2024 Questionnaire
TAC/MB meeting – Dubrovnik May 27, 2024

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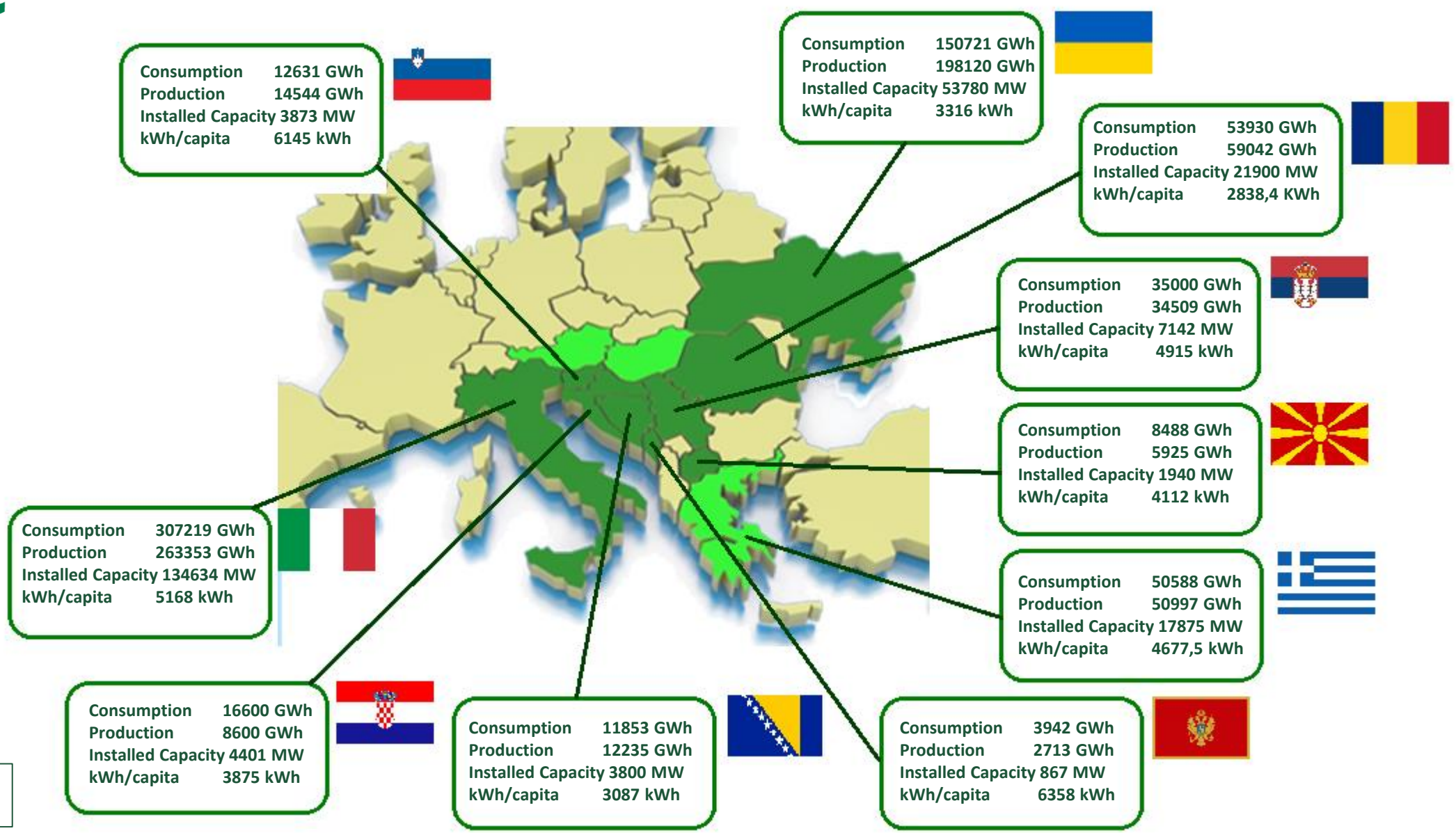

As in 2012

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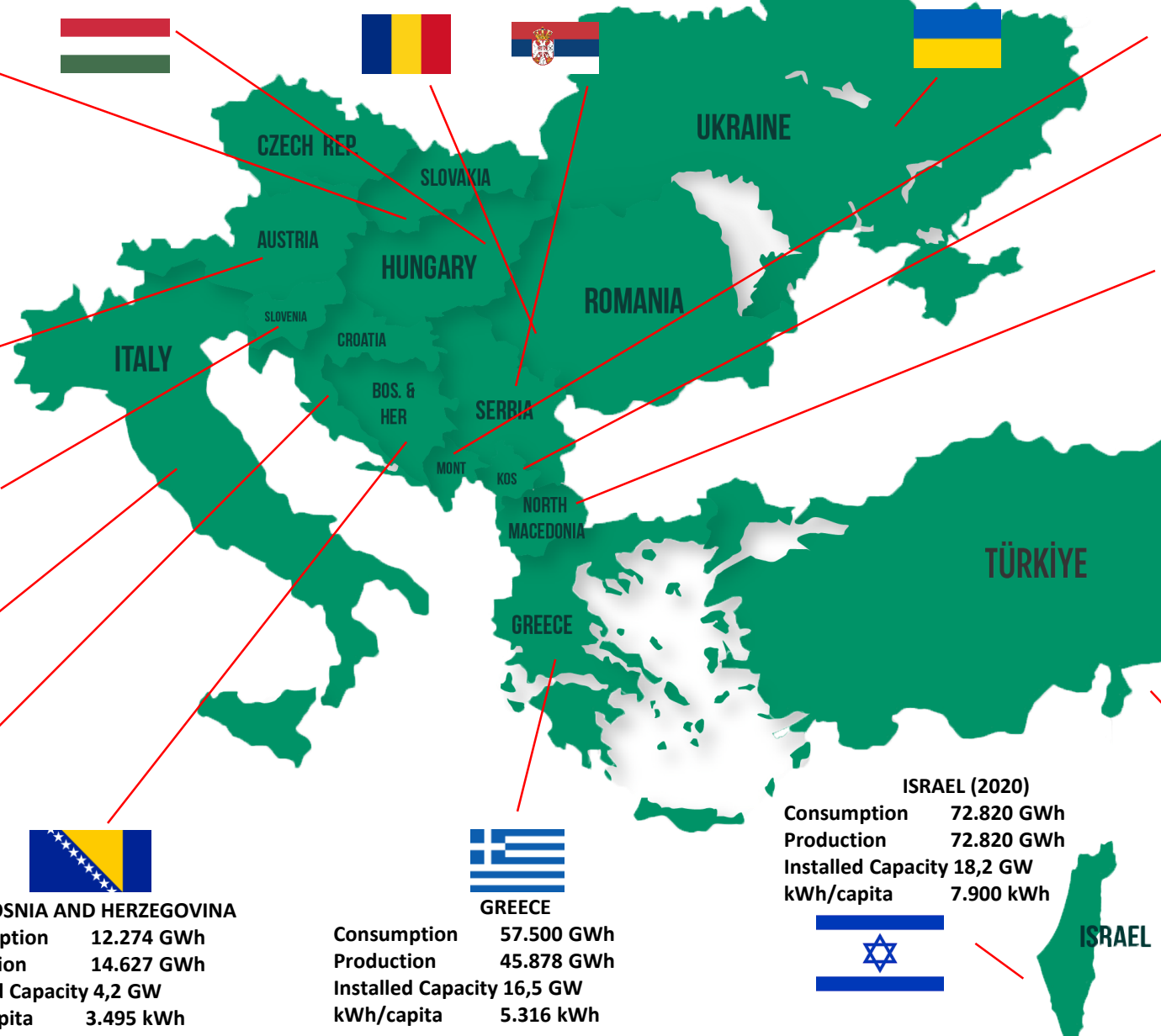


