A GLIMPSE AT THE MEDITERRANEAN ENERGY MIX AND CROSS-BORDER INTERCONNECTIONS

MEDREG

FIND OUT MORE ABOUT MEDREG

AN OVERVIEW OF THE REGIONAL ENERGY MARKET

540 + MILLION — **PEOPLE**

240 + MILLION — **ELECTRICITY** CONSUMERS

70 + MILLION — **GAS** CONSUMERS

2000 + TWh — **GENERATED ELECTRICITY** (IN 2021)

OF WHICH **30%** — **RES**

100 + — **CROSS-BORDER INTERCONNECTIONS**

OF WHICH **50%** — **ARE IN THE EU**

150 000 + KM — **NATURAL GAS PIPELINES** (TSO+DSO)

SERVING NATIONAL CONSUMERS

7,5 MILLION KM — **ELECTRICITY TRANSMISSION AND DISTRIBUTION LINES**

OVER **290** GW — OF TOTAL **RES INSTALLED CAPACITY**

45 + BILLION $ — OF **PLANNED INVESTMENT**

IN HYDROGEN BY 2030

4 — **NATURAL GAS EXPORTING COUNTRIES**

27 — **OPERATIONAL LNG TERMINALS**

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REGIONS

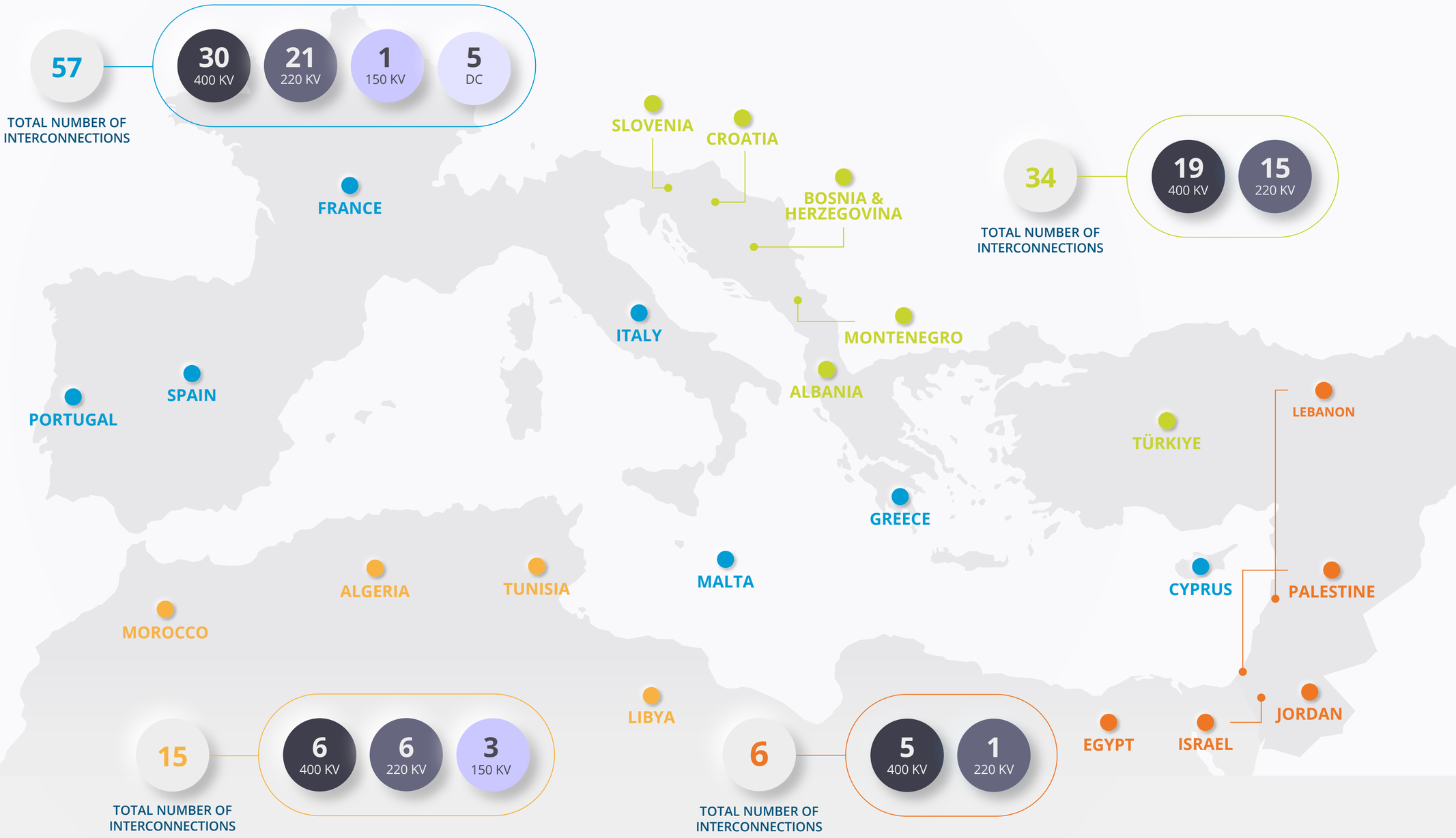
- Maghreb
- Middle East
- The Balkans and Türkiye
- EU MEDREG member countries

