EXECUTIVE SUMMARY

MED & Italian Energy Report 2024

The energy transition in the Mediterranean between sustainability and security: a dynamic think-tanking approach

6th Annual Report

In a world characterized by high complexity and a continuous flow of information, the "dynamic think-tank" approach, by integrating a holistic vision based on data and models, allows for a "science-based" support to the policy-decision making, improving its speed and effectiveness, through ex ante impacts assessment of the policies to be implemented and almost real-time monitoring of the systems' evolution.

- Currently the world is experiencing **rapid evolution**, characterized by an increasing amount of generated data, due to the continuous interaction between actors at different levels, a rapid exchange of information and a growing digitization, leading to an **unprecedented** level of **complexity**.
- **Energy system**, in particular, can be described as a **complex system** based on 5 main layers (physical, cyber, socio-economic, environmental, and geopolitical) deeply intertwined and continuously interacting with one another.
- Policy **decision-makers** in the energy field have to deal with the complexity and multidimensionality of the context, trying to **balance** the **three** main **goals**, i.e. environmental **sustainability**, energy **security** and **equity** (related to economic affordability of energy), which can be conflicting in some cases.
- To address these challenges, it is crucial to adopt a **science-based** and **evidence-based** approach that uses **data**, to allow a quantitative description of the current state of the considered system and the identification of possible issues in specific domains, and **mathematical models**, to capture, represent and simulate the mechanisms at the basis of the evolution of the considered system, enabling a better understanding and **ex-ante analysis** of the **impacts** of decisions, allowing alternative scenarios to be tested in advance of their implementation.
- The two types of analysis involved in this approach are the quantitative analysis of different **"what-if" scenarios** associated with the different options that can be implemented by policy makers, and the **tracking** over time through the definition of Key Performance Indicators (**KPIs**) related to the covered dimensions.
- A **dynamic think-tank** is a collection of knowledge, usually multi-disciplinary, mathematical models and data tracking systems that gives the policy decision-makers the possibility to get **customized answers** to their questions, almost in real-time, and to **explore** the most updated **information**, automatically collected. It integrates a holistic vision based on data and models and represents a fundamental element in providing an **objective view** of the **analysed system**.
- Unlike traditional "static" think-tanks that produce static reports, a dynamic think-tank uses **advanced IT tools**, such as interactive **web platforms**, bringing several advantages in terms of speed of response, adaptability to decision-makers'

needs, and **constant interaction** between the **think-tank** and the **decision-makers**, thus ensuring a shared definition of the objectives, a continuous testing during the development phase and an effective usability of the tools by the officers of the decision-makers.

- Interaction of the users with the platform and outcomes of services are made available by: 1) traditional **web-interfaces** for laptop and notebook screens; 2) **decision theatre** (semi-immersive environment allowing for an enhanced interaction between the users and the platform); 3) **interactive storytelling** (synthetic answers, called "stories", to specific instances of the decision-maker, automatically generated by the platform, but completely customisable by the decision-maker.
- **The tools**, by means of the quantitative assessment of the impacts and the state of the considered system, allow a continuous and almost **real-time monitoring** of its **evolution**, offering the decision-maker the possibility of **recalibrating** the undertaken **choices** and adapting the **strategies** for ensuring the achievement of the set goals.

The new ENEMED-Plat web-based platform applies the innovations and advantages of dynamic think-thanking. The platform gives its users the opportunity to dynamically explore the energy system of the Mediterranean Basin, filling the gaps left by the paper reports. Users can ask the platform – within given bounds and limitations – any question they wish to know the answer to.

- The ENEMED-Plat platform is an interactive, **web-based SW platform** that effectively implements the concept and the features of **dynamic think-tanking** to the energy system of the Mediterranean Basin and its countries, enabling its users to dynamically investigate the topics of **energy security** and **energy transition** at **different time and spatial scales.**
- The core of ENEMED-Plat is a vast **data lake**, where data is **automatically retrieved** from multiple sources, validated, and uploaded onto the platform itself, always providing the users with the **latest available information**. Users can inquire about the most relevant aspects of the Mediterranean energy system and **customize data views** by means of filtering and pivoting operations.
- ENEMED-Plat incorporates a customizable **library of mathematical functions** that implement more or less sophisticated models to carry out both **what-if scenario** and **contingency management** analyses.

