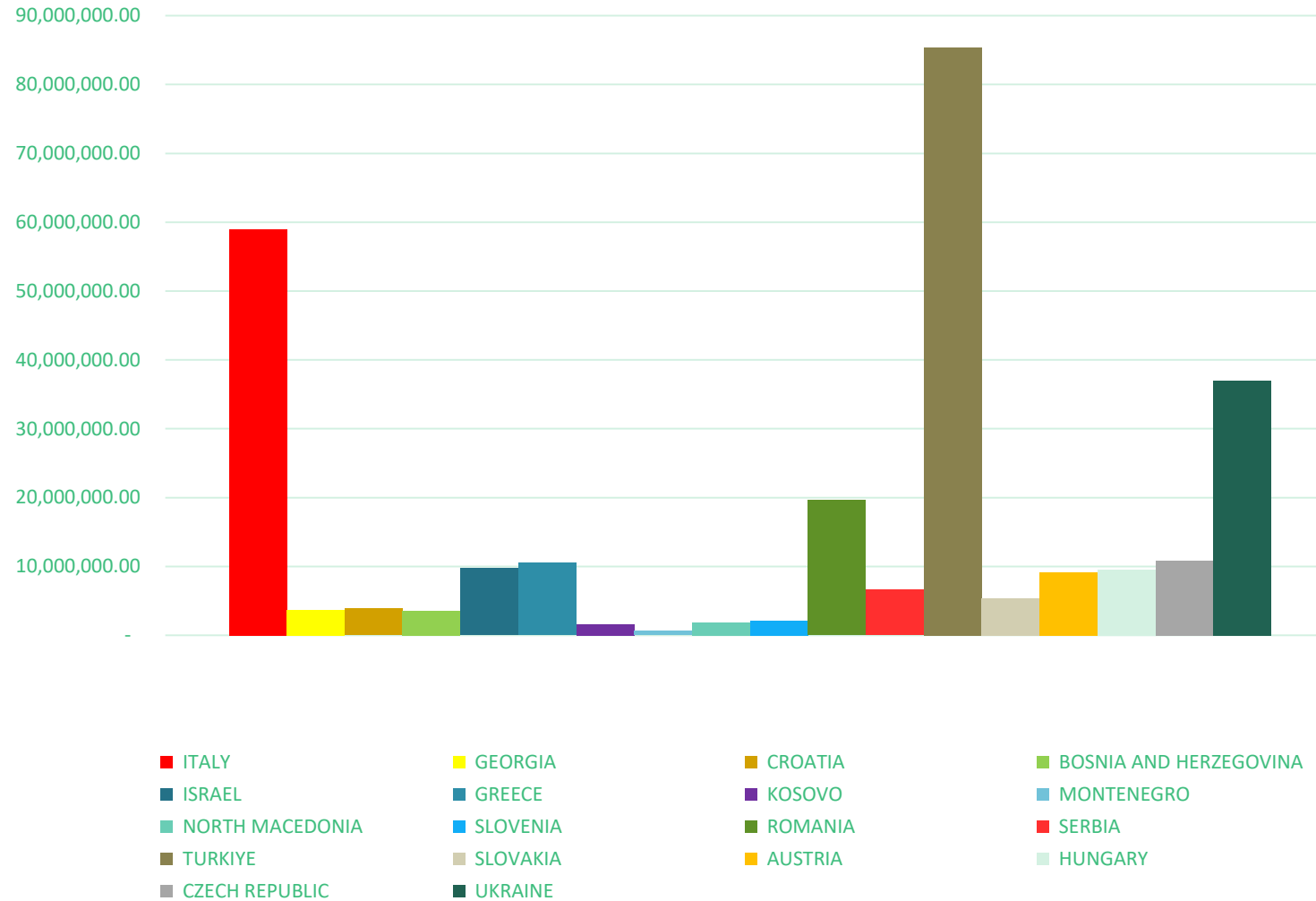


Data source: UN, World Population Prospects (2024)

Note: Values as of 1 July of the indicated year.

OurWorldinData.org/population-growth | CC BY

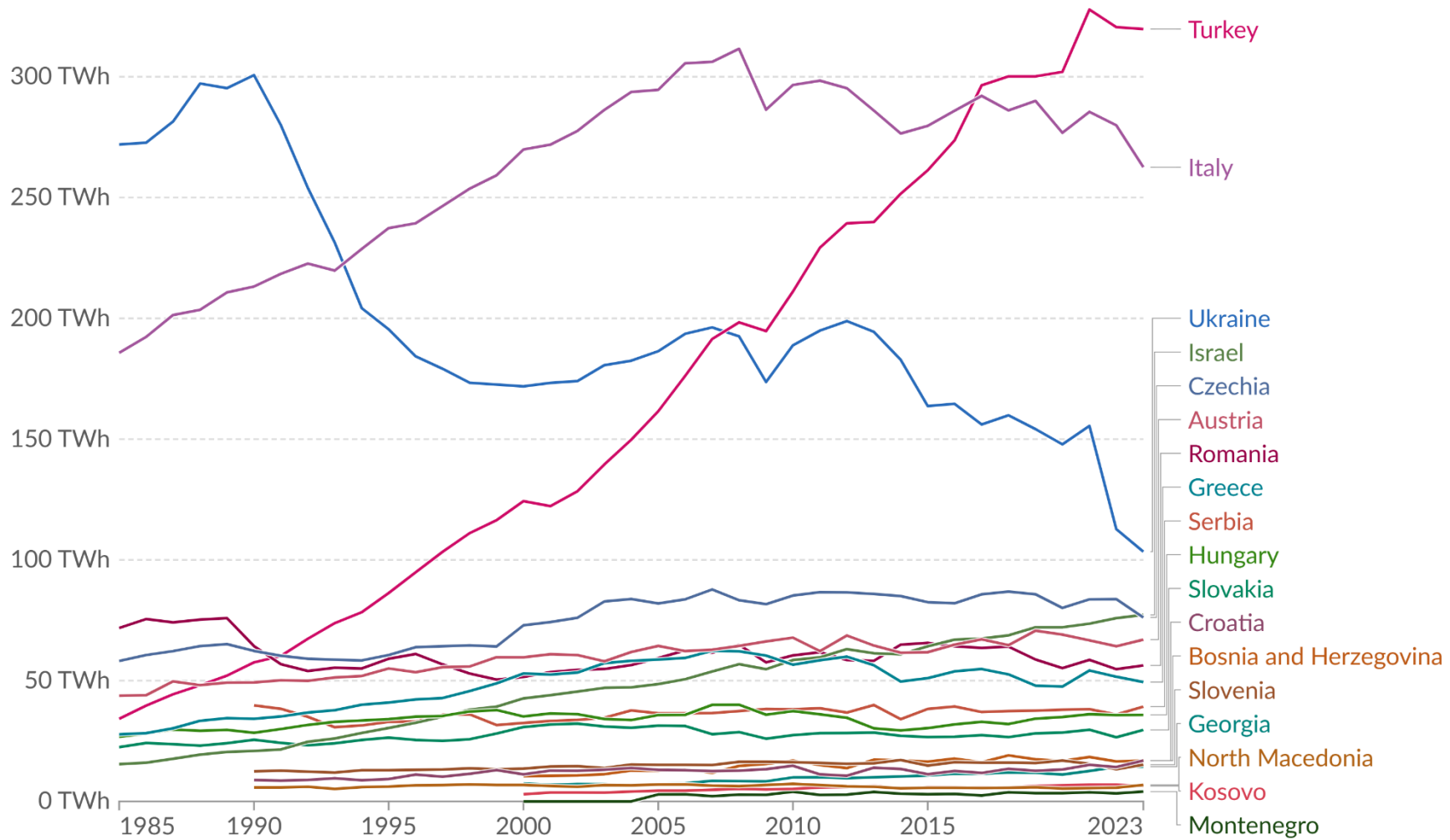
# Population in 2023





# Electricity generation

Measured in terawatt-hours<sup>1</sup>.

