

MED & Italian Energy Report

Geopolitics of energy in the Mediterranean area
between international crises and new energy commodities

SUMMARY



Energy geography: key figures

- The EU, with a total consumption of 58.2 exajoules, generates a GDP of almost \$17 trillion. China, which has the same GDP, consumes almost three times as much energy (159.4 exajoules), while the US is in the middle, consuming 95.9 exajoules to generate a GDP of \$25 trillion. Europe has the best ratio of energy consumption to GDP, consuming far less energy than China and also slightly less than the US as a proportion of GDP. Europe is still on the road to sustainability in terms of energy savings and efficiency.
- **China, the USA, the EU and India remain among the world's largest energy consumers accounting for 58% of total consumption** (China and the USA 26% and 16%, EU 10%, India 6%).
- With an average of 55.5% of energy imports, **Europe** has the largest energy dependency among big economies. From this perspective the only totally self-sufficient country is the USA. China has 20% of energy import.
- **Among the major European countries, Italy shows the highest level of energy dependency: 73.5%**, followed by all the other big EU economies. France, which uses nuclear power, is the country with the lowest dependency at 44.2%.
- **Europe has changed the composition of its generation mix over the last 20 years.** The use of coal has dropped from 31% to 16%, while natural gas has grown significantly from 12% to 20% because (being a fossil fuel with the lowest emissions) it was conceived as a buffer to support energy transition. The most important rise has happened in renewable energies that have increased from 15% to 38%. In the meantime, EU renewable electricity **pace of expansion has been considerable and it is expected to more than double up to 2027.**
- **Italy** significantly increased the use of **gas** and **renewables** for electricity production which are now the two most important ways to produce electricity (accounting for 54% and 35% of the electricity mix, respectively).
- Spain is the country with the most balanced mix, albeit with a greater weight of renewables, which account for 41% of the total; Germany is the country with the highest use of coal (31% of the total), even if in strong reduction. France's energy mix is dominated by nuclear (63% of the total).

The war in Europe has created geopolitical turmoil by impacting supply security, and the new crisis in the Middle East (although for now with few direct consequences on the energy market) raises questions about the stability of a crucial area. The main consequences:

- **Changes in the order of priority among the three main desirable attributes of energy systems.**
 - Sustainability and zero emission targets were at the top of the energy trilemma of sustainability, security and equity. But since Russia's invasion of Ukraine, the triangle has rotated, and **'security' has risen to the top and will remain there for a long time.**
 - Security of supply and the goal of reducing dependency have become essential elements of European energy strategies.
 - before the beginning of the war (2021) **Russian gas** accounted for **more than 41%** of total EU gas imports. **In the first 9 months of 2023**, Russian gas imports stood at around **6.3%** of the total for the EU.

○ **Increasing and crucial role played by LNG.**

- **LNG ensures high flexibility, diversification** and the possibility of **quickly installing new capacity**. In the **EU**, the **import of LNG** increased from 80.5 Gcm/y in 2021 to **132.8 Gcm/y in 2022**, and it already reached 100.2 Gcm during the first nine months of 2023.
- **LNG** was crucial in **diversifying** the gas suppliers for Europe after the **Ukrainian war**: the **US increased LNG export to Europe**, followed by **Qatar** and **Algeria**. Between 2021 and 2023 the US boosted exports from 26% to 30% and Algeria from 11% to 15%.
- **LNG from Russia** has a **non-negligible incidence in EU supplies**, equal to 13.0 Gcm (i.e. 12.9% of the total), showing a stable or slightly growing trend. Most of these Russian LNG flows are imported by **Belgium, Spain** and **France**.
- **LNG** is **beneficial for energy security**, but it leads to negative effects from the economic affordability perspective, due to **higher costs** and to **market competition** phenomena, especially with Asian markets. The new expected role of LNG as a possible "game changer" will be probably accompanied by an **evolution of the LNG market**, focused on finding a balance between long-term LNG contracts (to reduce the exposure to price volatilities) and short-term spot LNG purchases (to allow for supply flexibility).
- **Italy is the emblem of this change** because **Russian gas imports from the TAG pipeline** arriving in Tarvisio **decreased from 28.4% in 2020 to 2.4% in the first 10 months of 2023**. While gas imports from Algeria via the Transmed pipeline arriving at Mazara del Vallo increased from 12% in 2020 to 20.2% in the first 10 months of 2023. **A real Algeria-Russia substitution effect**. Which was also a shift of the energy barycentre from the EAST to the SOUTH, thus restoring centrality to the Mediterranean.