- ENEMED-Plat offers an **Interactive Storytelling** section, where **customizable reports** about specific aspects of the Mediterranean energy system can be quickly produced, starting from **pre-set versions** where several fields can be **arbitrarily edited** and automatically modify the rest of the sheet.

The Mediterranean region is facing a crucial challenge to ensure both the transition process towards decarbonization and the security of its energy supply, in a period of widespread geopolitical instabilities (like the Russia-Ukraine war, the Red Sea crisis, and the conflicts in the Middle-East), highly affecting the energy context.

- The Mediterranean region shows quite an **even distribution of population** among its shores: 209 million people in the Northern Shore (38% of the total), 216 million people in the Southern Shore (39%) and 125 million people in the Eastern Shore (23%).
- There are significant **differences** from the **economic** perspective: in 2023, the majority of the GDP was allocated to the Northern Shore (6.63 T$/y, 6.8% of world GDP), followed by the Eastern Shore (1.73 T$/y) and by the Southern Shore (93 T$/y). The gap is even broader considering per capita values: 24.4 k$/pers. in the Northern Shore vs. only 1.6 k$/pers. and 1.9 k$/pers. in the Southern and Eastern ones, respectively.
- The energy demand shows uneven allocation: in 2021, the total primary energy supply (TPES) of the **Northern Shore** was 23.8 EJ/y (**58%** of the Mediterranean overall **TPES**), while the Southern Shore accounted for 8.9 EJ/y and the Eastern Shore for 8.3 EJ/y.
- In terms of **GHG emissions**, in 2021 the **Northern Shore** was responsible for 1.1 GtCO2eq/y (**47.0%** of the Mediterranean total), while the Southern Shore for 0.7 GtCO2eq/y (26.6%) and the Eastern Shore for 0.6 GtCO2eq/y (26.4%).
- Wrapping up, the **Northern Shore** has a surface 1.8 times the one of the Eastern Shore and 0.3 times the one of the Southern Shore, a **GDP** 3.8 times the one of the Eastern Shore and **7.1 times** the one of the **Southern Shore**, a **TPES** 2.9 times the one of the Eastern Shore **and 2.7 times** the one of the **Southern Shore**, and **GHG emissions** 1.8 times those of the Eastern Shore and **1.6 times** those of the **Southern Shore**.
- The **carbon intensity** of **supply** (the ratio between GHG emissions and TPES) in 2021 was 81.6 gCO_{2eq}/MJ in the Southern Shore, 72.7 gCO_{2eq}/MJ in the Eastern Shore, and 44.4 gCO_{2eq}/MJ in the Northern Shore. Similarly, the **carbon intensity** of the **economy** (the ratio between GHG emissions and GDP) was 0.17 $kgCO_{2eq}$/$ in the

Northern Shore, 0.85 $kgCO_{2eq}$/$ in the Southern Shore and 0.38 $kgCO_{2eq}$/$ in the Eastern Shore. Moreover, the **energy intensity** of the **economy** (the ratio between TPES and GDP) was 3.8 MJ/$ in the Northern Shore, 5.2 MJ/$ in the Eastern Shore and 10.5 MJ/$ in the Southern Shore.

- **Carbon intensity of supply** of **Southern Shore** is **1.9 times** the one of **Northern Shore** and times the one of Eastern Shore. **Carbon intensity of the economy** of **Southern Shore** is **5 times** the one of **Northern Shore** and 2.2 times the one of Eastern Shore. **Energy intensity of the economy** of **Southern Shore** is **2.8 times** the one of **Northern Shore** and 2 times the one of Eastern Shore.
- These figures show that large values of both TPES and GHG emissions in the **Northern Shore** simply come from it being a **bigger energy consumer** w.r.t. the other two shores, but that **its energy mix** (thanks to an historically higher sensibility towards environmental issues) **is more sustainable** and **efficient**, especially w.r.t. the Southern Shore.
- The Mediterranean Basin contains 8.32 Gt of the global **proved crude oil reserves** (3.4% of global oil reserves) and 6.76 Tm^3 of **natural gas** (3.6% of global gas reserves). Most of them are located in the **Southern Shore**: Algeria, Libya and Tunisia together hold 95.0% (7.9 Gt) of the crude oil reserves, while Algeria, Libya and Egypt own 86.5% (5.85 Tm3) of the natural gas reserves.
- The high energy demand of the Northern Shore, coupled with the vast oil and gas reserves in the Southern one led to a **fossil-based energy dialogue** across the Mediterranean basin. In 2021, the Northern Shore imported 33 Mt/y of crude oil, 8.5 Mt/y of refined petroleum products and 47 Gm^3/y of natural gas from the Southern one, respectively corresponding to 18%, 9% and 27% of their total imports, and the Mediterranean Basin also worked as energy hub for other European countries.
- This energy dialogue has been **strongly affected** by the geopolitical tensions arisen in the last years, in particular the **Russia-Ukraine conflict** (started in February 2022) and the **Middle East crisis** (begun in 2023).
- Focusing on natural gas, the need for rapidly replacing the flows from Russia has led to an increase in the exploitation of the existing captive infrastructures like the Transmed pipeline, linking the Algerian Hassi R'Mel field and the Italian entry point in Mazara del Vallo. In few months, **Algeria** has **replaced Russia as** the **main** gas **supplier to Italy**. The gas imports from Algeria through the Transmed pipeline increased from 29.5% of the total Italian gas import in 2021 to 34.3% in 2022, and to **38.0% in 2023**. Oppositely, the incidence of Russian supplies through the TAG pipeline (with national entry point in Tarvisio) decreased from 39.4% in 2021 to 16.0% in 2022 and to just 4.2% in 2023.