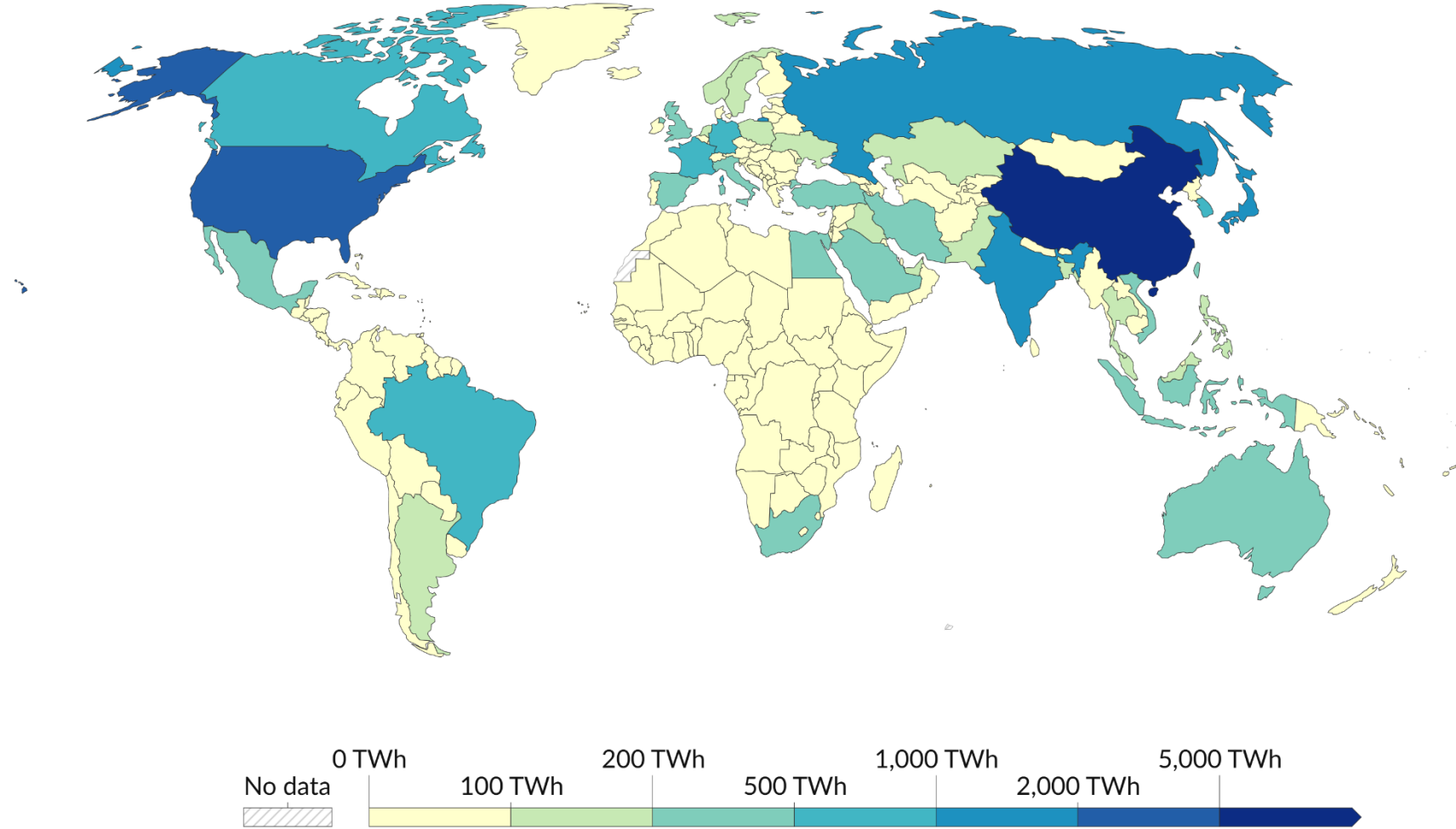


Data source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

OurWorldinData.org/energy | CC BY

# Electricity generation, 2023

Measured in terawatt-hours<sup>1</sup>.

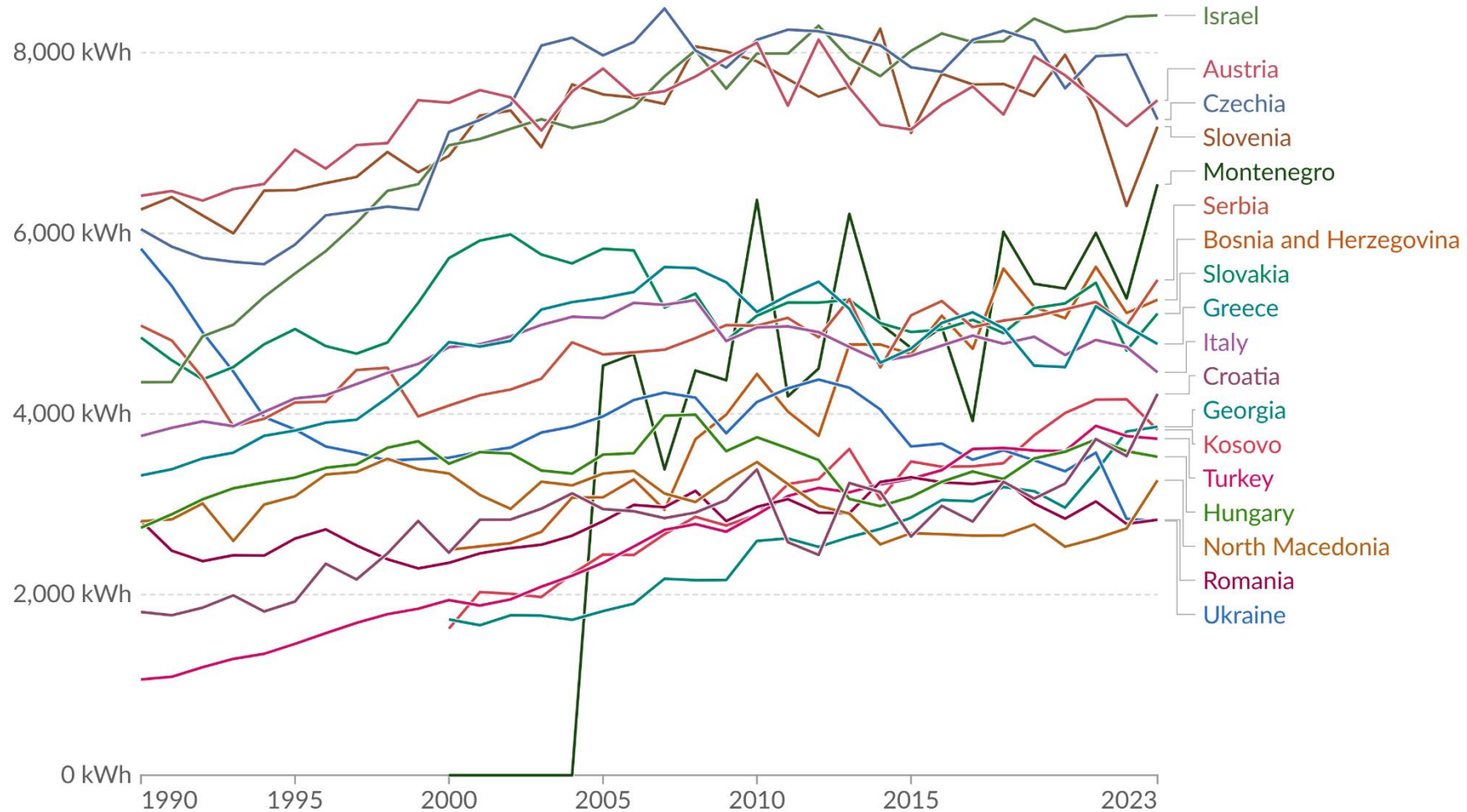


Data source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

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# Per capita electricity generation

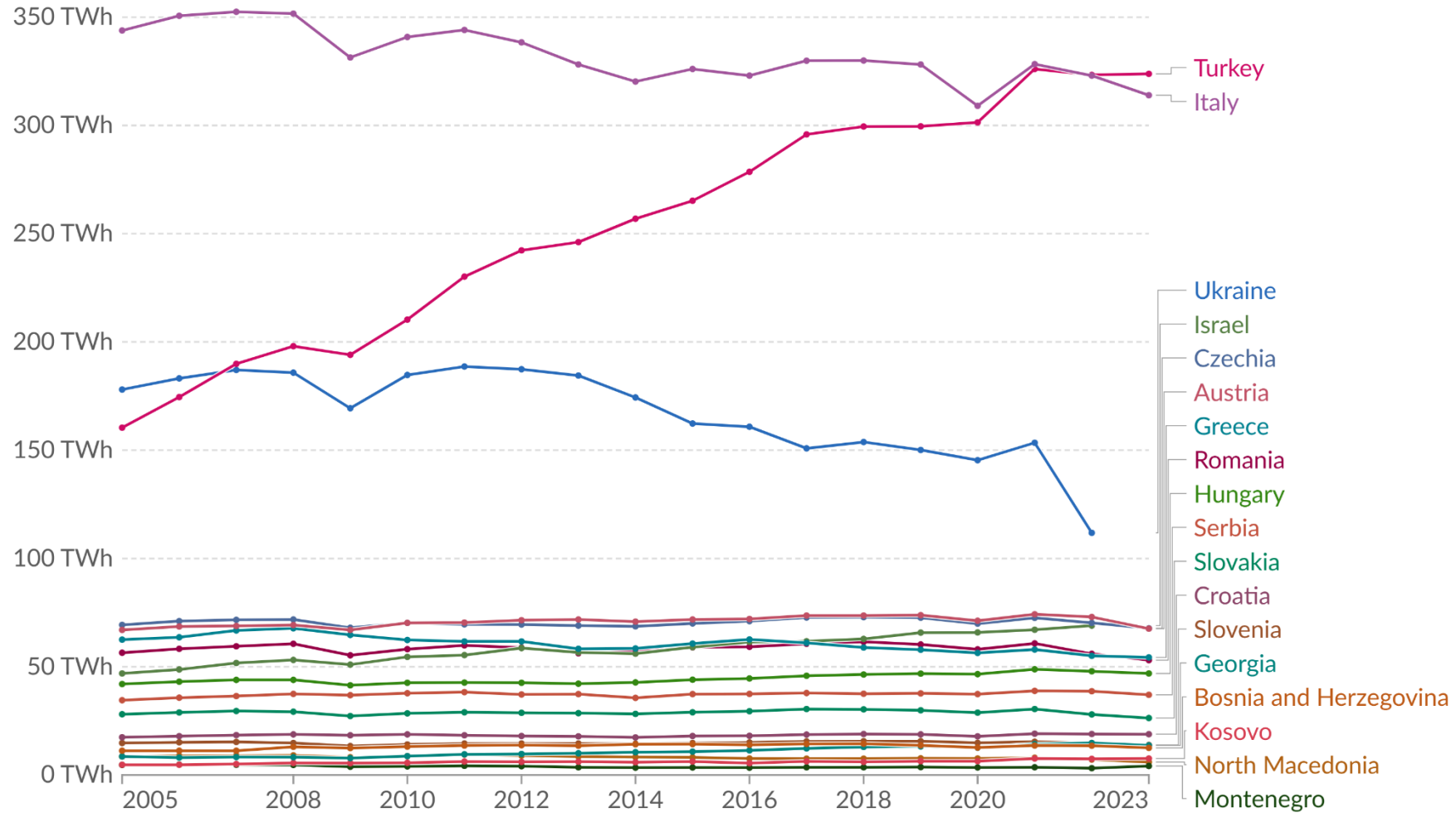
Annual average electricity generation per person, measured in kilowatt-hours<sup>1</sup>.