INTERCONNECTIONS CAPACITY

- 400 Kv
- 220 Kv
- 150 Kv
- DC (Direct current)

For more information on the interconnections between MEDREG member countries, please go to our **MEMO report**

1. CROSS-BORDER INTERCONNECTIONS BY REGION



MAGHREB REGION

• The Maghreb region is interconnected through **15 transmission lines** between the countries and to the European network through the **Morocco-Spain interconnection.**

• **Exchanges** among the Maghreb countries **are currently low compared to existing capacities,** instead interconnections are used for the security of supply. Efforts are needed to develop a regional market in the Maghreb, integrating renewable energies and strengthening security of supply.

• **Further interconnections are planned** (i.e., between Morocco and Portugal and between Italy and Tunisia).

• **Tunisia** imports electricity from **Algeria**, while **Libya** imports electricity mainly from **Egypt** to ensure security of supply.

MIDDLE EAST REGION

• There is a **limited number of 6 cross-border interconnections** in the Middle East region due to the fact that Middle East countries have focused on developing national infrastructure for **security of supply** and **meeting growing power demand.**

• Multiple projects were announced in 2021 to reinforce cross-border interconnections, including a **new transfer station in Jordan to connect with Iraq** and a memorandum of understanding for **interconnection projects between Jordan and Saudi Arabia.**

• **Palestine** imports all its electricity needs from **Israel**, while Israel has limited cross-border interconnections only with Palestine.

• There is a **proposal** to establish a **Euro Asia interconnector connecting Greece, Cyprus, and Israel** through a submarine cable with a capacity of 2000 MW. The first stage is expected to be completed by December 2025 with an initial transmission capacity of 1000 MW.

THE BALKANS AND TÜRKIYE

• Cross-border interconnections in Türkiye and the Balkan region are **well developed, facilitating energy exchanges.**

• However, **some interconnections in Türkiye with some countries** like Armenia, Azerbaijan, Iraq, Iran, and Syria **are currently not operational.**

• **Energy exchanges play a crucial role in covering electricity demand,** with countries like **Slovenia, Croatia, and Albania relying on imports** (depending on the hydrological conditions), while **Bosnia and Herzegovina, and Türkiye are net exporters.**

EU MEDREG MEMBER COUNTRIES

• The regional market in the EU MEDREG member countries is **well developed** and **supports security of supply** through imports from neighbouring countries.

• Countries in the market can be classified as net exporters or net importers of electricity, with **France** playing a key role in supporting the security of supply for many countries through its nuclear production.

• **Italy** heavily relies on energy imports from neighbouring countries to meet its electricity needs.