- Besides the increasing role of captive corridors, the importance of liquified natural gas (**LNG**) considerably **grew**, since it can ensure **higher diversification**, **flexibility** and the possibility of adding **new** regasification **capacity** rapidly, by purchasing and installing Floating Storage Regasification Units (FSRU).
- For example, **Italy** both increased the exploitation of the 3 already existing LNG terminals (Adriatic LNG, close to Rovigo; Snam LNG terminal in Panigaglia; OLT Offshore LNG Toscana, close to Livorno) and started the operation of a **new terminal**, the FSRU Golar Tundra, close to **Piombino**, with a capacity of 5 Gm^3/y; moreover, an additional FSRU (the BW Singapore) is planned to be installed close to **Ravenna** and begin its operation in 2025, with a capacity of 5 Gm^3/y (leading to a total of 28.1 Gm^3/y).
- If a key relevance was assumed by LNG imports from the USA, the role of **Algerian LNG** increased in the last 3 years as well, passing from 10.9% on the total LNG imports in the Mediterranean region in 2022 to **17.2% in 2024**.
- Not only Algeria is a relevant LNG supplier for the other Mediterranean countries, but the **Mediterranean** region **plays** a **crucial role** as **partner for Algeria**. In 2022, 85.0% of the LNG Algerian export was directed towards the Mediterranean countries, (83.7% in 2023 and 90.5% in 2024).
- Considering the geopolitical tensions in the Middle East area, a particular effect has been caused by the **Red Sea crisis**, due to the Houthi attacks against vessels sailing in the Red Sea. In fact, the weight of crude oil imported **through** the **Red Sea decreased** from more than 16% of the total crude oil import of the Mediterranean region in October 2023, to **about 4% in February 2024** and then stayed always below 5%. Moreover, the **LNG** flows passing **through** the **Rea Sea** have completely **stopped since February 2024.** At the same time, the average **voyage duration** for the supply of these commodities significantly **grew**, due to the need for vessels of rounding the Cape of Good Hope, with the **increase** in **delivery costs**.
- The tensions in the Middle-East area are also **affecting** the foreseen **expansion** of the **Leviathan** natural **gas** offshore **field**, in the Levantine basin. In October 2024, the Israeli company NewMed Energy, which owns 45.34% of the stakes in the field, announced a delay of six months – due to the uncertainties related to the Israel-Hamas conflict – in the expansion operations.

The construction of a new "green" dialogue based on renewables across the Mediterranean should be an opportunity not only for reaching the sustainability targets, but also to structurally reduce the energy

dependency from extra- Mediterranean countries. Several critical aspects have, however, to be carefully considered to avoid negative side effects.