Data source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024); Population based on various sources (2023)  
OurWorldinData.org/energy | CC BY

# Electricity demand, 2005 to 2023

Electricity demand is measured in terawatt-hours<sup>1</sup>, as total electricity generation, adjusted for electricity imports and exports.

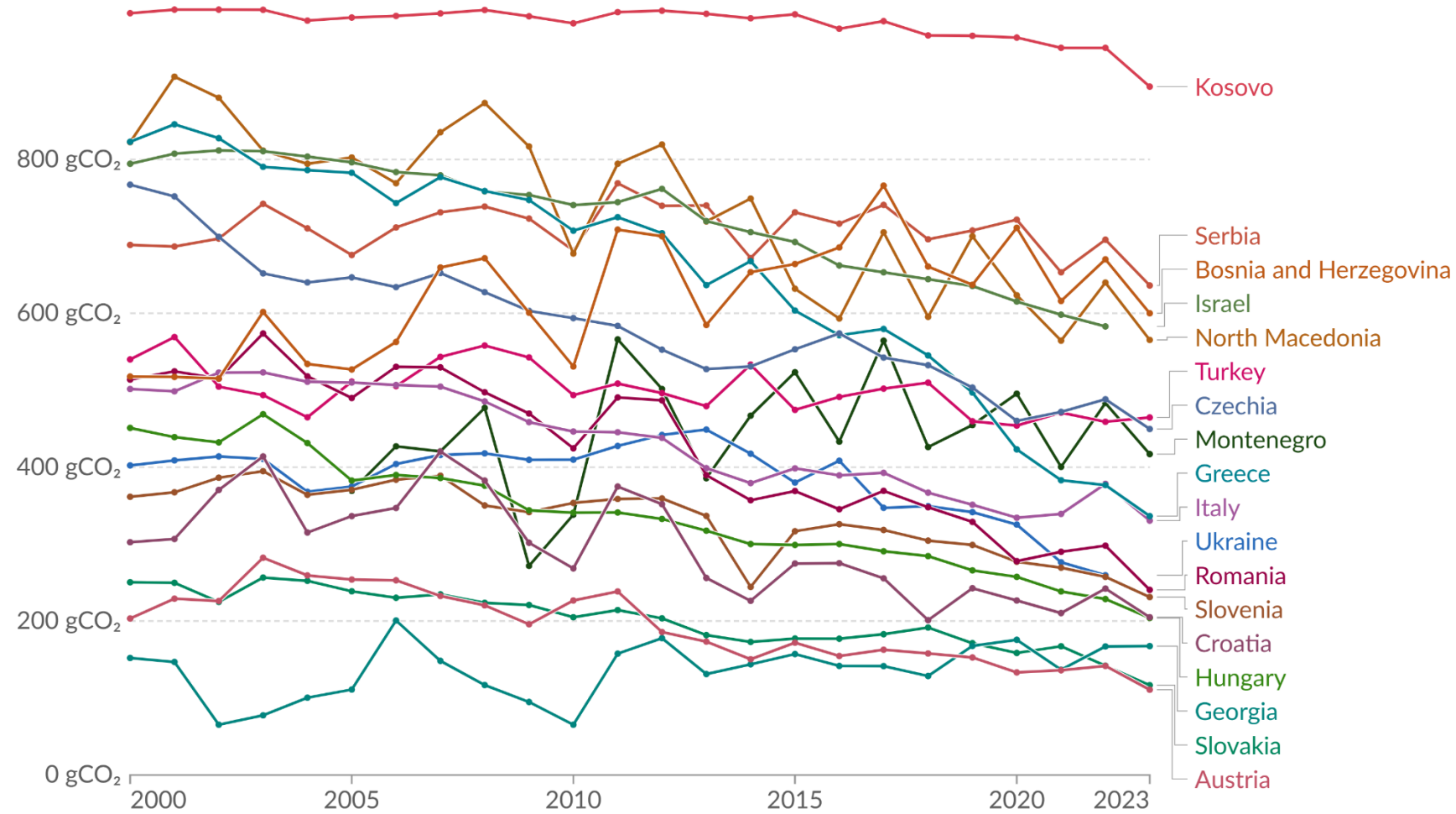


Data source: Ember (2024)

OurWorldinData.org/energy | CC BY

# Carbon intensity of electricity generation, 2000 to 2023

Carbon intensity is measured in grams of carbon dioxide-equivalents<sup>1</sup> emitted per kilowatt-hour<sup>2</sup> of electricity generated.

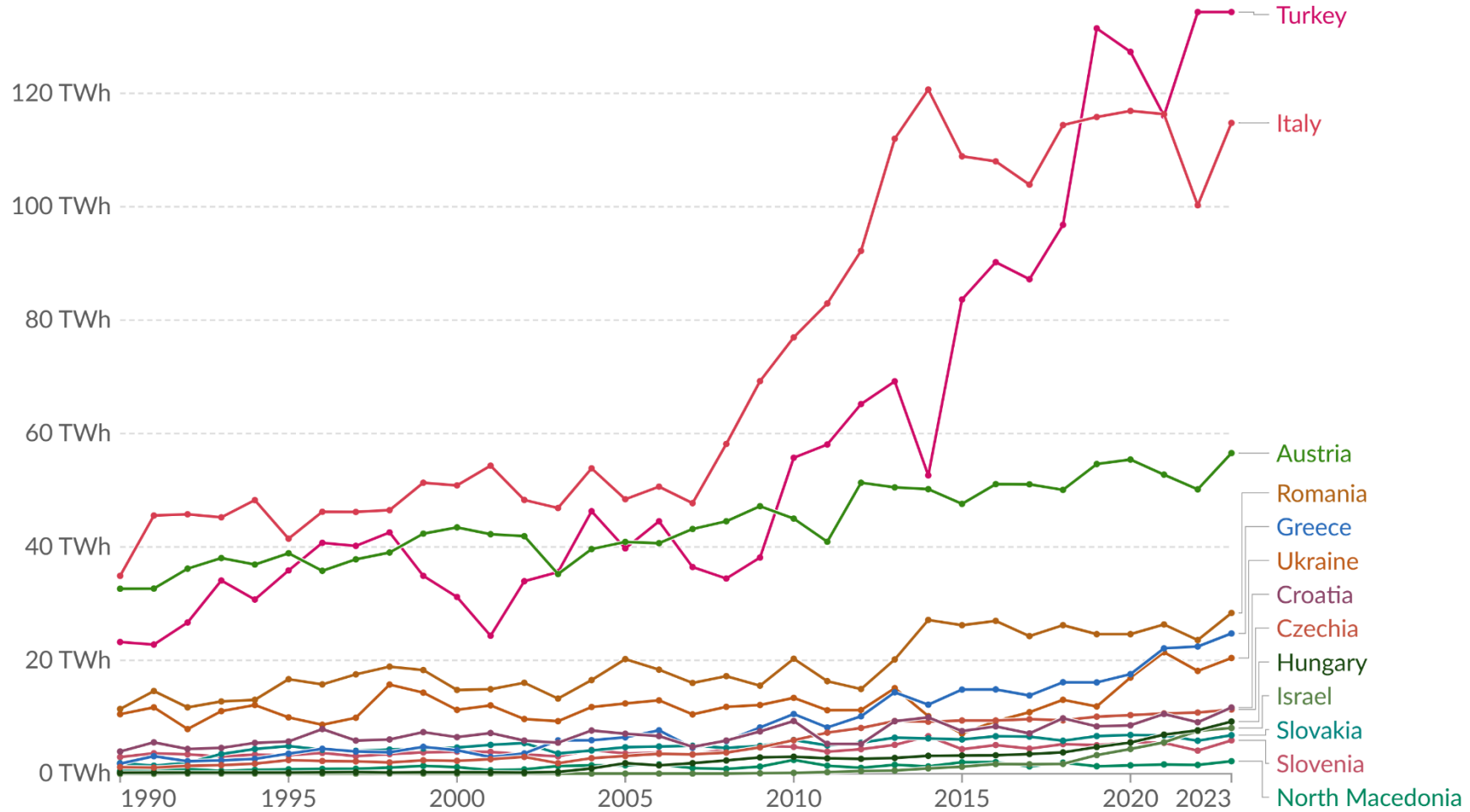


Data source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

OurWorldinData.org/energy | CC BY

# Electricity generation from renewables

Measured in terawatt-hours<sup>1</sup>. Renewable sources include hydropower, solar, wind, geothermal, bioenergy, wave and tidal.