HUNGARY
Consumption 45.460 GWh
Production 32.584 GWh
Installed Capacity 8,6 GW
kWh/capita 4.639 kWh

ROMANIA
Consumption 48.400 GWh
Production 63.784 GWh
Installed Capacity 23,7 GW
kWh/capita 2.464 kWh

SERBIA
Consumption 35.000 GWh
Production 34.509 GWh
Installed Capacity 7.142 MW
kWh/capita 4.915 kWh

UKRAINE
Consumption 118.000 GWh
Production 155.000 GWh
Installed Capacity 51,8 GW
kWh/capita 2.781 kWh

MONTENEGRO
Consumption 3.114 GWh
Production 2.329 GWh
Installed Capacity 0,97 GW
kWh/capita 5.000 kWh

KOSOVO
Consumption 5.686 GWh
Production 5.300 GWh
Installed Capacity 1,4 GW
kWh/capita 3.161 kWh

NORTH MACEDONIA
Consumption 8.488 GWh
Production 5.925 GWh
Installed Capacity 1.940 MW
kWh/capita 4.112 kWh

SLOVAKIA (WB Data)
Consumption 28.000 GWh
Production - GWh
Installed Capacity - GW
kWh/capita 5.137 kWh

CZECH REPUBLIC (WB Data)
Consumption 65.000 GWh
Production - GWh
Installed Capacity - MW
kWh/capita 6.258 kWh

AUSTRIA
Consumption 66.274 GWh
Production 70.823 GWh
Installed Capacity 25,4 GW
kWh/capita 7.521 kWh

SLOVENIA
Consumption 15.810 GWh
Production 15.400 GWh
Installed Capacity 3,6 GW
kWh/capita 7.637 kWh

ITALY
Consumption 301.880 GWh
Production 295.800 GWh
Installed Capacity 117,1 GW
kWh/capita 4.991 kWh

CROATIA
Consumption 18.197 GWh
Production 11.056 GWh
Installed Capacity 47,8 GW
kWh/capita 4.246 kWh

BOSNIA AND HERZEGOVINA
Consumption 12.274 GWh
Production 14.627 GWh
Installed Capacity 4,2 GW
kWh/capita 3.495 kWh

GREECE
Consumption 57.500 GWh
Production 45.878 GWh
Installed Capacity 16,5 GW
kWh/capita 5.316 kWh

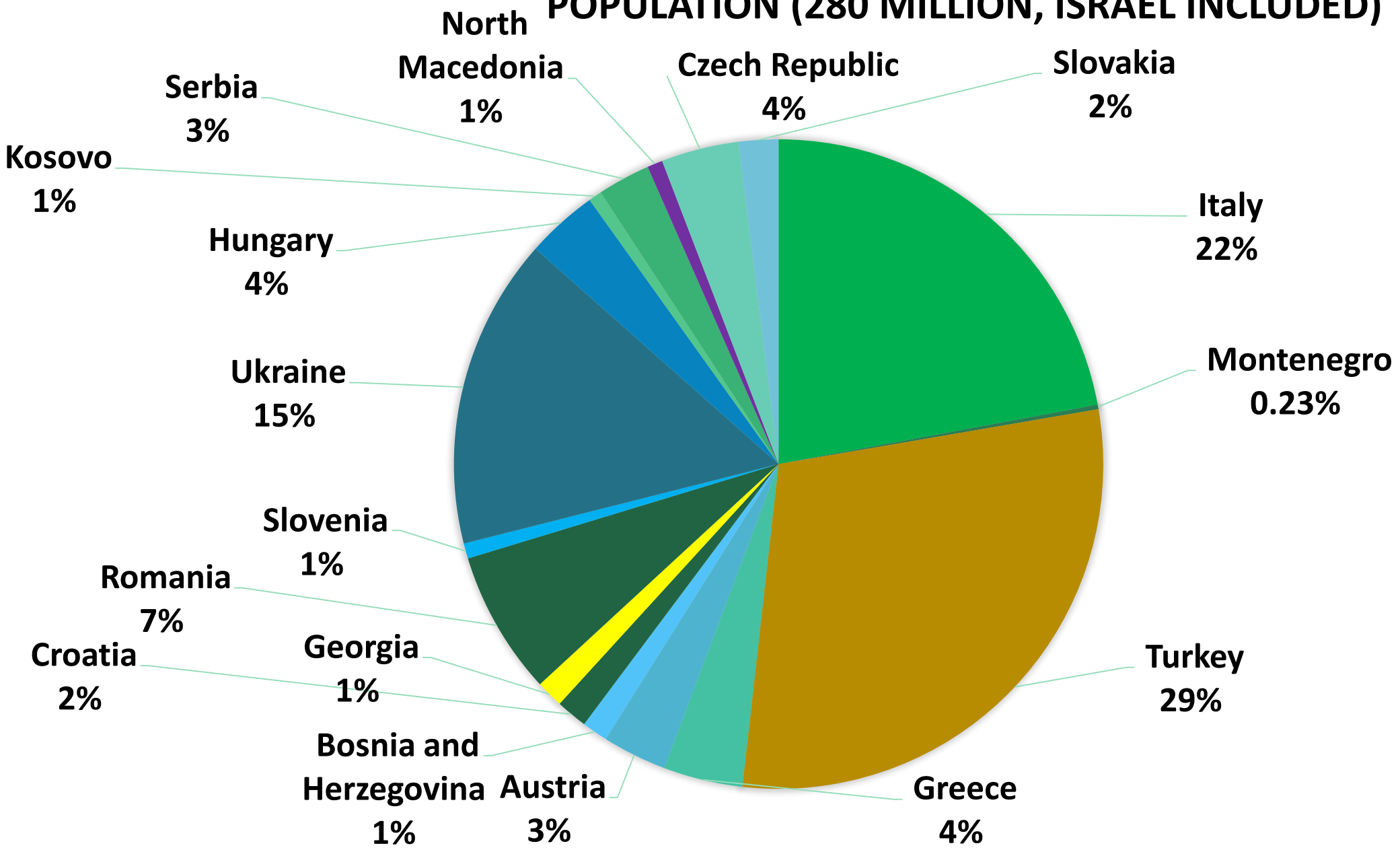
ISRAEL (2020)
Consumption 72.820 GWh
Production 72.820 GWh
Installed Capacity 18,2 GW
kWh/capita 7.900 kWh