- The Mediterranean region (specifically the Southern Shore) shows promising **solar** and **wind potentials**. In terms of Global Horizontal Irradiance (GHI) and wind speed, the **Southern Shore** presents average values of 5.67 kWh/m2 and 8.76 m/s respectively.
- Despite this potential, the **majority** of the solar photovoltaic (PV) and wind **installed capacity** is concentrated in the Northern Shore (the one with the lowest potential): out of 112.5 GW of PV installed capacity in 2023, 92.1 GW (81.9%) are located in the Northern Shore, and only 3.2 GW (2.8%) in the Southern one; similarly, for wind capacity (onshore and offshore), over a total of 92.6 GW, 76.4 GW (82.5%) are installed in the Northern Shore and only 12.2 GW (4.3%) in the Southern one.
- **Electricity** is expected to play a **central role** in the energy transition, but it will likely be **supported** by **other commodities**, both renewables, like green hydrogen and alternative fuels (biofuels and synthetic fuels), and non-renewables (like nuclear heat), and could be helpful in matching the needs of the broad range of final uses (including "hard-to-abate" sectors), following a **multi-commodity** perspective.
- The **exploitation of** the Mediterranean **RES potential**, besides providing **positive** impacts on the environmental **sustainability**, would enable the reduction in the energy import **dependence**, the strengthening of the geopolitical **relationships** across the Mediterranean, and the development of **new industrial value chains** (fostering the creation of new job positions), mobilizing significant **investments** in new infrastructures.
- Some crucial **barriers** have to be overcome: among them, a key element are the Critical Raw Materials (**CRMs**) necessary to manufacture some of the technologies for the transition, like batteries (e.g. Lithium), solar PV panels (e.g. Gallium) and wind turbines (e.g. Boron). The increase in the need for CRMs would cause a growing dependence from extra-Mediterranean countries, with possible issues in terms of security; for example, in 2023, 67.9% of the production and 38.1% of the reserves of rare earth elements, and 74% of the production and 21.4% of the reserves of graphite were located in China.
- Moreover, attention needs to be paid to the **economic model** to be implemented, given that the countries of the Southern Shore are **rentier states**: for instance, in 2021 crude oil revenues were equal to 14.5% of the Algerian GDP, 56.4% of that of Libya and 3.0% of the Egyptian one, while natural gas rents amounted to 8.0% of the GDP in Algeria, 4.6% in Libya and 2.1% in Egypt. A

possible new green dialogue should **avoid** creating **economic instabilities** that may also lead to negative **social repercussions**.

- A significant **enabling factor** for the transition is represented by **ports**, which are emerging as **energy** and **digital hubs** as well as logistics hubs. They could facilitate the transition in different ways, including spatial planning, investments in sustainable energy solutions, promotion of cleaner fuels in the port area, collaborations with several stakeholders in the transport and energy fields, implementation of shore-to-ship power services and increase in the efficiency of port operations.

Since Houthi rebel groups have started attacking ships travelling through the Red Sea in October 2023, the ordinary operation of crude oil and Liquefied Natural Gas (LNG) tankers that used to sail through the Suez Canal to reach the Mediterranean Basin has significantly been impacted both in terms of delivery times and costs.

- In the period 2019-2023, the relevance of Mediterranean crude oil imports **travelling through the Red Sea** showed differences when looking at various shores and countries. The Northern Shore was mildly dependent on Red Sea crude imports, whose weight **oscillated between 7% and 13%**, with the only exception of Greece, which was always delivered **more than 24%** of its crude from the Red Sea. The same trend characterized **Türkiye**, reaching a **maximum dependence of 33% in 2021**. Thanks to its vast local resources, the Southern Shore always registered negligible dependencies.
- When looking at **LNG**, Mediterranean imports through the Red Sea in the same period **registered a decreasing trend** in both the Northern and Eastern shores**: from 21% to 13%**, and **from 17% to 2%**, respectively. **Italy** was by far **the most dependent country**, because of the **large volumes imported from Qatar** that **always surpassed 40%**, spiking at **69%** in 2021. Also in this case, the Southern Shore imported almost no LNG through the Red Sea, mainly thanks to its extremely large resources.
- The situation drastically changed after the **first attacks of the Houthi rebel groups** off the coasts of the Gulf of Aden, on **October 19th, 2023**. Crude oil and LNG tanker ships **rescheduled their routes** to not sail through the Red Sea anymore and **started rounding the Cape of Good Hope** and entering the Mediterranean Basin from the Gibraltar Strait. Therefore, in 2024, not only the weight of both Mediterranean crude oil and LNG imports through the Red Sea substantially decreased, but **the average voyage duration** of journeys leaving from the ports of the Persian Gulf **grew from 20-25 days to 40-45 days**.

- **The tensions in the Red Sea** had severe **repercussions** on the costs incurred by shipping companies, which first imposed **additional insurance fees** on several routes to account for additional risks, delays and difficulties in sailing through the Red Sea, while **shipping fuel costs more than doubled**. Egypt, which collects transit fees from ships crossing the Suez Canal, claimed that ships rerouting caused a 6 G$ loss during the first eight months of 2024.

