MED & Italian Energy Report 2023

Presentation of the 5th Annual Report

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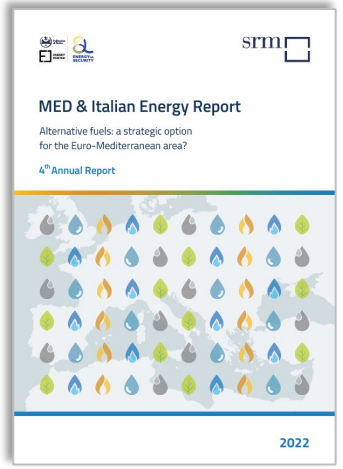
Geopolitics of energy in the Mediterranean region between international crisis and new energy commodities

5 years of collaboration on the ENEMED Project



2023

A NEW STRAND OF ANALYSIS WITH THE SUPPORT OF

Fondazione Compagnia di San Paolo

dedicated to the interactions between **geopolitics and energy**, with a focus on the Mediterranean area

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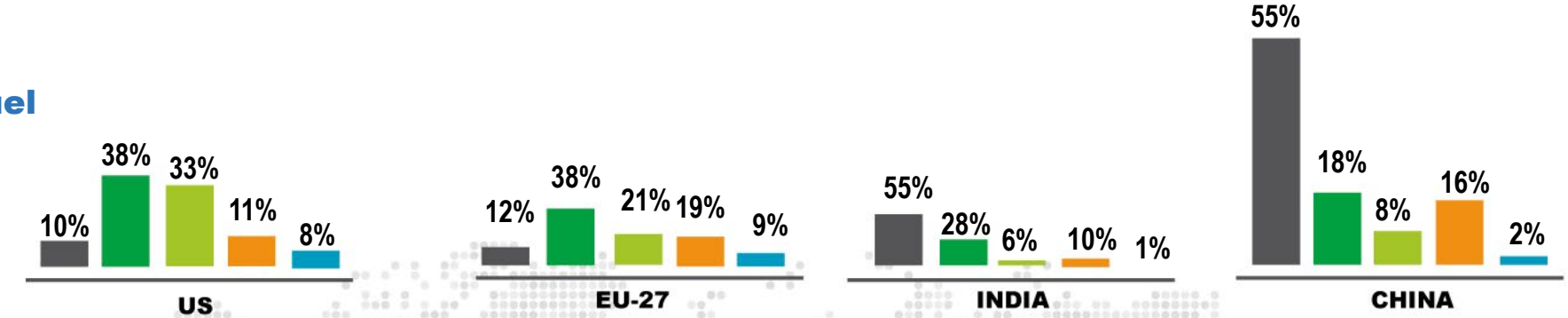
Energy consumption to GDP: an international comparison

Primary energy consumption by fuel
(2022, Exajoule)



COAL

OIL

NATURAL GAS

RENEWABLES

NUCLEAR

Source: SRM on British Petroleum Data, 2023

Total Final Consumption (2022, Exajoules)

Top 3 energy areas	US	EU27	CHINA
	95.9	58.2	159.4
GDP	$25.5 Trillion	$16.7 Trillion	$17.9 Trillion

Source: SRM IMF – WEO Database, 2023

Europe has **the best energy consumption-to-GDP ratio**, consuming far less energy than China and also a little less – in proportion with GDP – than the US. **Europe still is on the road of sustainability also from the point of view of energy saving and efficiency.**