GEORGIA
Consumption 12.700 GWh
Production 11.056 GWh
Installed Capacity 4,1 GW
kWh/capita 3.416 kWh

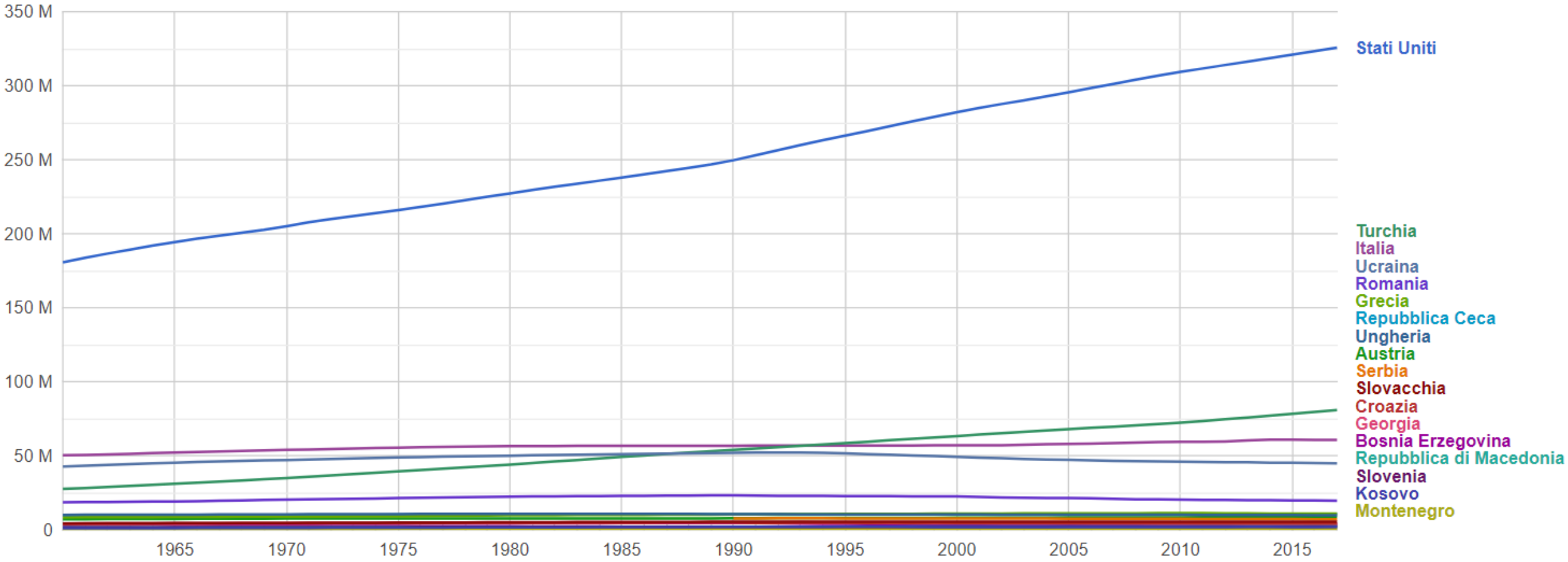
TURKEY
Consumption 296.702 GWh
Production 297.278 GWh
Installed Capacity 85,2GW
kWh/capita 3.671 kWh

As in 2022

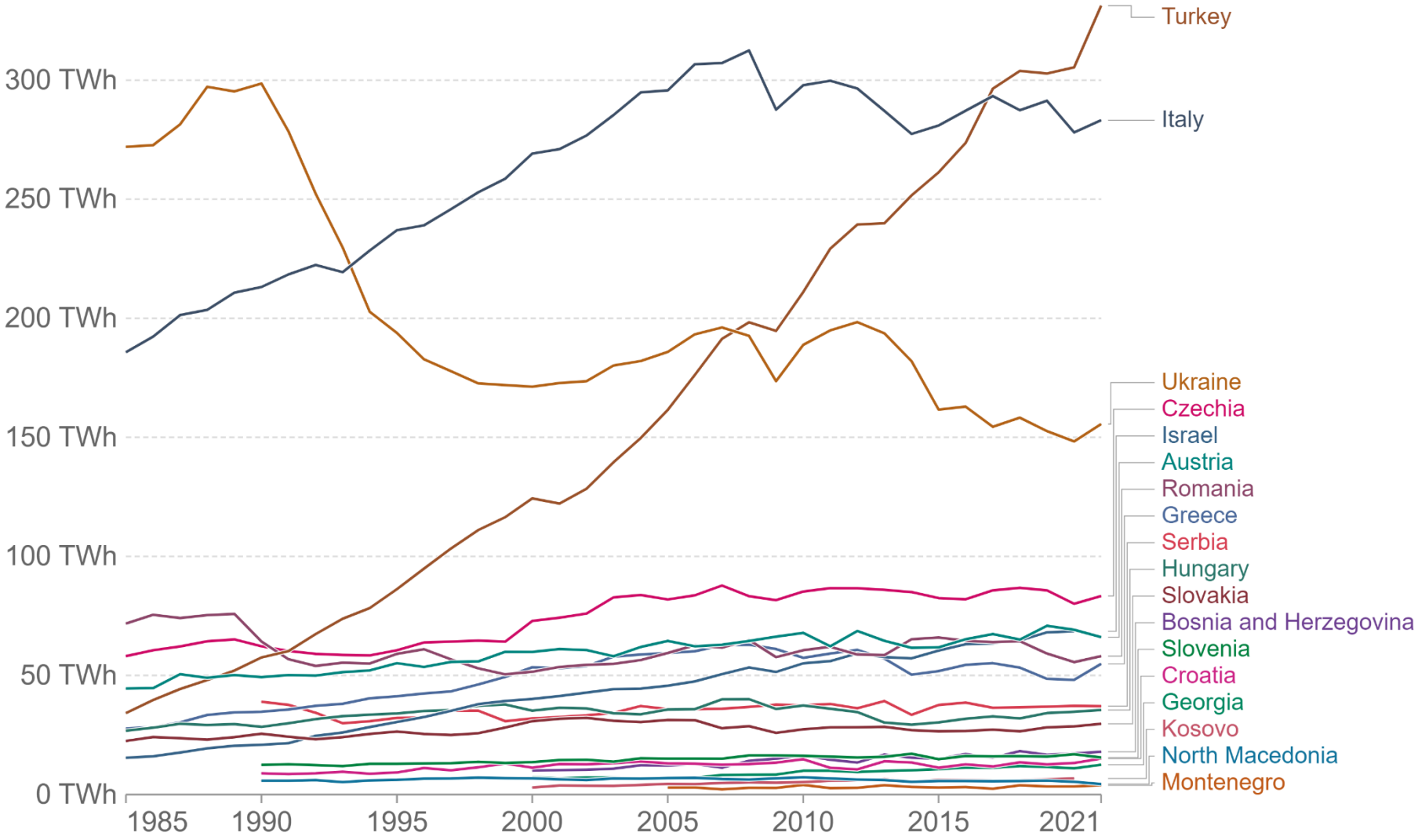
POPULATION (280 MILLION, ISRAEL INCLUDED)