The vast availability of fossil resources in the Southern Shore, coupled with the lack of resources and the large energy consumptions of the Northern and Eastern shores, has historically led to a net flow of fossil commodities – especially natural gas – from the Southern two the other two shores. A potential disruption of the ordinary Southern Shore gas supplies may threaten the security of the natural gas supply systems of the other Mediterranean countries.

- In the period 2013-2022, exports of natural gas from the Southern Shore have **oscillated above and below 20%** of the total imports of the Northern and Eastern shores together. In 2022, the Southern Shore exported **54.1 Gm^3/y** of natural gas to the other two shores, accounting for **22.7%** of their imports. **Algeria was the main exporter** and alone weighted for **19.2%** of the total Southern Shore exports. Among importing countries, **Italy** depended on the Southern Shore for **41.3% of its imports (26.0 Gm^3/y)**, also registering the highest dependency on Algerian gas, equal to **35.8%. Spain** was also heavily dependent on the Southern Shore, whose exports weighted for **27.0% of the total (10.7 Gm3/y).**
- The outbreak of the **Russo-Ukrainian conflict** urged Northern Shore countries to **diversify their natural gas import mix** to progressively replace Russian gas imports, while maintaining the proper operation of their natural gas systems. In this framework, **LNG imports** significantly increased (**from 55.8 Gm^3/y to 87.8 Gm^3/y**) from 2021 to 2022, following the need to diversify their gas supplies and increase the security of their import mixes: for example, French LNG imports registered an **87.1% growth**, from **18.4 Gm^3/y** to **34.5 Gm^3/y**, while Italy's went **from 9.4 Gm^3/y to 14.1 Gm^3/y (50.2% more).**
- 2022 also saw the **rise of the USA** as the main LNG supplier not only for the Northern Shore, but for the entire EU27. In fact, if in 2021 American LNG weighted for 27% of the total European LNG supply (20.3 Gm^3/y out of 75.3 Gm^3/y), its share **grew to 41%** the following year (**53.0 Gm^3/y out of 128 Gm^3/y**). In the Southern Shore, **LNG exports from Egypt** to the Northern and Eastern shores registered a **maximum of 5.3 Gm^3/y in 2022**, more than twice the previous year's. Quantities exported from **Algeria** consistently **surpassed 11.0 Gm^3/y every year** from 2013 to 2024,

underscoring the role of the country as a primary natural gas and LNG supplier for the other two shores.

- Several Mediterranean countries either increased or planned to increase their **total national regasification capacity**. Italy, France, Spain and Türkiye started operating an additional **LNG regasification terminal in 2023**, and Greece started the commercial operation of the new **Alexandroupolis LNG terminal** in **October 2024**. France and Italy will further expand their national regasification capacity within the next two years (2.6 Gm^3/y and 5.0 Gm^3/y, respectively). Cyprus will build its **first LNG regasification terminal** ever, with a **0.80 Gm^3/y** annual capacity.
- LNG represents an effective way **to improve the security of supply** of a country's natural gas system diversifying the mix of exporting countries. However, it is not as cost competitive as natural gas imported via pipeline, which is generally purchased with **long-term procurement contracts**, whereas LNG is sold on the **spot market** at **higher prices**. Additionally, if LNG traded quantities are expected to sharply grow, so should the global **liquefaction capacity**. Moreover, LNG supplies can be subject to potential **disruptions** and/or **perturbations** affecting **supply corridors** regardless of the origin country, such as the case of the ongoing tensions in the area of the **Red Sea**.

The transition towards the decarbonization of the Mediterranean energy system is happening at different speeds in the three shores, with the Southern Shore dramatically lagging behind the other two, while burdened by an economic system too largely dependent on fossil fuels. However, if adequately exploited, the intensities of the solar and wind resources would be so promising to produce enough electricity to both match their internal demand and export surplus electricity towards the other two shores.