REGIONS

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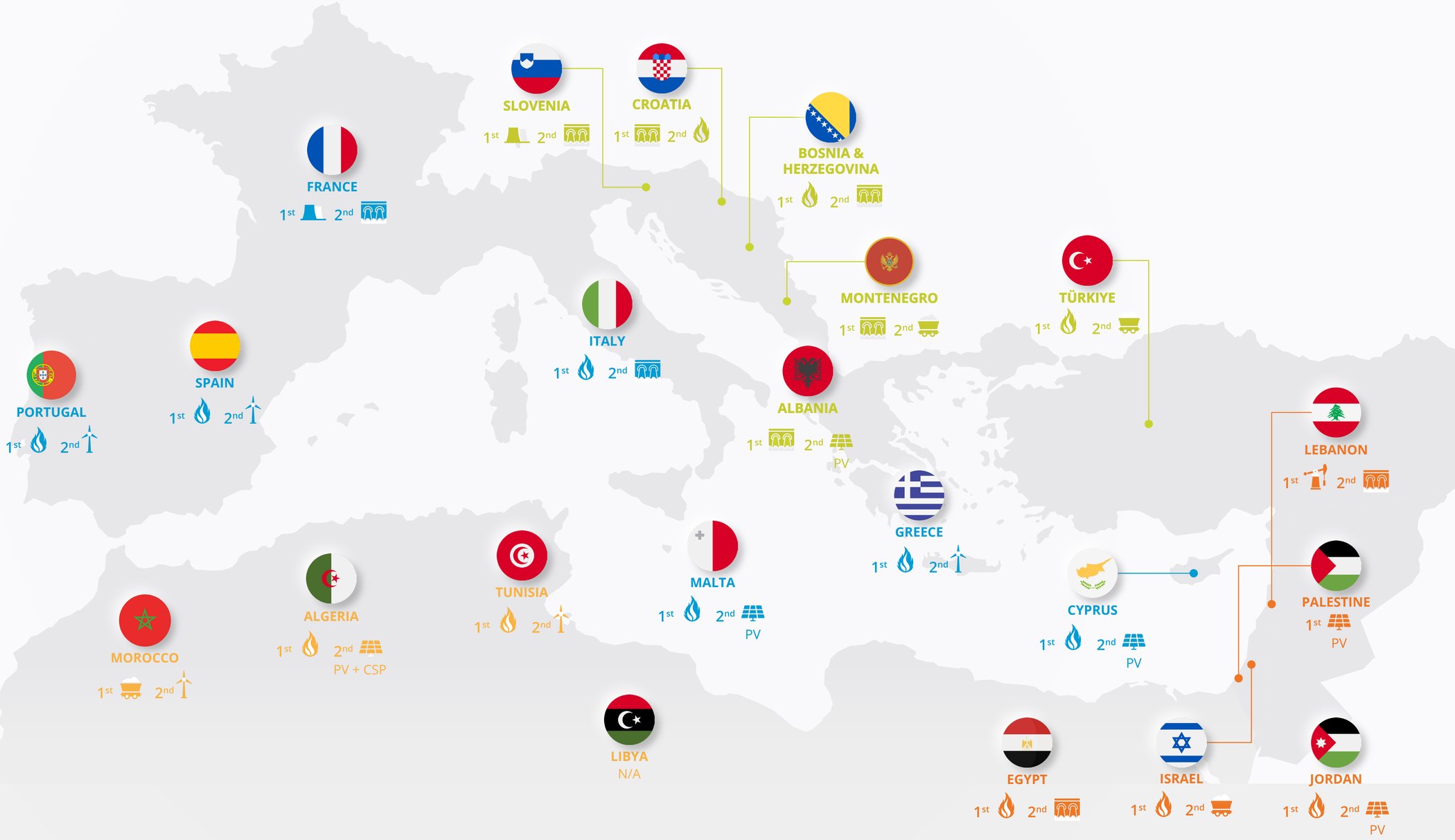
ELECTRICITY SOURCES