○ **Dependency and energy security supply became central issues.**

- The conflict has highlighted the **critical dependency** of some countries on **captive corridors** like gas pipelines. In particular, in May 2022, the Russian gas company **Gazprom stopped** the gas supply to Europe via the **Yamal-Europe** pipeline, while on 26 September 2022 the **Nord Stream 1 and 2** pipelines directly connecting Russia and Germany through the Baltic Sea were severely **damaged by explosions**.
- The conflict also had a significant **economic impact**, leading to a remarkable **increase** of energy commodity **prices** during 2022. F.i., the gas price on the Dutch hub Transfer Title Facility (TTF, benchmark for the EU), grew from about 70 €/MWh on 21 February 2022, immediately before the conflict, to more than 170 €/MWh on 7 March, reaching a **peak** of **about 350 €/MWh** on 26 August, with relevant negative impacts on both household income and productive sectors. **After this peak**, the capability of reaching the gas storage filling targets, the enhancement of alternative gas supply options (increase in LNG regasification capacity and in gas flows through other pipelines) and the reduction in gas demand (-13.8% in the EU in 2022 w.r.t. to 2021), led to a **decrease in gas prices**. Since March 2023, gas prices have stabilised at around €50/MWh, **well below the peak** but still almost **double the 2021 level**.
- **In response** to the crisis, the EU launched the **REPowerEU plan**, which aims to rapidly **reduce energy dependency on Russia** and accelerate the ecological transition through a series of measures based on **three pillars: diversification** of energy supply, energy **savings** and increased penetration of **renewables**. The **value** of the plan is **300 G€**, with 210 G€ of new investments in addition to those already foreseen in the "Fit for 55" strategy.

- L'attuale instabilità geopolitica in Medio Oriente si inserisce in un'area dove ci sono diversi passaggi strategici e vulnerabili dal punto di vista della sicurezza energetica mondiale. Il **20% del commercio mondiale di petrolio passa dallo Stretto di Hormuz** e il **10%** del traffico mondiale di **petrolio e l'8%** dell'**GNL** transitano dal **Canale di Suez**. Insieme in questi due soli passaggi transitano oltre 26 milioni di barili di petrolio al giorno.
- The current geopolitical instability in the Middle East is framed in an area where there are several strategic and vulnerable global energy security passages. 20% of the world's oil trade passes through the Strait of Hormuz while 10% of the world's oil traffic and 8% of LNG flows through the Suez Canal. More than 26 million barrels of oil per day pass through these two passages.

The Mediterranean basin has historically been characterized by a net flow of oil and natural gas from its Southern shore to the Northern and Eastern areas. Moreover, the Mediterranean basin plays a crucial role as crossing hub for the European supply of energy commodities coming from the rest of the world.

- Currently, the Northern and Eastern shores rely on the Southern for **18% and 27% of their overall imports** of crude oil and gas, respectively.
- In the countries of the Southern shore, whose economies **heavily depend on the export of fossil fuels**, the promising solar and wind potentials are in stark contrast with the very little **share of renewable capacity**, which is **as small as 9.8%**.
- In **EU countries of the Northern shore**, the push towards renewables is fostered by the **European Commission** itself, who requires the publication of **National Energy and Climate Plans (NECPs) every two years** and supports MCs to accomplish their decarbonization targets.
- The **export of crude and oil products** from Mediterranean countries matches a non-negligible portion – **about 9% for both** – of the demand of European, non-Mediterranean countries.
- **Saudi Arabia, Iraq and Nigeria** stand out among the major **exporters of crude oil** to the Mediterranean, while **Russia** and the **USA** are the largest exporters of **refined products**.

The transition towards a decarbonized energy system is presently an undeferrable need, to be tackled with a multicommodity energy system.

- **Electricity will reasonably take on a pivotal role** in accomplishing the decarbonization of the Mediterranean energy system, but **electrification of all the final energy uses** may be unlikely. Therefore, the development of a **multicommodity energy system** could effectively promote the decarbonization of the Mediterranean energy system.
- Mediterranean countries should significantly increase the rate of penetration of renewables if they wish to match their 2030 renewable energy targets. **RES development and implementation** on the three shores and in individual countries show **stark differences**. In fact, out of **309 GW of renewable installed capacity** in the Mediterranean, **76% is located in the Northern shore only, 18% in Turkey, and only 3.6% in the entire Southern shore**.
- The **urgency of installing considerable amounts of generation capacity** could lead them to **outsource all the required human resources training, engineering, procurement, and construction services** to extra-national companies, hence **depending on foreign countries** to increase the penetration of renewables within their national borders.

The decarbonization of the current energy system and its processes requires commercial scale diffusion of new technologies.

- **In terms of energy efficiency**, electricity is by far the preferable technological choice. In fact, **very little losses** occur along electricity pathways, which show **overall energy efficiencies even above 90%**.
- The considerable uptake of green hydrogen implies that the share of renewables must consistently increase. For example, to match the 2030 target of **42% green hydrogen consumption in the industrial sector**, EU countries of the Northern shore must deploy a **considerable additional amount of PV and wind capacity**. For example, **Italy should install about 10 GW of further PV capacity**, meaning 12.5% of the PV target value for 2030.
- On the other hand, the development of a **widespread and transnational hydrogen infrastructure** would not only support the **integration of RES at scale**, since hydrogen can be stored for long periods, but also and more importantly, **increase the energy security of supply** of Mediterranean countries, especially those of the Northern shore.

Implementing the energy transition implies other geopolitical risks, related to the need for critical raw materials for “green” technologies.