- When comparing the values of **solar irradiance** and **wind speed** of the three Mediterranean shores, the Southern Shore stands out as the most suitable area for the diffusion of onshore photovoltaic (PV) and wind generators. In fact, its monthly average Tilted Global Irradiance is equal to **287 kWh/m^2**, the Northern Shore's and Eastern Shore's being respectively **0.72 and 0.85 times**. Similarly, in comparison to a mean wind speed (at 10 m height) of **3.66 m/s** in the Southern Shore, the Northern and Eastern could harvest average values of **2.47 m/s (0.68 times)** and **2.43 m/s (0.67 times).**
- The Mediterranean Basin presents variable conditions for the profitable installation of **offshore wind turbines** (OWTs). Offshore wind speeds (at a height of 100 m) can vary **from 4 m/s to 10 m/s**, while seabed depths span from **200 m in the Adriatic Sea** to even **5,000 m in the Ionian Sea**. Considering the technical, environmental

and regulatory constraints, the Mediterranean Basin could potentially host **more than 1 TW** of OWTs capacity, almost equally split between the Northern and the Southern Shore.

- Considering electricity generation from PV, it would take **less than 1%** of the surface of Southern Shore countries to generate enough electricity to not only match **their future electricity demand**, but to also produce **surplus electricity** that could be exported to the other two shores. For example, if all the available surface in the **Egyptian region of Buhayra** were destined to the installation of PV modules, surplus electricity would be enough to match the future demand of the Northern Shore **1.3 times** and that of the Eastern Shore **3.2 times**.
- When looking at generation from OWTs, the estimation of **the local wind and bathymetry conditions** must be coupled with an accurate evaluation of **environmental and use restriction constraints**. In Italy, in the locations of **Brindisi** and **Carloforte**, a 1 GW-sized plant could generate **2.65 TWh/y** and **2.82 TWh/y** at an average **levelized cost of electricity (LCOE)** of **227 €/MWh** and **235 €/MWh**, respectively. In comparison, the higher wind **capacity factor** harvestable around the **French Vermillion Coast** could yield an annual production of **4.66 TWh/y** at almost half the LCOE, namely **132 €/MWh**.
- In the framework of the energy transition, a complementary role could be played by **Wave Energy Converters** (WECs), potentially in remote areas without any power interconnections with the mainland. A 30 MW large WEC farm installed off the coasts of the island of **Pantelleria** (Italy) could provide **14%** of the island's current electricity demand, currently almost completely matched by diesel generators, however at an LCOE of **663 €/MWh**. WECs are still an **under-development technology**, thus their LCOE is not yet competitive.
- In order to shift from the present, fossil-based energy dialogue, to a **new "green" energy dialogue** based on the production and trade of **renewable electricity**, the **power transmission infrastructure** must be adequately strengthened. By 2030, the total transmission capacity from the Southern to the other two shores could **grow from 1,400 MW to 13,300 MW**, thus being capable of transporting an amount of electricity equivalent to about **4%** of their future electricity demand.

Ports and shipping are strategic for the maritime routes of energy commodities. The chokepoints remain key elements for the development of the "energy corridors". New "green" port models are advancing.

- **Key maritime trade routes remain vital to the well-being of global oil and gas markets.** This includes the safe passage of ships through passages such as the Strait of Malacca and the Strait of Hormuz.

- **The Strait of Hormuz**, at the entrance to the Arabian Gulf, **and The Strait of Malacca**, between the Malay Peninsula and Sumatra, **are particularly important to oil and gas trade and are set to become even more so in the future.**
- **The Strait of Hormuz** is particularly important for energy, with **27% of the total oil and gas trade** — including 34% of crude oil trade, 14.3% of refined products, 25.6% of gas, and 18% of LNG — passing through this 20-mile-wide waterway.
- About **33.5% of crude oil trade passes through the Strait of Malacca**, along with around 13% of refined products, 15.1% of gas, and 17% of LNG.
- **Another important transit point in the Middle East is the Suez Canal**. Strategically linking Europe and Asia, the Canal represents one of the most critical sea routes for global trade. **The Canal's location makes it a key regional hub for the transport of oil and other hydrocarbons**; 5% of total oil trade (crude and refined), 2.2% of gas, and 1.2% of LNG pass through Suez.
- **Due to Houthi attacks, maritime trade flows through the Bab el-Mandeb Strait have decreased dramatically, turning the Red Sea into a focal point of geopolitical tension.** Regarding energy traffic specifically, significant shifts in traffic shares can be observed by examining **LNG carrier transits through the Suez Canal**, which, in terms of gross tonnage (GT), have **decreased by 90%** compared to average levels in 2023. **Oil tanker transits are down by 40-50%**.
- **Energy flows are concentrated in a west-east direction. About 80% of the crude oil imported by East Asian countries passes through the Strait of Malacca, and more than half passes through the Strait of Hormuz.** Saudi Arabia, the United Arab Emirates, Iraq, Russia, Qatar and the United States are among the main exporters of energy commodities; China, South Korea, Japan, India and other Asian countries among the main importers.
- Over time, **Mediterranean ports have taken on the role of crucial nodes in the energy supply chain**, enabling the import and export of oil, natural gas, and LNG.
- **Ports are increasingly turning into energy and digital hubs, alongside their usual function for logistics**. Since they are terminals for fossil fuels and located close to high-energy intensive industries, they can actively contribute to global decarbonisation efforts.
- Alongside its role as a hub for fossil commodities, **the Mediterranean is set to become a significant area for the development of the green transition**.
- The **southern shore countries** possess emerging energy sources with great potential and may establish **strong links with EU economies precisely through ports.**