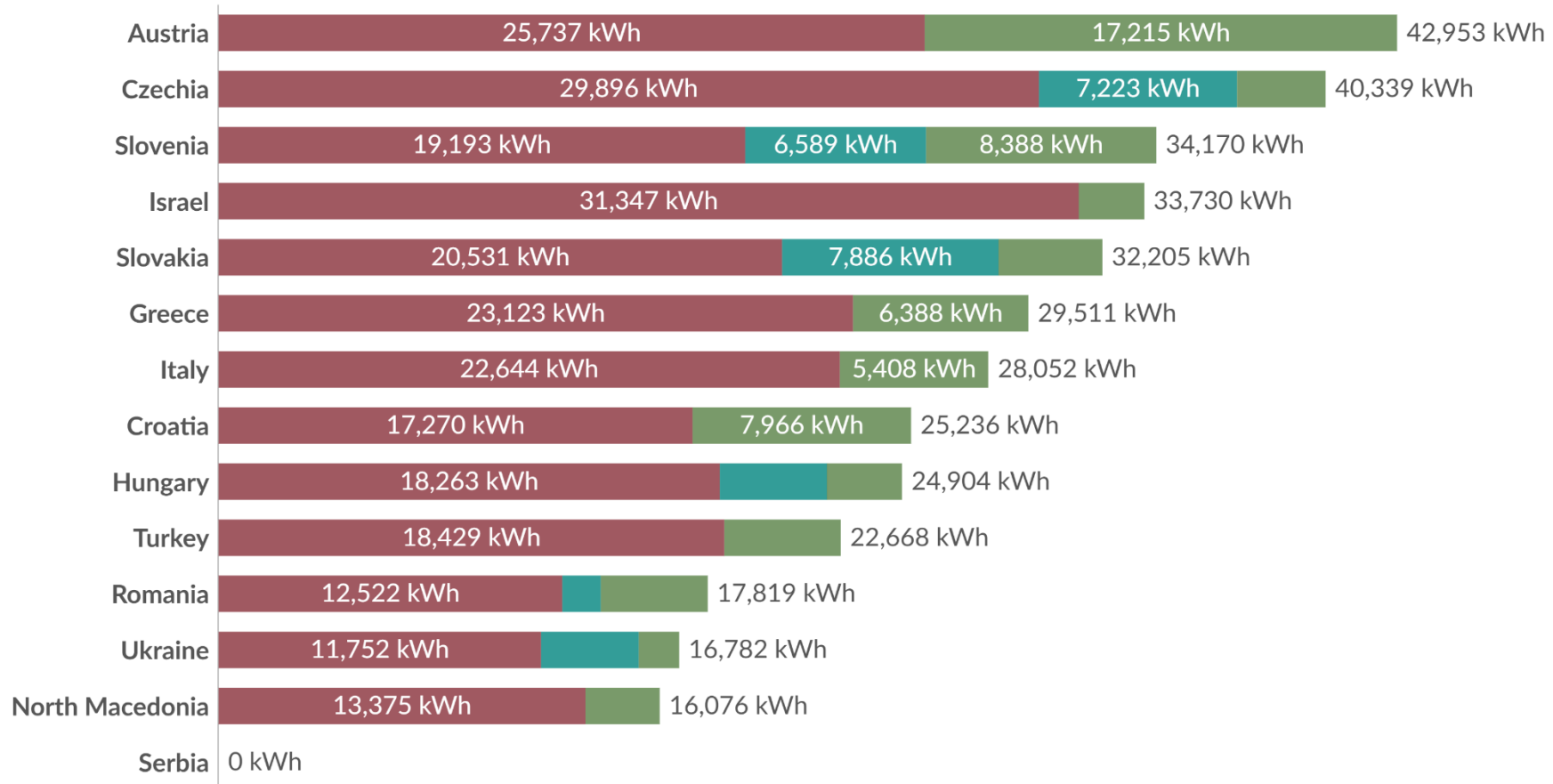
Data source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

OurWorldinData.org/energy | CC BY

# Per capita energy from fossil fuels, nuclear and renewables, 2023

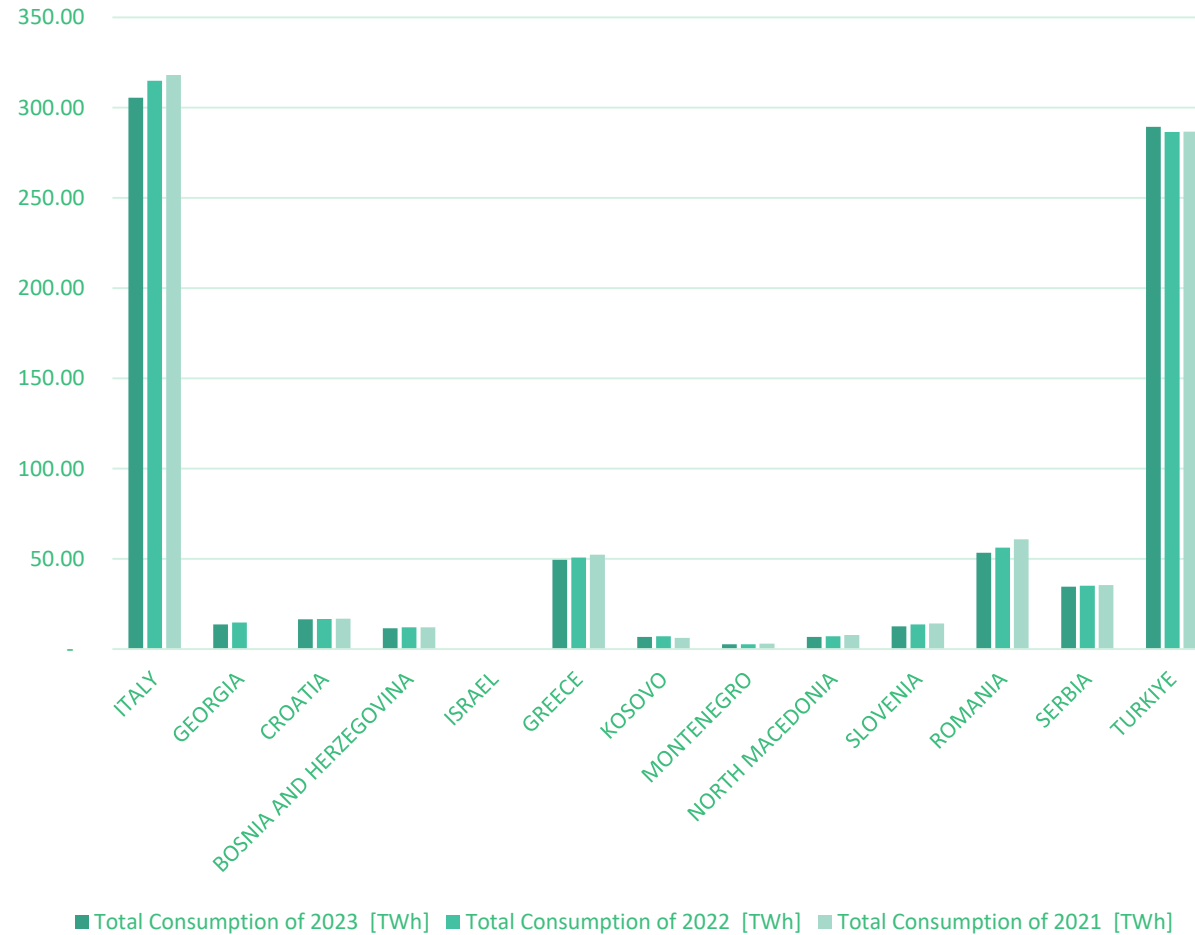
Measured in kilowatt-hours<sup>1</sup> of primary energy<sup>2</sup> consumption per person, using the substitution method<sup>3</sup>.

■ Fossil fuels ■ Nuclear ■ Renewables



Data source: Energy Institute - Statistical Review of World Energy (2024); Population based on various sources (2023)  
OurWorldinData.org/energy-mix | CC BY

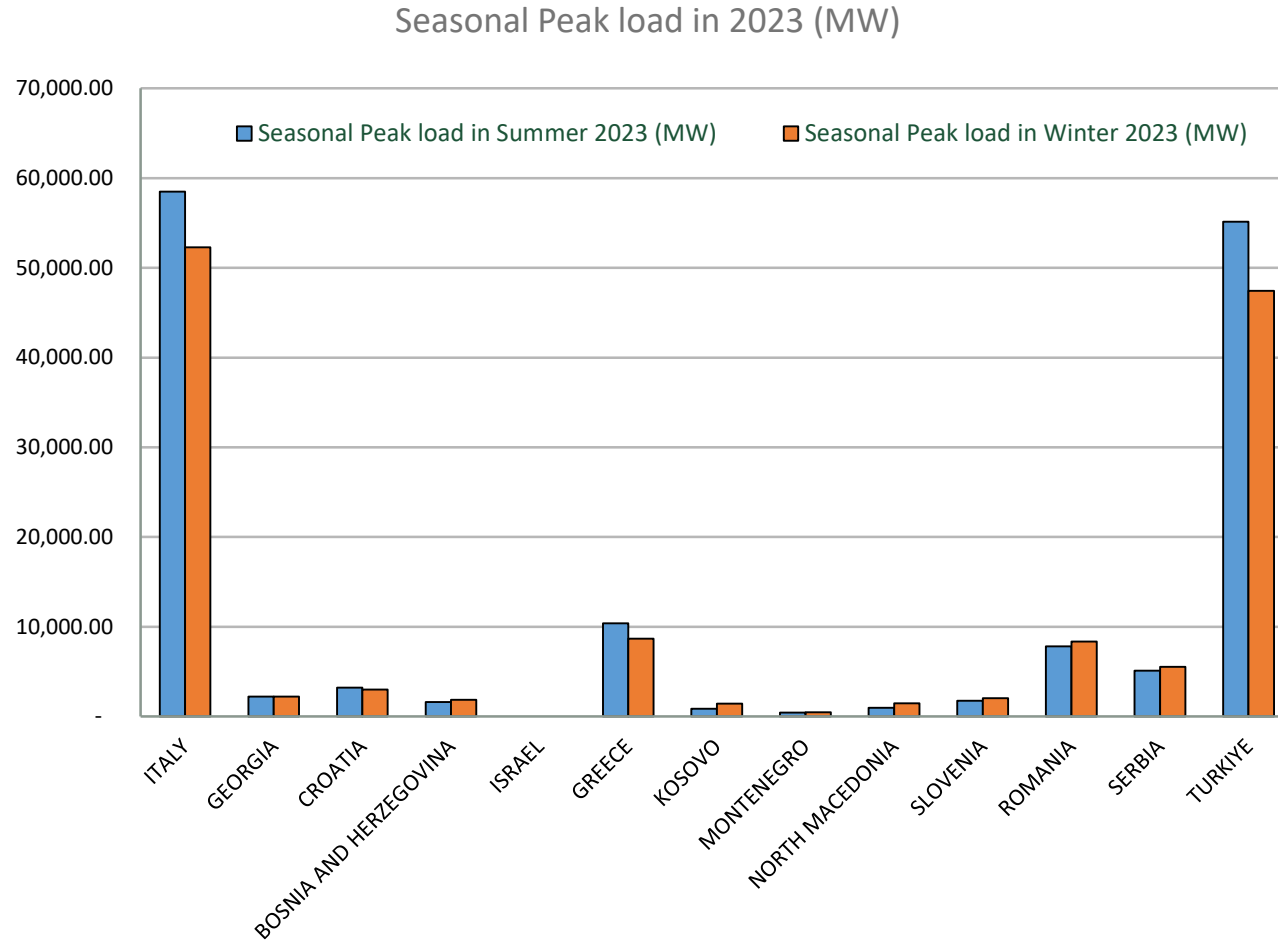
# Total Energy Consumption of the last three years (TWh)





