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

AN OVERVIEW OF THE REGIONAL ENERGY MARKET

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- 540 + million people
- 240 + million electricity consumers
- 70 + million gas consumers

- 2000 + TWh electricity generated in 2021, of which 30% from RES
- 100 + cross-border interconnections, of which 50% in the EU
- 150 000 + km natural gas pipelines serving national consumers

- 45 + billion $ of planned investment in hydrogen by 2030
- 290 GW of total RES installed capacity
- 7.5 million km electricity transmission and distribution lines

- Over 4 natural gas exporting countries
- 27 operational LNG terminals

FIND OUT MORE ABOUT MEDREG
1. CROSS-BORDER INTERCONNECTIONS BY REGION

**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.
**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.

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**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.

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**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.

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**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.
2. ENERGY MIX BY COUNTRY

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

ELECTRICITY SOURCES
- COAL
- OIL
- HYDRO
- NATURAL GAS
- NUCLEAR
- SOLAR
- WIND
- CSP: CONCENTRATED SOLAR POWER
- PV: PHOTOVOLTAICS

PORTUGAL
- 1st
- 2nd

SPAIN
- 1st
- 2nd

ALGERIA
- 1st
- 2nd

TUNISIA
- 1st
- 2nd

LIBYA
- N/A

MOROCCO
- 1st
- 2nd

SLOVENIA
- 1st
- 2nd

CROATIA
- 1st
- 2nd

BOSNIA & HERZEGOVINA
- 1st
- 2nd

MONTENEGRO
- 1st
- 2nd

TURKEY
- 1st
- 2nd

TUNISIA
- 1st
- 2nd

EGYPT
- 1st
- 2nd

ISRAEL
- 1st
- 2nd

JOORDAN
- 1st
- 2nd

LEBANON
- 1st
- 2nd

PALESTINE
- 1st
- PV

PORTUGAL
- 1st
- 2nd

SPAIN
- 1st
- 2nd

ITALY
- 1st
- 2nd

ITALY
- 1st
- 2nd

GREECE
- 1st
- 2nd

ALBANIA
- 1st
- PV

MONTENEGRO
- 1st
- 2nd

TURKEY
- 1st
- 2nd

TUNISIA
- 1st
- 2nd

EGYPT
- 1st
- 2nd

ISRAEL
- 1st
- 2nd

JOORDAN
- 1st
- 2nd

LIBYA
- N/A
3. ENERGY MIX BY REGION

MAGHREB REGION

• 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

• 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 TÜRKİYE

• 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.
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 TÜRKİYE
- 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.