- **Green technologies require** significant amount of **critical raw materials** (CRMs): solar PV technologies require large amounts of copper; wind turbines rely on copper, rare earths, manganese and nickel; Li-ion batteries use all the CRMs except for platinum and rare earths; electric motors use copper and rare earths.
- An onshore wind plant requires nine times more mineral resources than a gas-fired plant. And an electric car contains an average of 207 kg of various minerals, including graphite, copper, cobalt, nickel, rare earths, lithium and manganese (used in the construction of electrical and electronic parts) compared to 33.6 kg for a conventional car: **six times the amount of minerals used in a conventional car**.
- These **raw materials** are **concentrated** in a **small number of countries**. The highest country shares are related to **Congo** for cobalt (66%), **Australia** for lithium (54%), **China** for natural graphite (65%) and rare earths (65%), and **South Africa** for platinum (72%);
- **Mediterranean countries**, and in particular the European ones, have **limited availability** of those resources; only Morocco is included among the top three world producers of phosphorous. This fact can “condemn” them to **significant “new” dependencies**, due to the new paradigm determined by the energy transition.
- In response to these criticalities, the **EU has proposed** in 2023 the **Critical Raw Materials Act**, outlining **measures** to ensure a secure and **sustainable supply of critical raw materials** (CRMs). The goal of this Act is to reach at least **10%** of the EU’s annual consumption covered by **domestic extraction**, **40%** covered by **domestic processing**, **15%** covered by **domestic recycling** and **no more than 65%** covered by **single third country**.
- A **scenario analysis** assessing the quantity of raw materials needed for reaching the **penetration targets** of renewables foreseen by national plans **by 2030** in the Mediterranean area **shows** that **demand largely exceeds the current Mediterranean production** for most of the materials, including cobalt, lithium, natural graphite and nickel. Furthermore, **in case of rare earths** the Mediterranean countries are **completely reliant on third countries**.

Ports are becoming essential hubs for green energy transition and strategic geopolitical tools. Italy as a key energy bridge in the core of the Euro-Med relations.

- All over the world, **ports are focusing on the energy transition to become zero-emission ecosystems**, also thanks to the growing role of renewable energy sources, and are implementing investment strategies for projects involving smart grids, technologies to replace fossil fuels with green hydrogen and ammonia, electricity generation from wind and solar farms, and the capture, storage and use of CO₂.
- The bunkering of new fuels will become a key element of competitiveness in the near future. There are currently **178 active LNG bunkering ports worldwide (and 91 planned facilities)**, while more than 2,000 ships are or will be equipped with shore-side electrical connections (*cold ironing*).
- **Ports** are increasingly becoming a **geopolitical instrument of influence** used by major powers to **increase** their **connectivity** with countries deemed strategic.
- **The results of a survey of 173 port authorities located in 85 countries** clearly show that port investment is heavily focused on infrastructure, energy transition and sustainability: **over 90% of all responding ports have planned to invest in infrastructure and sustainability**. Another interesting finding is that **31% of ports are planning to allocate space for renewable energy production**, while 13% will expand existing energy production facilities.
- As an example of an increasingly attentive approach to environmental issues, **the Northern Range ports are investing heavily in sustainability**. **Rotterdam, Antwerp and Hamburg** share the goal of contributing to a low-carbon economy, with projects that include hydrogen, renewable energy production, fossil fuel replacement, shore-side power and CO₂ transport and storage.
- **Positive examples can also be found in the Mediterranean**, and these include **Valencia and Suez**. For the years 2022 and 2023, seven agreements worth \$1.34 billion have been signed by ports near the Free Zone. The search for synergies with international partners to produce green hydrogen in the Suez Canal Zone recently led to the signing of an agreement worth \$15.6 billion between the Suez Canal Zone and a group of Chinese companies to develop the production of green fuels. An alliance that would create around 9,000 jobs through the implementation of 11 projects.
- The Suez Canal Authority's initiatives to **turn the Suez Canal into a green shipping corridor by 2030** are also worth mentioning.
- There are examples, including in the Italian context, where innovation, the strengthening of the industrial supply chain and the reduction of pollution go hand in hand with the significant energy characterization that the Italian port sector has been showing for some time. **Ancona, Cagliari, Civitavecchia, Genoa, Leghorn, Ravenna, Taranto** are some of the ports engaged in sustainability-related projects.
- **Several initiatives have been launched thanks to NRRP funding**. The allocation for Green Ports amounts to €270 million; 9 Port Network Authorities are beneficiaries of amounts on the Tyrrhenian and Adriatic sides and 31 projects have been awarded to 8 port systems for the implementation of renewable energy and energy efficiency measures.
- **34% of port traffic is liquid bulk** (over 169 million tonnes in 2022). The **top five Italian energy ports** (Trieste, Cagliari, Augusta, Milazzo and Genoa) **account for around 70% of energy traffic**.
- Italian ports can actively contribute to global decarbonisation efforts because they are fossil fuel terminals, pipeline outlets, and close to energy-intensive industries. Moreover, thanks to

their proximity to potential renewable energy production areas in North Africa, investments in sustainable infrastructure and logistics are helping to make our ports key players, strengthening Italy's geo-strategic position in the Mediterranean.