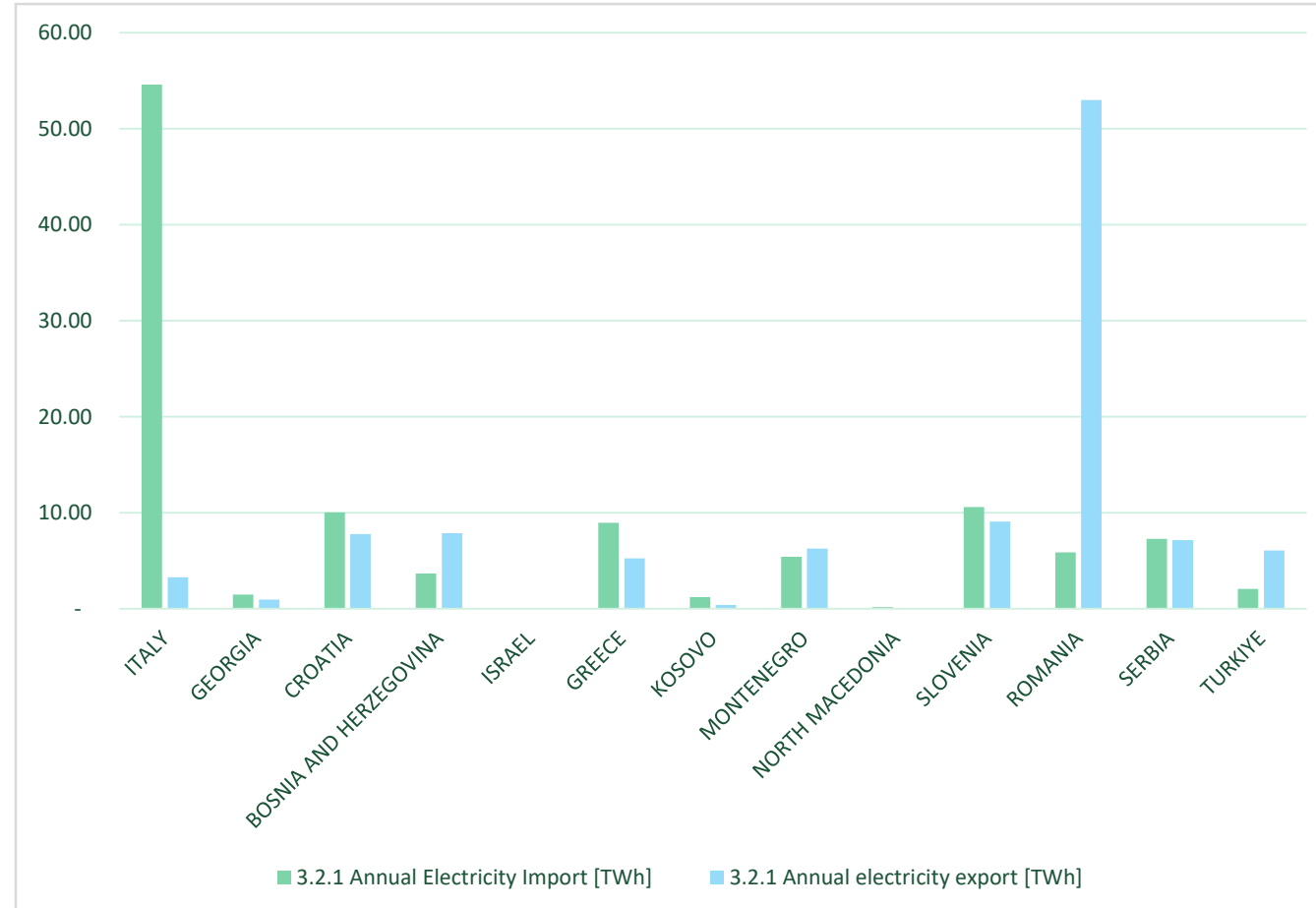
# Energy Outlook - Seasonal Peak load in 2023 (MW)

Reference year 2023



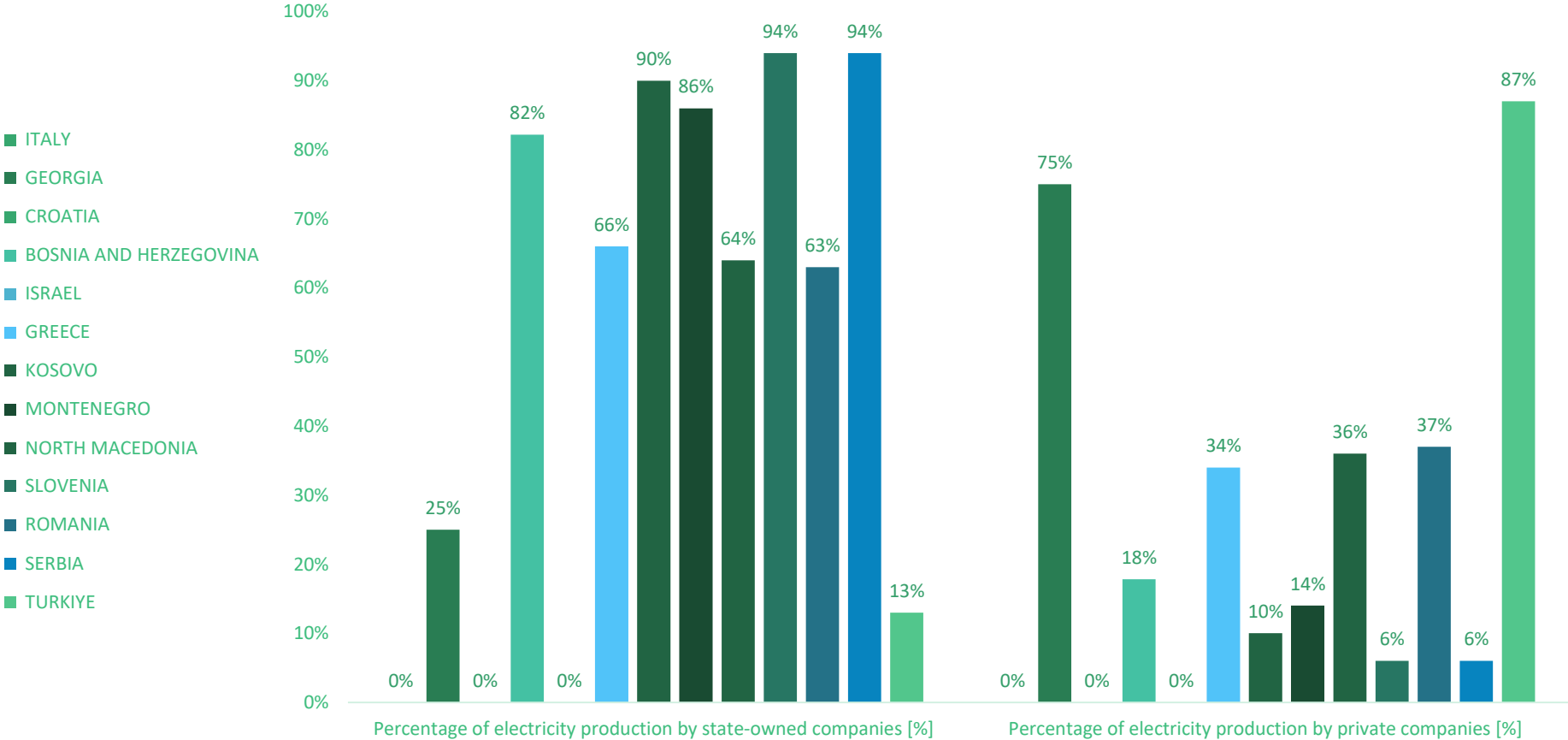
# Annual Electricity import and export (TWh)