General Outlook – Population (WB data)



Electricity generation



Source: Our World in Data based on BP Statistical Review of World Energy & World Bank

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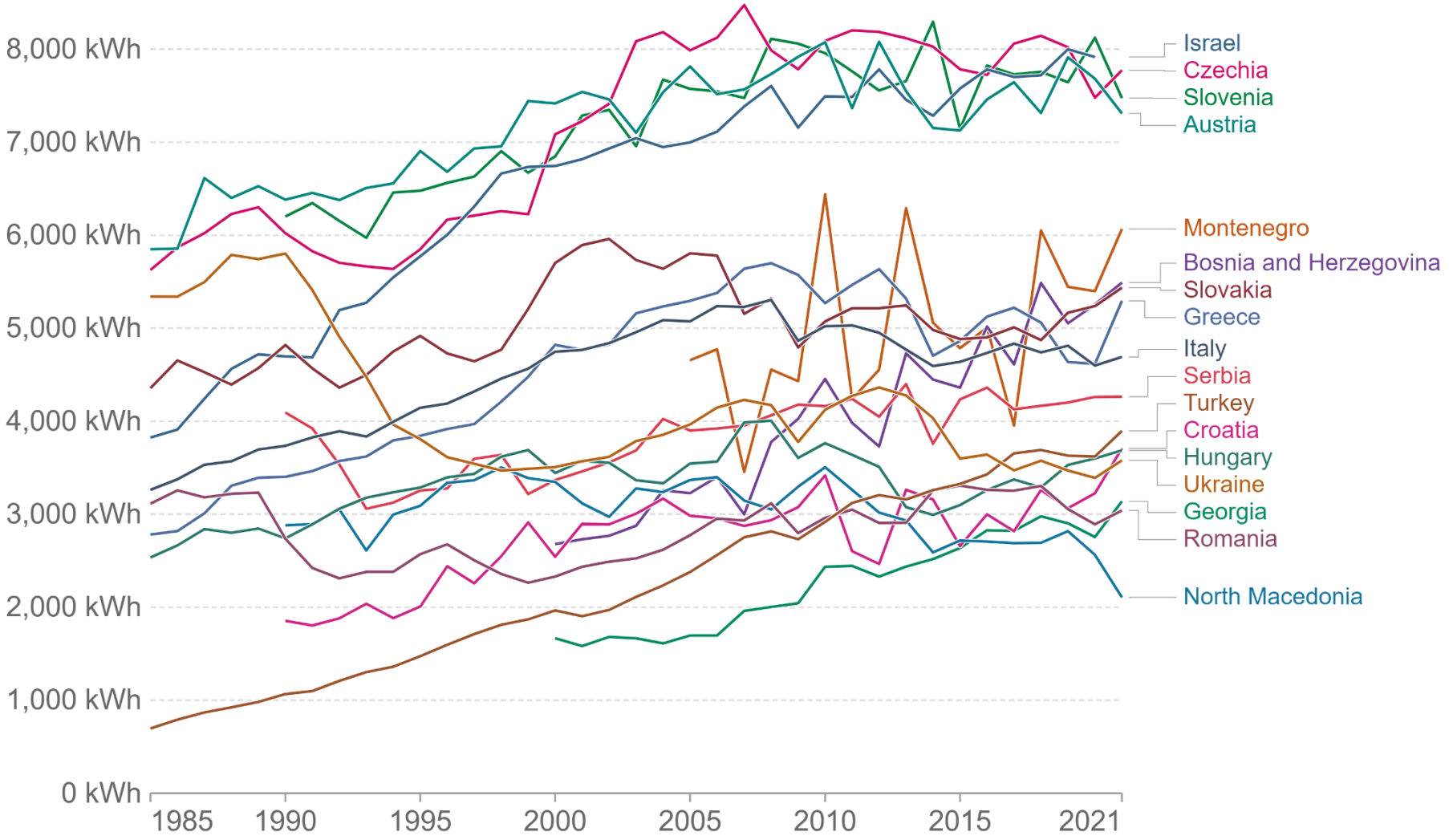
Per capita electricity generation

This is annual average electricity generation per person, measured in kilowatt-hours.



Source: Our World in Data based on BP Statistical Review of World Energy & World Bank