COAL · OIL · HYDRO · NATURAL GAS · NUCLEAR · SOLAR · WIND

CSP: CONCENTRATED SOLAR POWER
PV: PHOTOVOLTAICS

2. ENERGY MIX BY COUNTRY



3. ENERGY MIX BY REGION

MAGHREB REGION

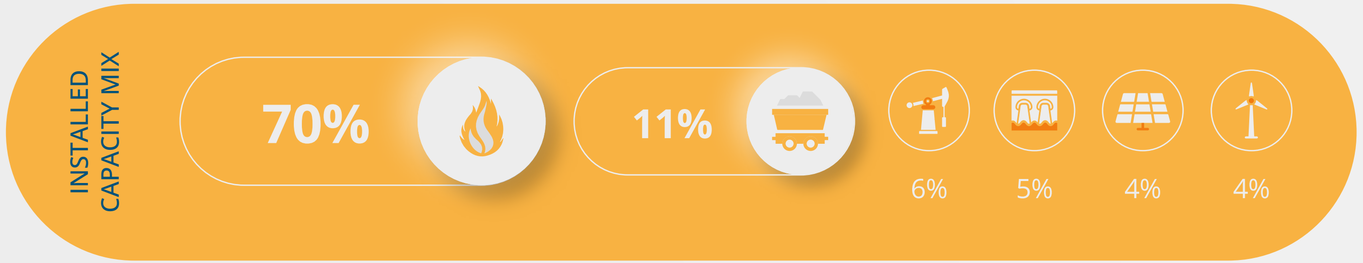
140 TWH

TOTAL GENERATION CAPACITY

• **The Maghreb region**'s energy mix is dominated by conventional production, primarily natural gas in Algeria, Tunisia, and Libya, while Morocco has a diverse mix including coal, gas, hydro, and renewable energy sources (RES).

• Natural gas represents almost 70% of the installed capacity in the Maghreb region, followed by coal at 6%, and RES at 8%.

• Morocco has the largest share of RES capacity in the region, accounting for 85% of the total.



MIDDLE EAST REGION

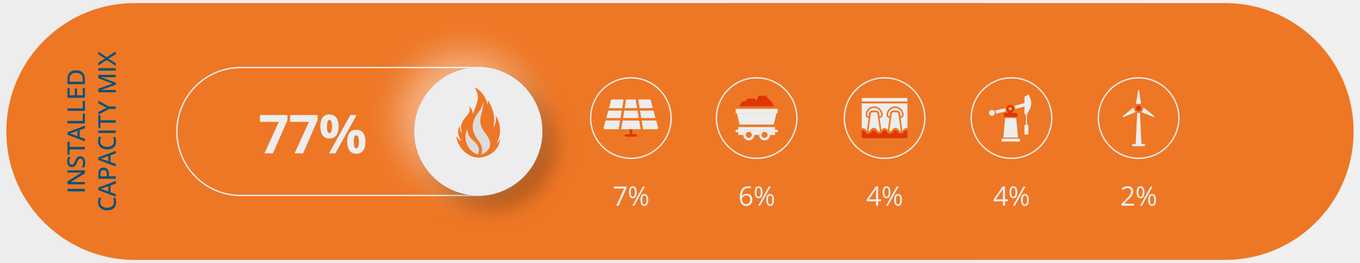
310 TWH

TOTAL GENERATION CAPACITY

• Natural gas dominates the energy mix in **Middle East MEDREG member countries**, representing 77% of installed capacity, while renewable energy sources (RES) account for 13%.

• Combined cycle and steam turbines, which are optimal for integrating RES, make up 55% of installed capacity.

• The development of RES has led to a 2% reduction in the share of conventional energy sources in the region since 2019, with Israel and Egypt reducing coal usage and adopting natural gas and solar PV.



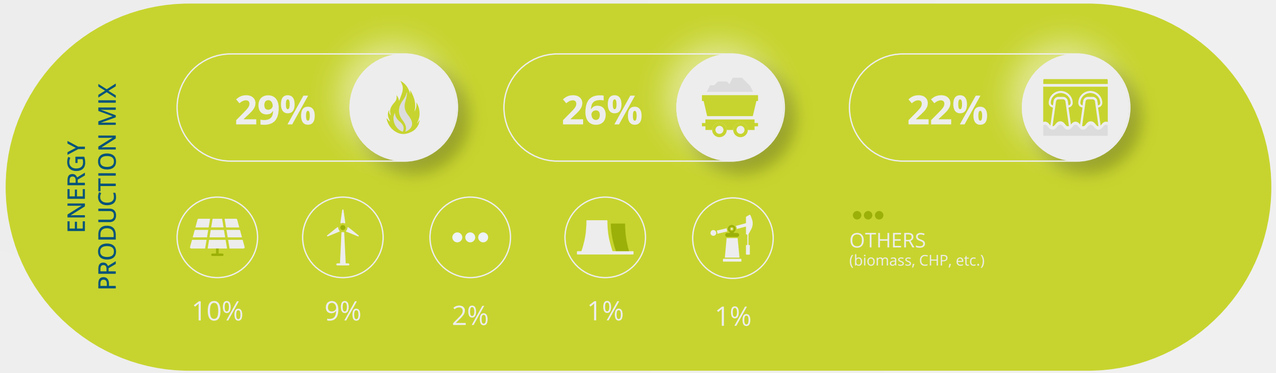
THE BALKANS AND TÜRKIYE

320 TWH

TOTAL GENERATION CAPACITY

• The installed capacity is well diversified in **Türkiye and the Balkans**, with fossil fuel-based technologies representing 45% and the rest being shared among multiple renewable energy sources.