Reference year 2023



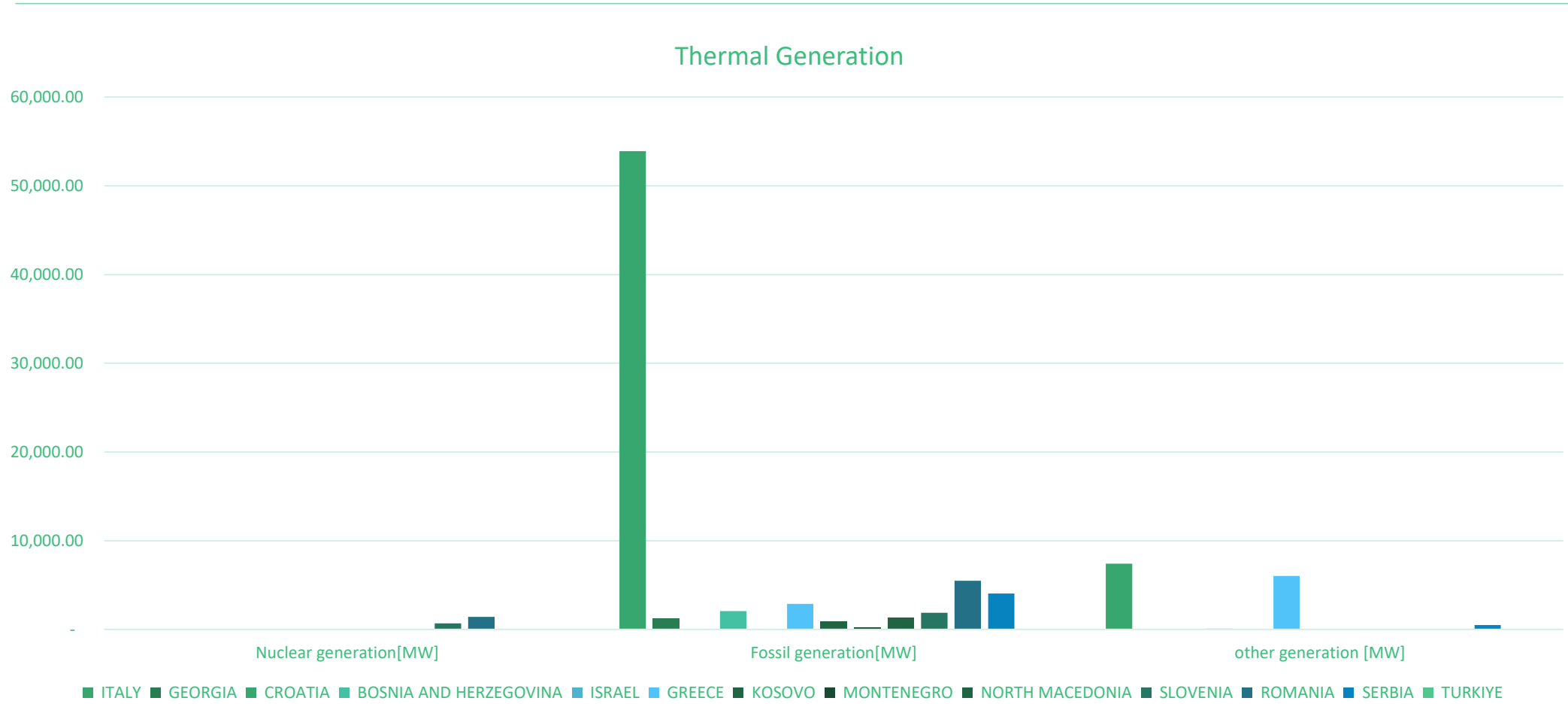
# Percentage of electricity production by state-owned and by private companies

Reference year 2023



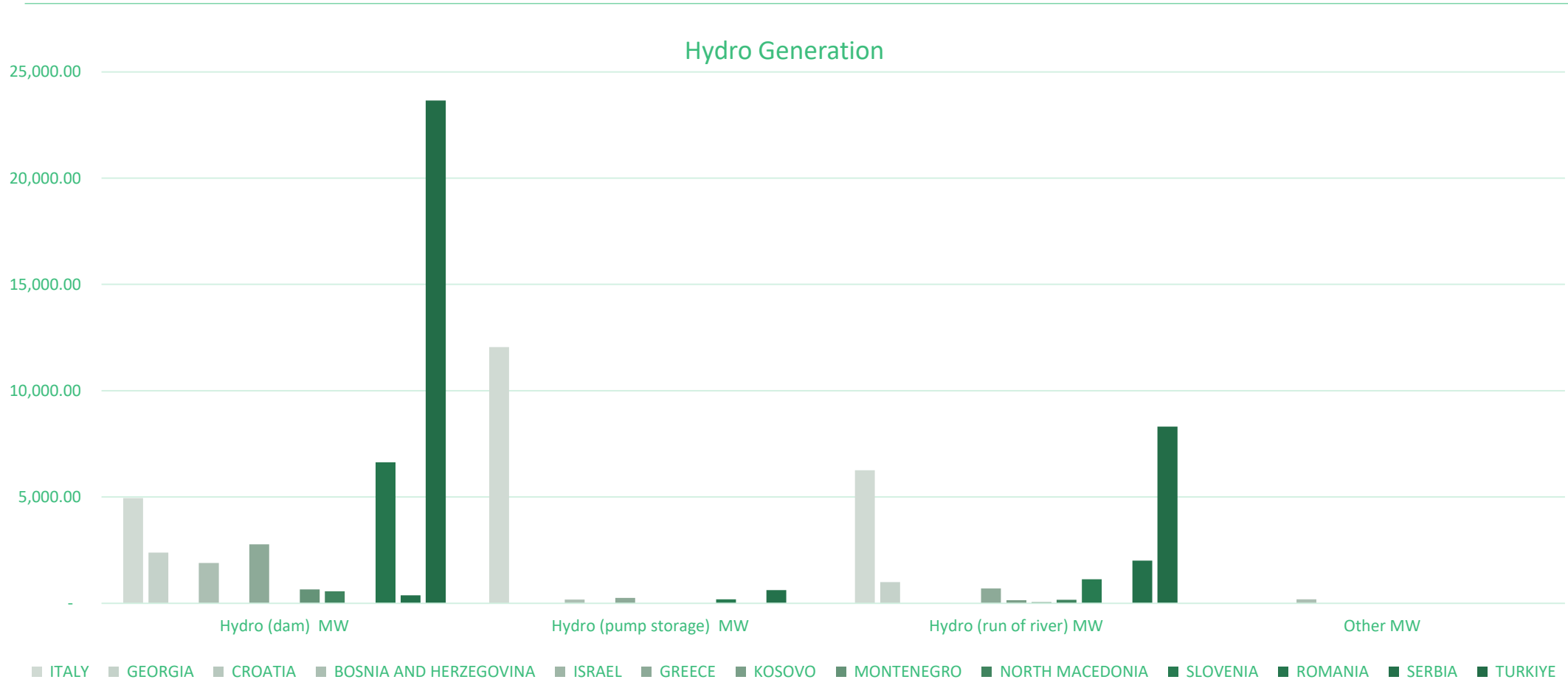
# Thermal generation (MW)

Reference year 2023



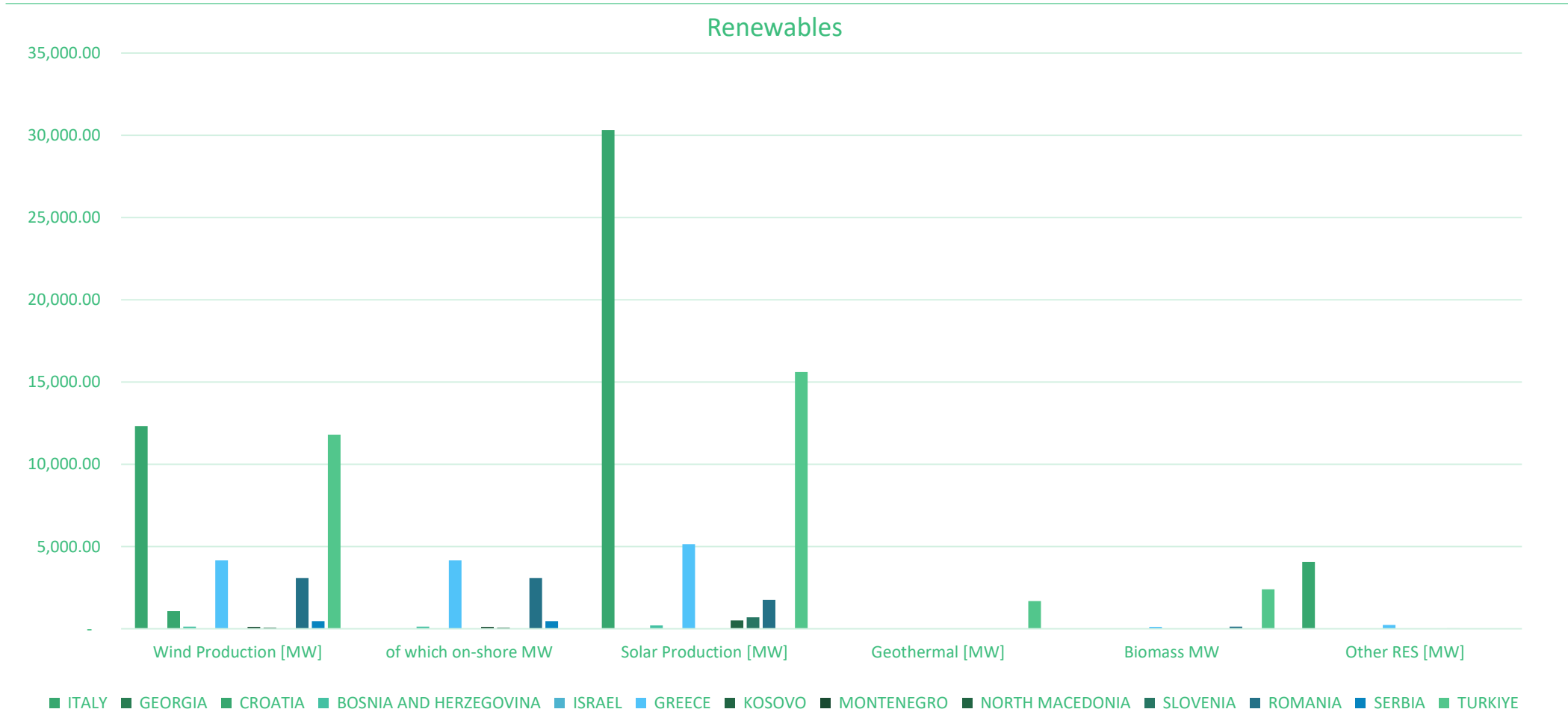
# Hydro generation (MW)