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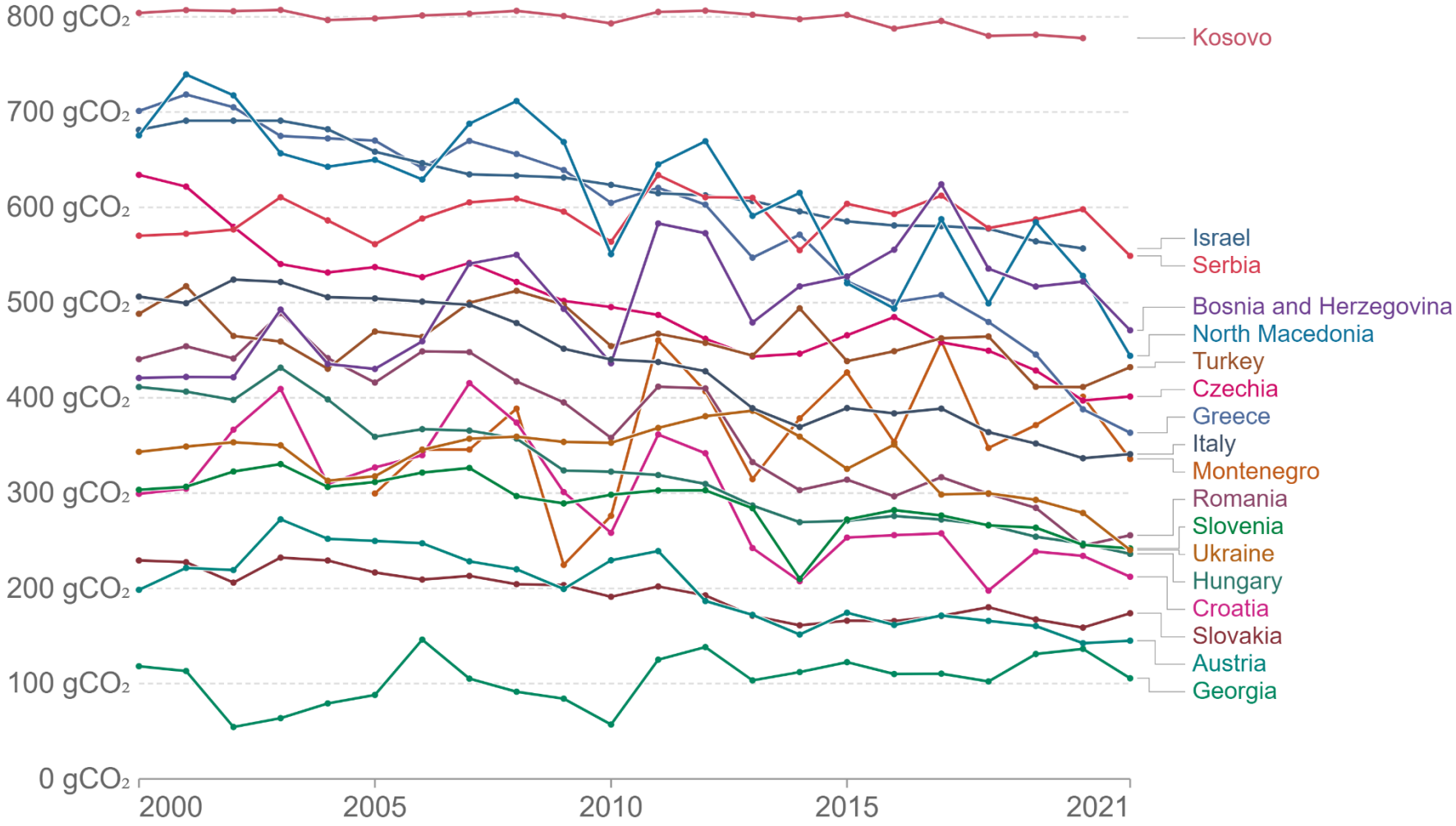
Carbon intensity of electricity, 2000 to 2021

Carbon intensity measures the amount of greenhouse gases emitted per unit of electricity produced. Here it is measured in grams of CO_2 per kilowatt-hour of electricity.

Our World in Data



Source: Ember Climate (from various sources including the European Environment Agency and EIA)

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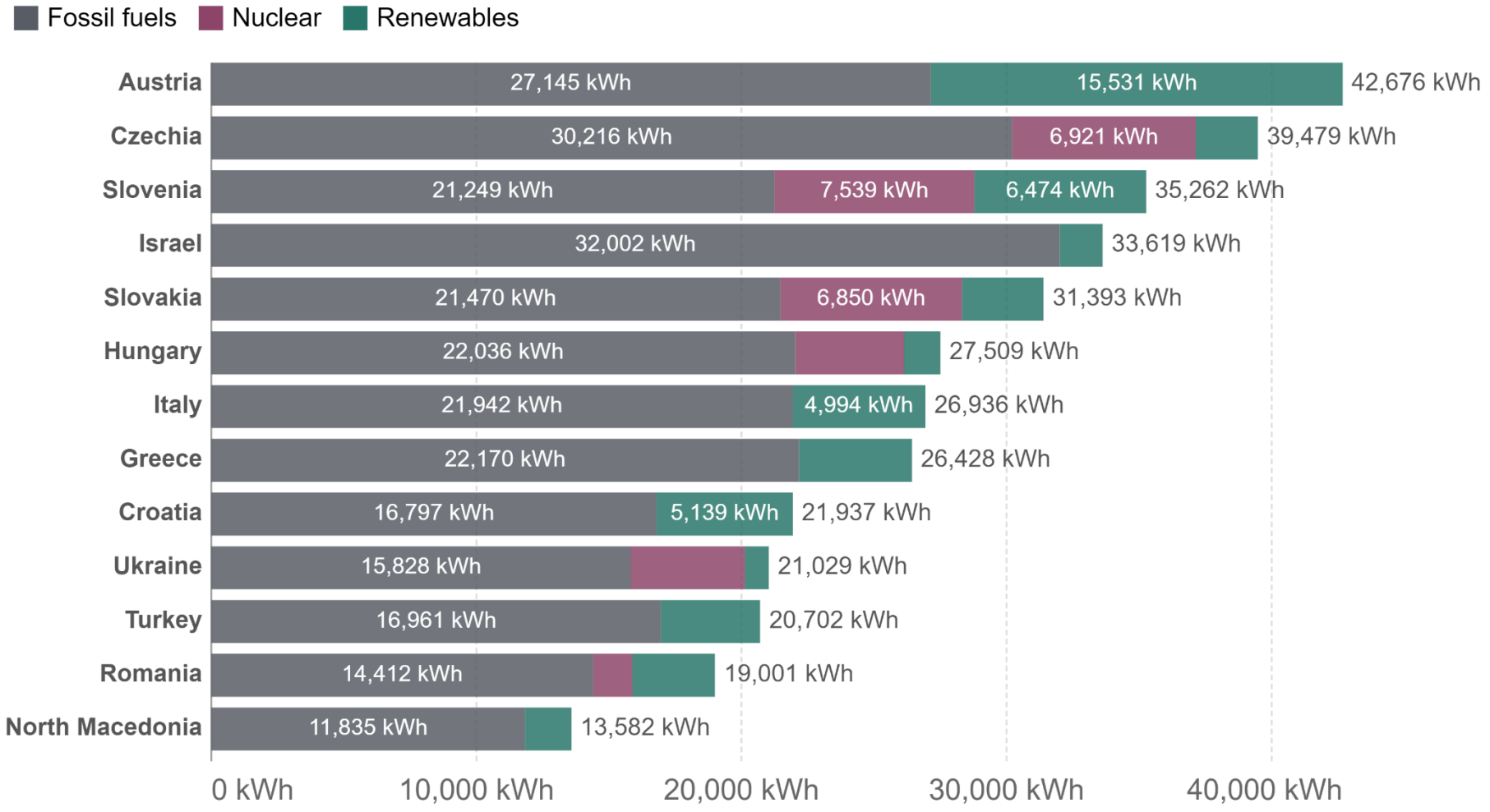
Per capita energy from fossil fuels, nuclear and renewables, 2020