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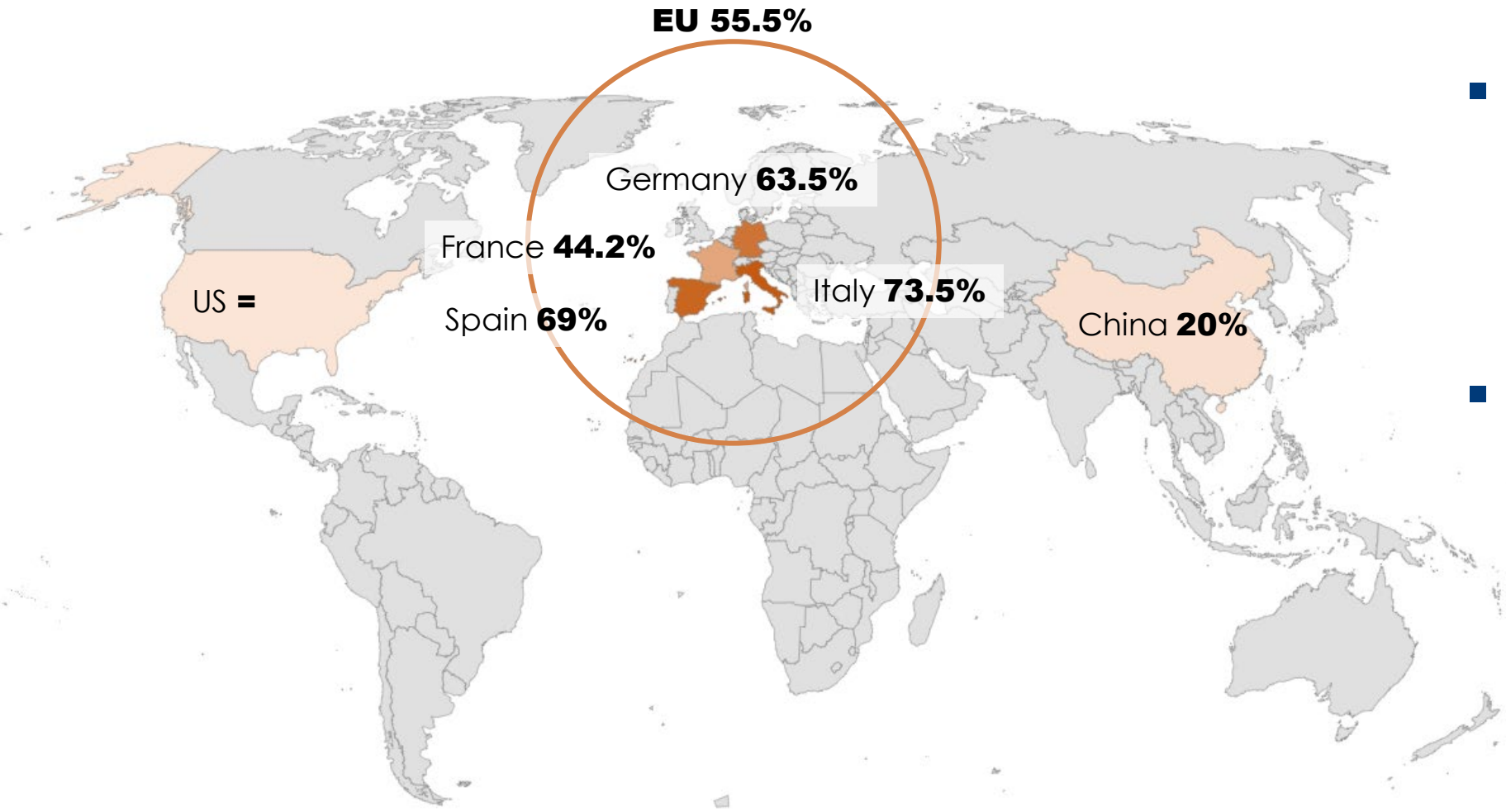
Energy dependency in the EU, US and China