• The energy mix is primarily dominated by hydraulic power, which is the main source of electricity production in three out of six countries, followed by natural gas and coal.

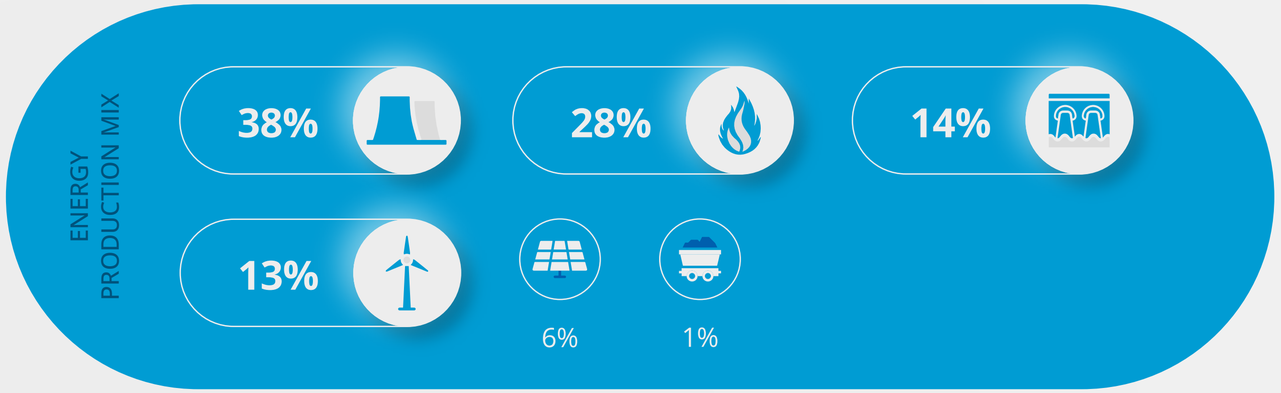


EU MEDREG MEMBER COUNTRIES

970
TWH

TOTAL GENERATION CAPACITY

- In terms of the energy mix in **EU MEDREG member countries**, nuclear power accounts for at least 38% of total production, followed by renewable energies at 33% and natural gas at 28%.
- The installed capacity is distributed among various technologies, with renewable energies representing around 50%, followed by natural gas at 24%, and nuclear power at 17%.
- The policy towards nuclear power varies across countries, with France planning to commission additional reactors by 2050 while Spain intends to phase out nuclear power plants by 2035.



4. CONCLUSIONS AND RECOMMENDATIONS

MAGHREB REGION

- Design and implement measures and actions to **reduce non-technical losses**, contributing to a more robust electricity system.
- **Increase the energy efficiency** measures as most of the consumption comes from residential consumers.
- Develop common rules and approaches to **improve the electricity exchanges** among the countries.
- Establish a transparent and **clear regulatory framework for RES and facilitate the investment rules** for private and external producers.

MIDDLE EAST REGION

- **Reduce non-technical losses** to improve the electricity system, as for the Maghreb region.
- Extend and **pursue efforts to increase RES in the energy mix** to achieve the energy transition objectives.
- **Promising cross-border interconnection projects** that will increase the stability of the electrical systems and improve the security of supply.
- **Energy efficiency measures** need to be implemented to reduce the consumption and maintain the balance between supply and needs.

THE BALKANS AND TÜRKIYE

- **International electricity exchanges** are a key element to **maintain the electricity system balance** in the Balkan countries.
- Regulators should **tackle technical and non-technical losses.**
- **Diversification of energy sources** is highly recommended **to reduce the dependence of hydrological conditions** in some countries.

EU MEDREG MEMBER COUNTRIES

- **Cross-border interconnections** highly supported the balance of the electricity systems in the EU during the last energy crisis.
- **More interconnections are required in Malta and Cyprus** to improve the security of supply in these countries.
- **Diversify the energy mix** to reduce the fossil fuel dependence.
- **Increase RES**, including alternative solutions such as hydrogen and biogas, in the energy mix to **achieve the decarbonisation** of the electricity market.