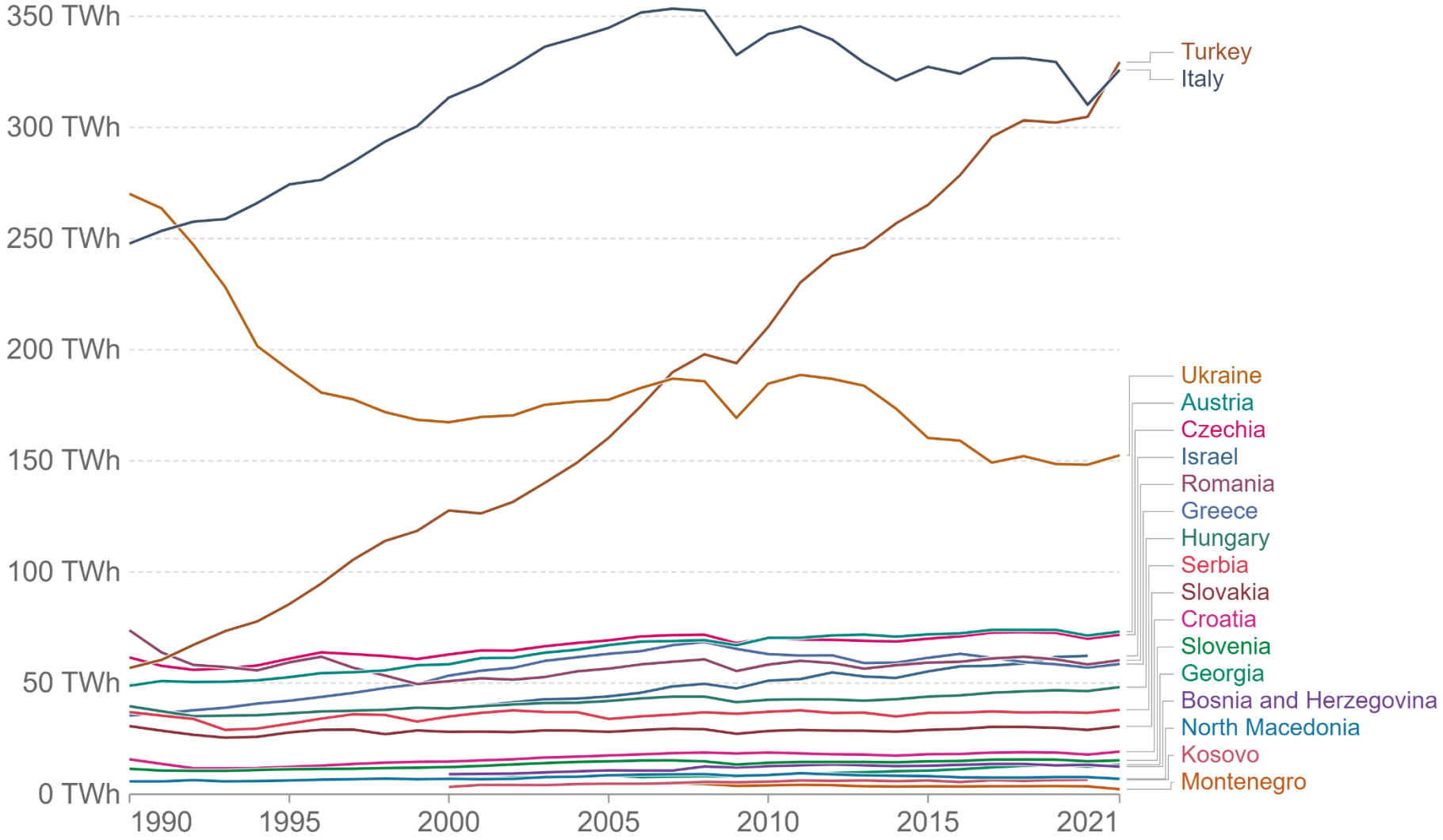
Primary energy is calculated based on the 'substitution method' which takes account of the inefficiencies in fossil fuel production by converting non-fossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.



Source: Our World in Data based on BP Statistical Review of World Energy

Electricity demand, 1990 to 2021

Electricity demand is measured as total electricity generation, adjusted for electricity imports and exports.



Source: Ember Climate (from various sources including the European Environment Agency and EIA)

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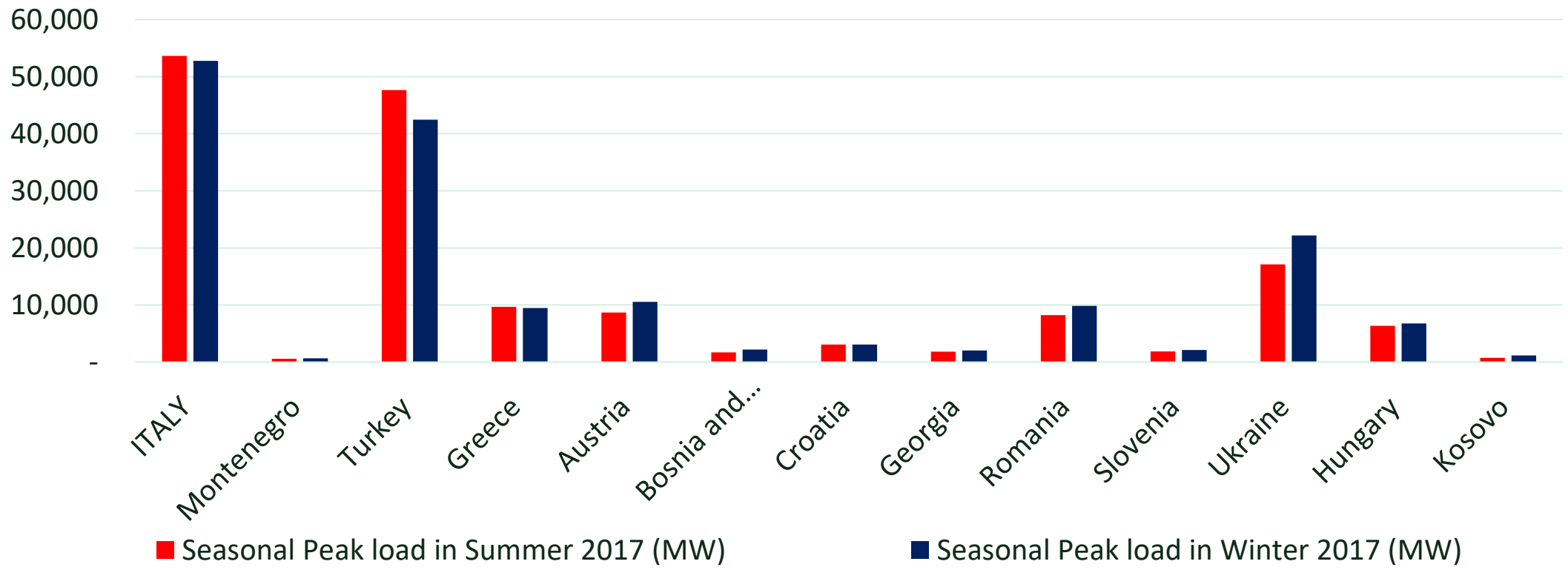
New topics for questionnaire 2024 - Proposal