Reference year 2023



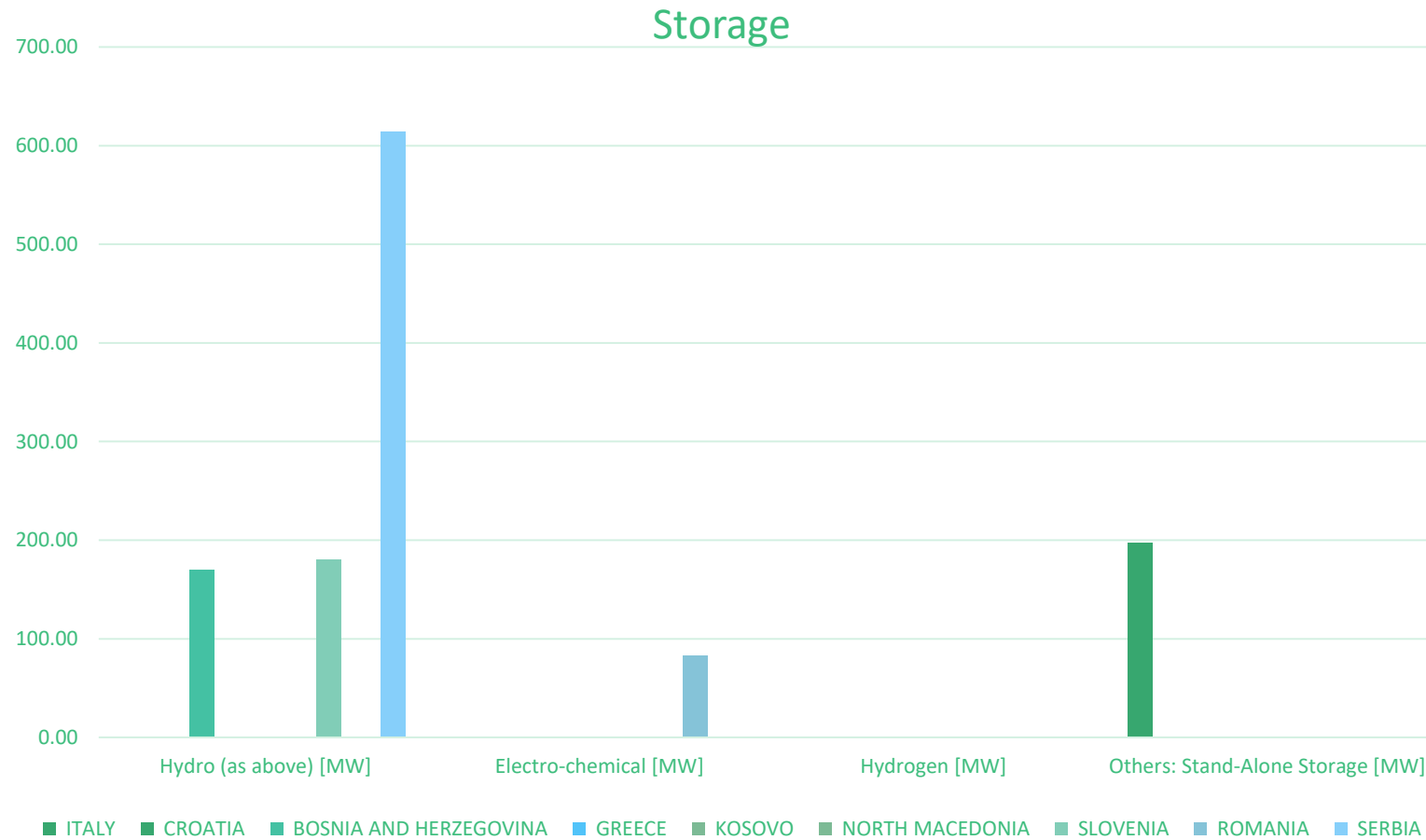
# Renewables

Reference year 2023



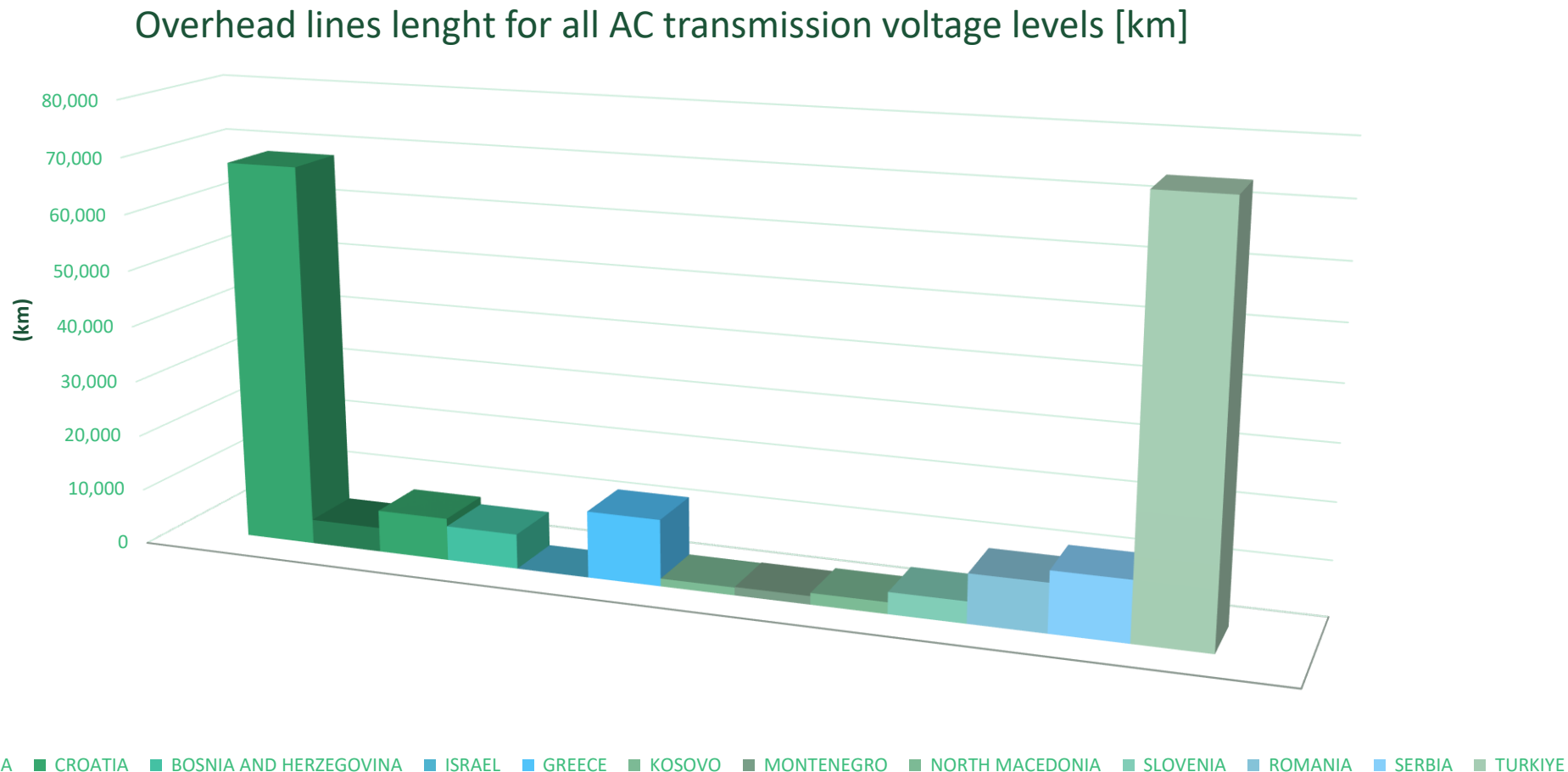
# Storage

Reference year 2023



# Transmission Network (30-750 kV)

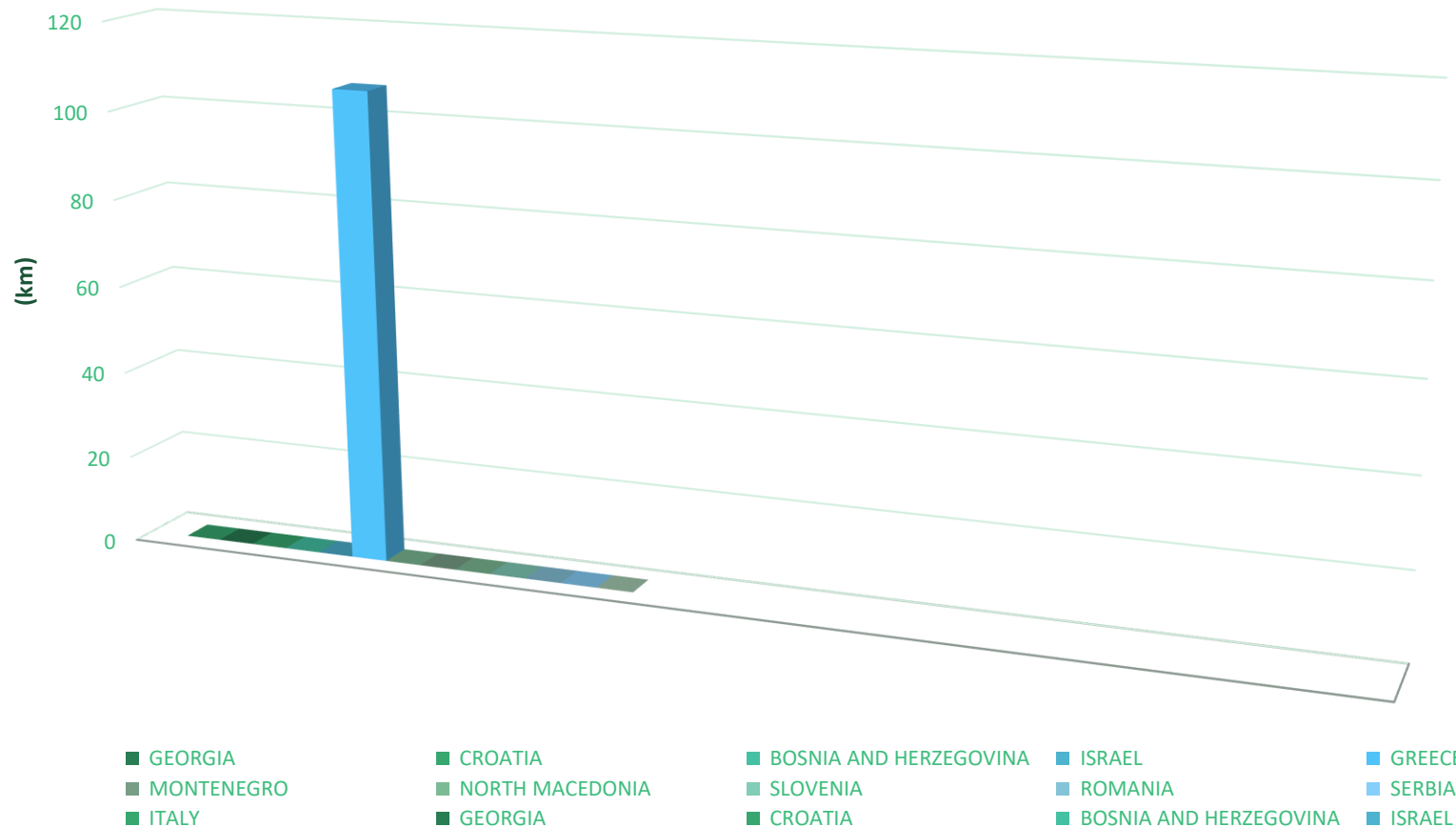
## Overhead lines length for all AC transmission voltage levels [km]