Alternative fuels for ships and the great future challenge for port services.

- The development of new energy infrastructure, such as **LNG terminals** and **bunkering facilities for alternative fuels**, can enhance **energy security** and reduce dependence on fossil fuels. By shifting to greener energy sources in port operations, **ports** can set a precedent for **sustainable practices**, improving energy efficiency and reducing emissions.
- **A key challenge for ports will be alternative fuels**; the ability to accommodate ships powered by fuels such as Methanol, LNG, Ammonia, and others could be a major competitive factor. Currently, **7.6% of the global fleet at sea** (up from 5.3% in 2023 and 2.5% in 2017) and **52.6% of the order book** in terms of gross tonnage (up from 45.5% in 2023 and 10.8% in early 2017) **are capable of using alternative fuels or propulsion systems.** By the end of 2026, it is expected that 9% of the global fleet's total capacity will be powered by alternative energy sources.
- Various **opportunities** are **tied to the development of green hydrogen in the countries on the Southern Shore.** Coastal nations have significant potential not only due to the availability of water and energy but also because of existing **port infrastructure, which could produce and store green hydrogen** for export to Europe.
- Development opportunities are linked to the creation of the **South H2 Corridor, a planned network of pipelines between Europe and Africa dedicated entirely to transporting hydrogen.** The project, overseen by Snam, recently saw the signing of a declaration of intent among the involved countries (Austria, Germany, Algeria, and Tunisia, with Switzerland as an observer), establishing the rules to follow in the coming years. This marks a crucial step in moving from the planning phase to the implementation stage of the project.
- The development of the corridor is part of the **European Hydrogen Backbone** and will be key to creating a connected and diversified hydrogen backbone in Southern and Central Europe. **The corridor could account for over 40% of the total import target set by the REPowerEU plan.** The South H2 Corridor will be one of the flagship projects in Snam's new Strategic Plan for 2025-2029.

Italy is at the forefront in the development of a new port model as energy hub, with Trieste focusing on Crude, Naples on Gas and Porto Levante and Piombino on LNG.

- **Several Italian ports rank among the top 10 energy ports in the Mediterranean region,** playing a significant role, particularly in the trade of oil and its derivatives.

For crude oil: Trieste (38 million tonnes handled), **Augusta** and **Sarroch** (12 million tonnes handled each); **for refined petroleum products: Augusta** (9.5 million tonnes) and **Sarroch** (7.8 million tonnes); **for gas: Naples** (1 million tonnes); **for LNG: Porto Levante-Rovigo** (6.4 million tonnes) **and Piombino** (2.4 million tonnes).

- **The energy sector accounts for 35% of the total cargo handled by Italian ports.** These ports are currently undergoing – and will increasingly be at the forefront of – a transformation towards energy. **The new challenge for these ports is to become hubs for the energy transition, with a commitment to making their activities more sustainable.**
- **The top 5 Italian energy ports account for 69% of the traffic**, namely: Trieste, Cagliari, Augusta, Milazzo, and Genoa. Trieste stands out as the most important energy port and gateway for Italy. **Three of these ports are located in Southern Italy.**
- **Southern Italy, handling approximately 50% of the country's total port traffic, plays a key role in the transition to a "green" energy future**, contributing to the creation of **synergies between the Mediterranean's two shores** and leveraging North Africa's vast renewable energy resources.
- Thanks to the proximity to potential renewable production areas in North Africa, investments in sustainable infrastructure and logistics help make **our ports key players, strengthening Italy's geostrategic position in the Mediterranean.**