- Consumption trends (key factors for the green transition)
- Storage capacity trend (hydro, hydrogen and electrochemical)
- HVDC transmission and distribution projects
- Fuel and electricity costs (war consequences)
- European projects and PhDs courses in electrical sector
- Artificial intelligence application on electrical grid
- Safety rules, reclosing and remote control for electrical distribution grids
- Climate disorder and effects on distribution and transmission grids

Energy Outlook - Seasonal Peak load in 2017 (MW)

Reference year 2017

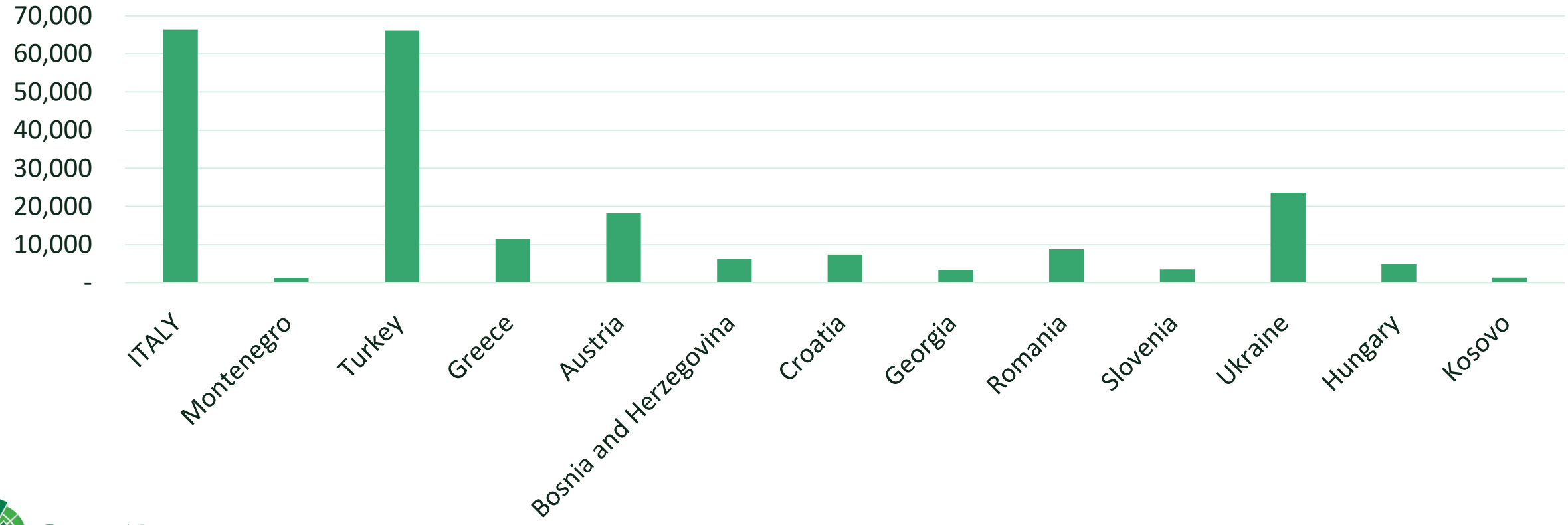


Preliminary data

Transmission and Distribution Outlook (2022)

Transmission overhead lines and cables (100 - 750 kV)

Total extension (2022 SEERC 222.679 km)



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2024 Questionnaire – Part 2

2. General Information

2.1	Population		according to the latest census estimates
2.2	Area		km^2
2.3	Gross National Income (GNI) per capita		PPP dollars (2020)
2.4	Gross Domestic Product (GDP) Per Capita		US dollars (2020)
2.5	Annual Growth Rate		% (2020)

PPP: Purchasing Power Parity

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2024 Questionnaire – Part 3.1

3. Power statistics of member country (for web site presentation) ✓

Reference year: *Please insert a year*

3.1	Consumption				
3.1.1	Total Consumption				GWh
3.1.2	Amount of household consumption in %				%
3.1.3	Amount of industry consumption in %				
3.1.4	Seasonal Peak Load		MW for Summer in 2020		MW for Winter in 2020

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2024 Questionnaire – Part 3.2

3.2	Generation				
3.2.1	General				
	Installed Capacity			MW	
	Annual Production			GWh	
	Annual Electricity Export			GWh	
	Annual Electricity Import			GWh	
	Percentage of electricity production by state-owned companies			%	
	Percentage of electricity production by private companies			%	
3.2.2	Thermal Generation				
	Nuclear		MW		GWh
	Gas		MW		GWh
	Coal		MW		GWh
	Other		MW		GWh
	Sub-total		MW		GWh
3.2.3	Hydro Generation				
	Hydro (dam)		MW		GWh
	Hydro (pump storage)		MW		GWh
	Hydro (run of river)		MW		GWh
	Other		MW		GWh
	Sub-total		MW		GWh
3.2.4	Renewables				
	Wind		MW		GWh
	Solar (PV)		MW		GWh
	Geothermal		MW		GWh
	Biomass		MW		GWh
	Other		MW		GWh
	Sub-total		MW		GWh

2024 Questionnaire – Part 3.3

3.3	Transmission Network (66-750 kV)		
	Transmission voltage level(s)		kV
	Circuit length for all AC transmission voltage levels		km
	Overhead lines length for all AC transmission voltage levels		km
	Underground/sea cables length for all AC transmission voltage levels		km
	Overhead lines length for all DC transmission voltage levels		km
	Underground/sea cables length for all DC transmission voltage levels		km
	Number of substations at transmission voltage levels		voltage level (kV)
	Power Transmission Transformers (66-750 kV)		estimated number of units
	Number of interconnection lines (please specify AC, DC, HVDC Back-to-Back connection) with other countries and their voltage levels		voltage level (kV)
	Name of Transmission System Operator (TSO)		
	Ownership of Transmission System Operator (State/Private)		
	Markets operated by Transmission System Operator		
	Electricity Markets operated by Electricity/Energy Market Operator (MO)		