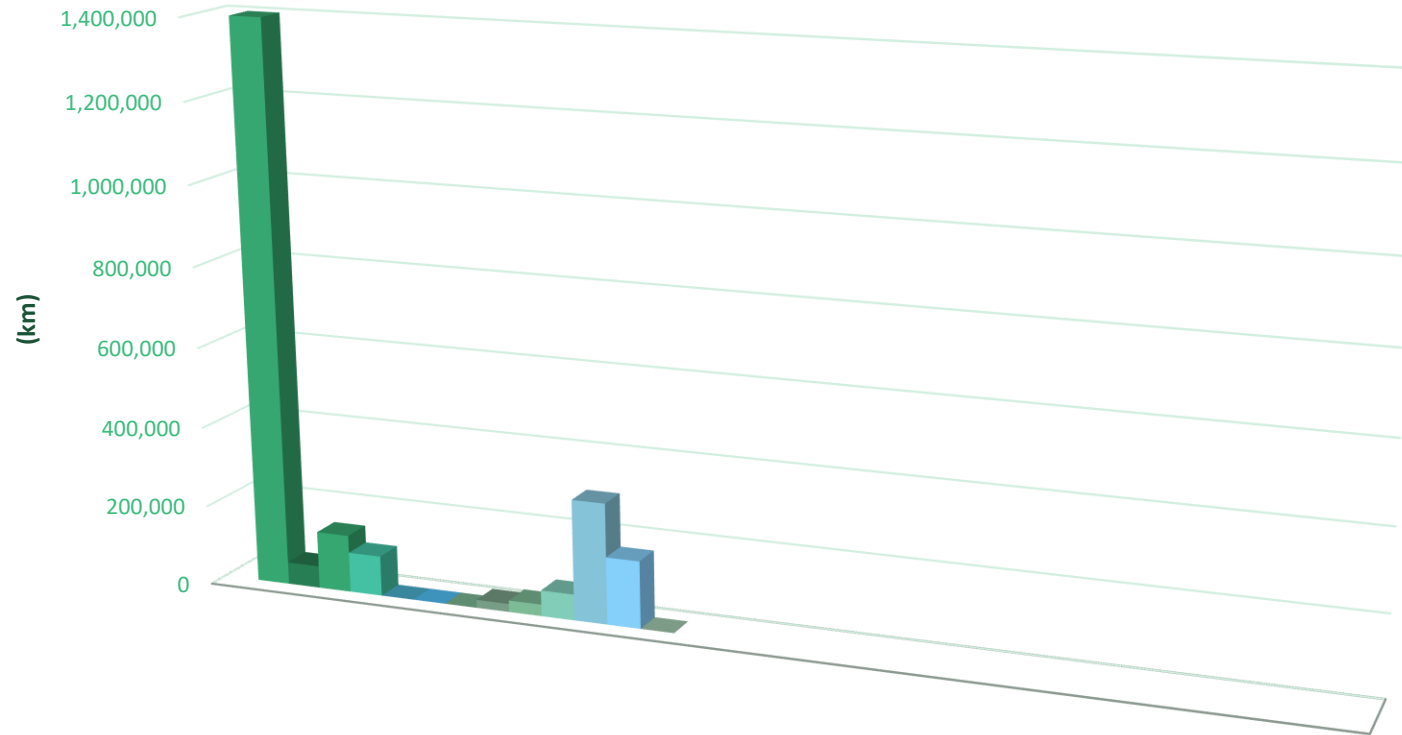
# Transmission Network (30-750 kV)

## Overhead lines length for all DC transmission voltage levels [km]



# Distribution Network (0.4 - 30 kV)

Estimated circuit length in km for all distribution voltage levels (0.4 - 30kV)



- ITALY
- GEORGIA
- CROATIA
- BOSNIA AND HERZEGOVINA
- ISRAEL
- GREECE
- KOSOVO
- MONTENEGRO
- NORTH MACEDONIA
- SLOVENIA
- ROMANIA
- SERBIA
- TURKIYE
- ITALY
- GEORGIA

# Questionnaire

## What technical field of electric power engineering do you prefer for a regional CIGRE cooperation?

QUESTIONNAIRE													
Questions	Italy	Georgia	Croatia	Bosnia and Herzegovina	Israel	Greece	Kosovo	Montenegro	North Macedonia	Slovenia	Romania	Serbia	Turkey
Elements of electric power system (Generators/motors, Transformers, HV-MV-LV equipment, Materials)	no	no	no	no	no	no	yes	no	yes	no	yes	no	no
Sub-systems (cables, OHLs, Substations, Protection/automation, HVDC and power electronics, HVAC, Power plant performances, DC distribution, DTR systems, sensors)	yes	yes	yes	no	yes	no	no	no	no	yes	yes	no	yes
Systems and Interconnection (Development, Operation, Control, Planning approaches, Tools, Dynamics, Regional Trainings, Regional Market design, Regulation of system, Regional Power Exchange, Cooperation)	yes	yes	no	yes	no	yes	yes	yes	yes	no	no	yes	yes
Security of electricity supply, System adequacy, Stability issues	yes	yes	no	yes	no	no	yes	no	no	no	yes	yes	yes
Power system resilience (Cyber Security, Damage preventing, System Recovery, Survivability)	yes	yes	yes	yes	no	no	yes	no	yes	yes	yes	no	yes
Environment, decarbonization and transition of power system	yes	no	no	yes	yes	yes	no	no	yes	yes	yes	no	yes
Power system economics and social implications	yes	no	no	yes	no	no	no	no	no	no	no	no	yes
Renewables, Smart Grids (strategic views, observability/TSO-DSO interoperability, ancillary services/flexibility/aggregation, Electrical Vehicles issue, power-2-gas, DSM, DR, energy efficiency etc.)	yes	yes	yes	yes	no	yes	yes	no	yes	yes	yes	yes	yes
Institutional arrangements, legal issues, standardization supports	no	no	yes	no	no	no	no	no	no	yes	no	no	no
Information and telecommunication technologies in Power sector, smart utilities, digitalization of system	no	no	yes	yes	no	yes	no	no	no	no	no	no	no
Distribution system challenges, Smart Houses, Micro Grids, Smart local communities	no	no	no	yes	no	yes	no	no	yes	no	no	yes	no
Technological innovation in power sector	no	no	no	yes	no	no	no	no	no	yes	yes	no	no

# Questionnaire

## What are the technical areas which you would like to contribute to, generally?

### QUESTIONNAIRE

Questions	Italy	Georgia	Croatia	Bosnia and Herzegovina	Israel	Greece	Kosovo	Montenegro	North Macedonia	Slovenia	Romania	Serbia	Turkey
A1 - Power generation and electromechanical energy conversion	yes	no	no	no	no	no	no	no	no	no	no	no	no
A2 - Power transformers and reactors	no	no	no	no	no	no	yes	no	yes	no	no	no	no
A3- Transmission and distribution equipment	no	no	no	no	no	no	no	no	no	no	no	no	no
B1 - Insulated cables	yes	no	no	no	yes	yes	no	no	yes	no	no	no	no
B2 - Overhead lines	yes	no	yes	no	yes	no	no	no	yes	yes	yes	no	no
B3 - Substations and electrical installations	no	no	no	no	no	no	no	no	no	yes	yes	no	no
B4 - DC Systems and power electronics	yes	no	no	no	no	no	no	no	no	no	no	no	yes
B5 - Protection and Automation	no	no	no	no	no	no	no	no	no	no	yes	no	no
C1- Power system development and economics	yes	yes	yes	yes	no	yes	yes	no	yes	yes	no	no	yes
C2 - Power system Operation and Control	no	yes	no	yes	no	yes	yes	no	yes	no	no	yes	yes
C3 - Power system sustainability and environmental performance	yes	no	yes	yes	yes	no	no	no	no	no	yes	no	no
C4 - Power system technical performance	yes	yes	yes	no	no	no	no	no	yes	no	no	no	no
C5 - Electricity markets and regulation	yes	no	no	no	no	yes	no	yes	yes	no	no	yes	yes
C6 - Active distribution systems and distributed energy resources	yes	no	no	no	no	yes	yes	no	yes	no	no	no	no
D1 - Materials and emerging test techniques	no	no	no	no	no	no	no	no	no	no	no	no	no
D2 - Information systems and telecommunication and cybersecurity	no	no	no	no	no	no	no	no	no	no	no	no	no

**Thanks for your attention!**

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