2024 Questionnaire – Part 3.4

3.4	**Distribution Network (0.4-66 kV)**		
	Distribution voltage level(s)		kV
	Estimated circuit length in km for all distribution voltage levels (0.4 – 100 kV)		km
	Distribution transformers (0.4 – 66 kV)		estimated number of units
	Ownership of Distribution System Operators (DSOs) (State/Private)		

2024 Questionnaire – Part 4

4. Academic Statistics

Reference year: *Please insert a year*

4.1	Number of Universities	
4.2	Number of Universities having electrical and/or electrical-electronics engineering faculties	
4.3	Number of students at the electrical/electrical-electronics engineering faculties	
4.4	Number of the PhD, master and bachelor degrees in electrical/electrical-electronics engineering in reference year	
4.5	The number of bachelor (B.Sc.) degrees in electrical/electrical-electronics engineering in reference year	
	The number of master (M.Sc.) degrees in electrical/electrical-electronics engineering in reference year	
	The number of doctoral (Ph.D.) degrees in electrical/electrical-electronics engineering in reference year	
4.6	Taking into account all the master and bachelor students, specify in % how many of them move within Erasmus or similar international cooperation programs (estimated)	

2024 Questionnaire – Part 5.1

5. Questions for improving cooperation in SEERC region

5.1	**What technical field of electric power engineering do you prefer for a regional CIGRE cooperation?** *(please choose a maximum of 5 items)*
☐	Elements of electric power system (Generators/motors, Transformers, HV-MV-LV equipment, Materials)
☐	Sub-systems (Cables, OHLs, Substations, Protection/automation, HVDC and power electronics, Power plant performances, DC distribution, DTR systems, sensors),
☐	Systems and Interconnection (Development, Operation, Control, Planning approaches, Tools, Dynamics, Regional Trainings, Regional Market design, Regulation of system, Regional Power Exchange, Cooperation),
☐	Security of electricity supply, System adequacy, Stability issues, Power Quality,
☐	Power system resilience (Cyber Security, Damage preventing, System Recovery, Survivability),
☐	Environment, decarbonization and transition of power system
☐	Power system economics and social implications
☐	Renewables, Smart Grids (strategic views, observability/TSO-DSO interoperability, ancillary services/flexibility/aggregation, Electrical Vehicles issue, power-2-gas, DSM, DR, energy efficiency etc.)
☐	Institutional arrangements, , legal issues, standardization supports,
☐	Information and telecommunication technologies in Power sector, smart utilities, digitalization of system,
☐	Distribution system challenges, Smart Houses, Micro Grids, Smart local communities,
☐	Technological innovation in power sector

2024 Questionnaire – Part 5.2

5.2	**What are the technical areas which you would like to contribute to, generally?** *(please choose up to three CIGRE areas)*
☐	A1 Rotating electrical machines
☐	A2 Power transformers and reactors
☐	A3 Transmission and distribution equipment
☐	B1 Insulated cables
☐	B2 Overhead lines
☐	B3 Substations and electrical installations
☐	B4 DC systems and power electronics
☐	B5 Protection and automation
☐	C1 Power system development and economics
☐	C2 Power system operation and control
☐	C3 Power system environmental performance
☐	C4 Power system technical performance
☐	C5 Electricity markets and regulation
☐	C6 Active distribution systems and distributed energy resources
☐	D1 Materials and emerging test techniques
☐	D2 Information systems and telecommunication

2024 Questionnaire – Part 5.3-5.5

5.3	**What are the technical areas that you would like to contribute to at a regional level?** *(please choose a maximum of 3 items)*
☐	Regional cooperation in certain standards uprating
☐	Regional initiatives for innovation in Power sector
☐	Institutional arrangements, legal issues, market and regulation design, resilience issues,
☐	Large regional projects issues (covering more CIGRE SCs)
☐	None at the moment
5.4	**Please report (maximum 3 items) new topics of relevant technological innovations and advances in specific fields (diagnostic, HV, Dynamic lines ratings, smart transformers, cyber security, etc.) recently introduced in your country:** *Note: these subjects could be used for common financed project proposals (like H2020)*
1	
2	
3	
5.5	**Could you propose technical subjects, which are of regional interest for specific discussions, workshops or mature topics for WG or TF? (From your opinion)** *(Note: some of technical interested fields are: Renewable Energy Source as Mini Hydro, Micro-Hydro, Solar PV, Solar Thermal, Biomass, Wind Power Renewable, Energy Support Mechanisms, Market Design & Experiences with Renewable Integration, Electric Vehicle/Plug-in Hybrid Vehicle Integration, Energy Storage, Influence of Large Installation of Renewables on Power System, Smart Grid in Transmission or/and Distribution, Operational Aspects of RE, Access Requirements of RE, On Shore Interconnection, HVDC transmission (Overhead, Underground and Submarine, interconnecting two asynchronous AC systems, embedded), Conversion from Overhead to Underground Transmission, Long Distance HVAC Cables (i.e. Malta- Italy), Environmental issues with submarine cables, Future of Thermal Power plants, experiences with CCS, Artificial inertia, FACTS (SVC, STATCOM, TCSC, UPFC), PST, Synchronous condensers, Dynamic line rating, WAMS, Defense plan, Restoration, Dynamic security assessment, Operator training simulator, Forecasting tools, Acquisition of DG data, wide area monitoring and protection, substation automation, SCADE/EMS Systems, new control center applications, etc.)*
1	
2	
3	

2024 Questionnaire – Part 6-8

6. **Do you have any suggestions regarding the SEERC website or a better dissemination method for our work or better information exchanges inside SEERC membership?**

1	
2	
3	

7. **If you have additional proposals for SEERC technical activities, please state it below and it will be subject for discussion at the next TAC meeting.**

1	
2	
3	

8. **The membership data of National Committee (Please describe concerning year)**

	Membership type	Number of Members	Fee per membership in EURO
1	Collective I members		
2	Collective II members		
3	Individual I members		
4	Individual II members		
5	Student members		---

2024 Questionnaire – Part 9

9. Planned international/local events and activities for 2022-2023

9.1	List of international events planned/foreseen to be organized by CIGRE National Committee in 2022-2023 together with estimated dates (if any)	
9.2	List of local events planned/foreseen to be organized by CIGRE National Committee in 2022-2023 together with estimated dates (if any)	
9.3	Activities of NGN (if available) foreseen to be done during the period of 2022-2023	1.
9.4	Activities of WiE (if available) foreseen to be done during the period of 2022-2023	1.
9.5	Topics proposed for 4th SEERC Conference to be organized in Istanbul in 2023 *(Please propose maximum 3 topics)*	

2024 SEERC Questionnaire - Timing

- Call for questionnaire: May-June 2024
- Questionnaire replies: September – October 2024
- Questionnaire 2024 presentation results: December 2024

Thanks for your attention!