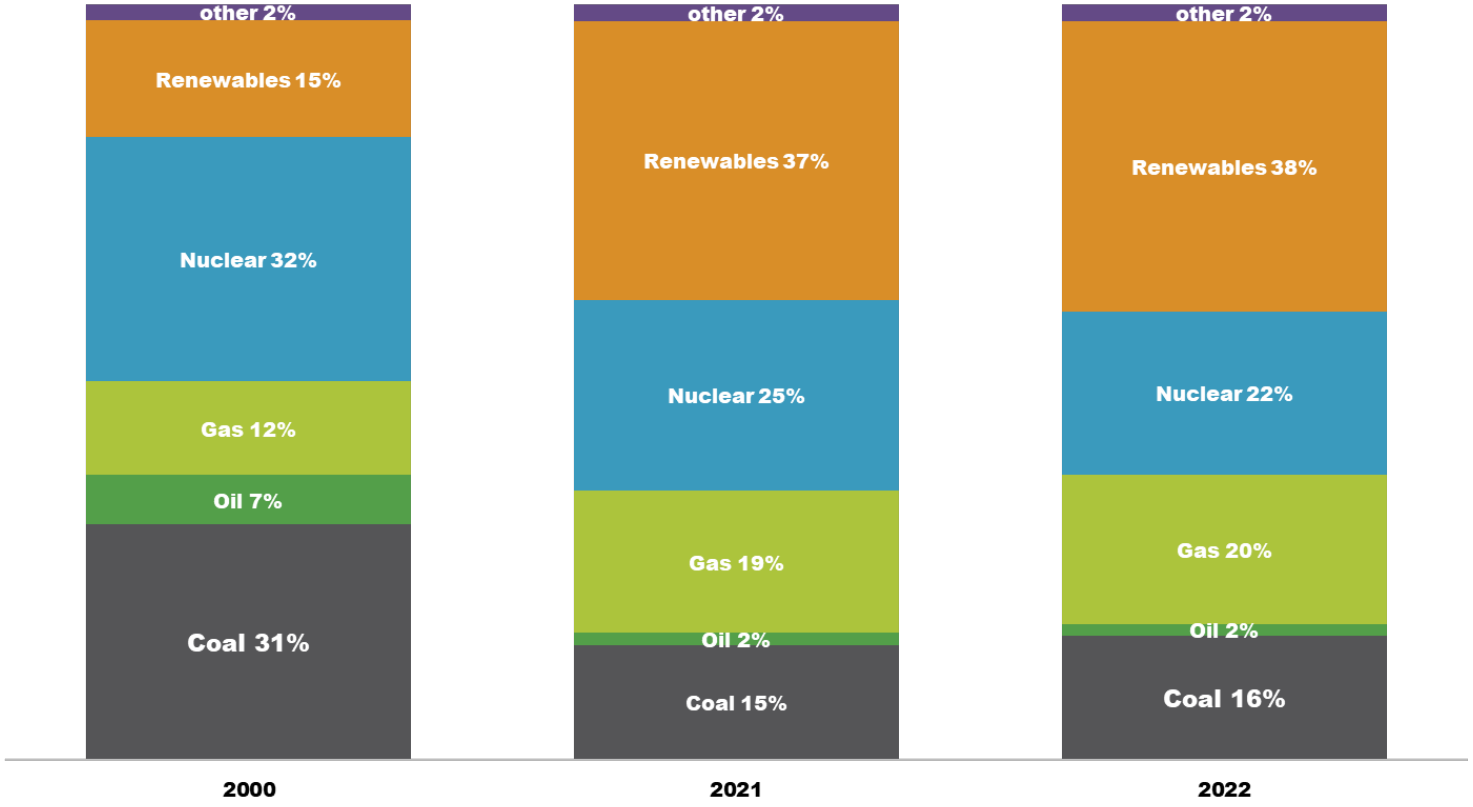
- Dependency from foreign countries energy imports is also high in nations such as France, where nuclear power is used.
- Among the major European countries, Italy shows the highest level of energy dependency: 73.5%.

Source: SRM on EUROSTAT and IEA Data, 2023

Electricity is the most common form of energy use … let's take a look at how the electricity mix has changed over the last 22 years…

- **The EU electricity generation mix has changed** in the last 22 years: the use of **oil and coal has declined**, while **natural gas has increased** because (being a fossil fuel with the lowest emission) it was conceived as a buffer to support energy transition.
- In the meantime, EU renewable electricity **pace of expansion has been considerable and it is** expected to **more than double** up to **2027.**

Electricity generation by fuel (TWh)



Source: SRM on British Petroleum Data,2023

Var 2000 – 2022

RENEWABLES	+23 p.p.
NUCLEAR	-10 p.p.
NATURAL GAS	+8 p.p.
OIL	-5 p.p.
COAL	-15 p.p.

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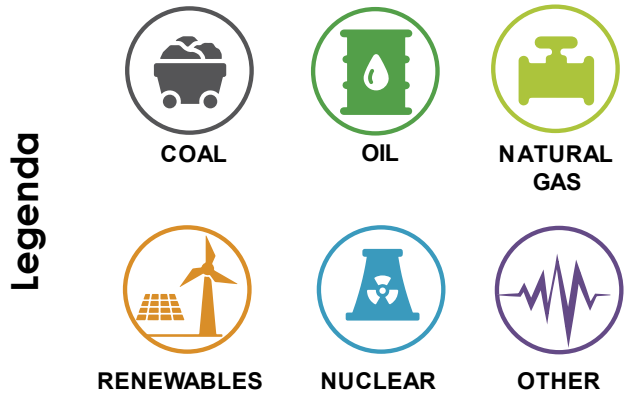
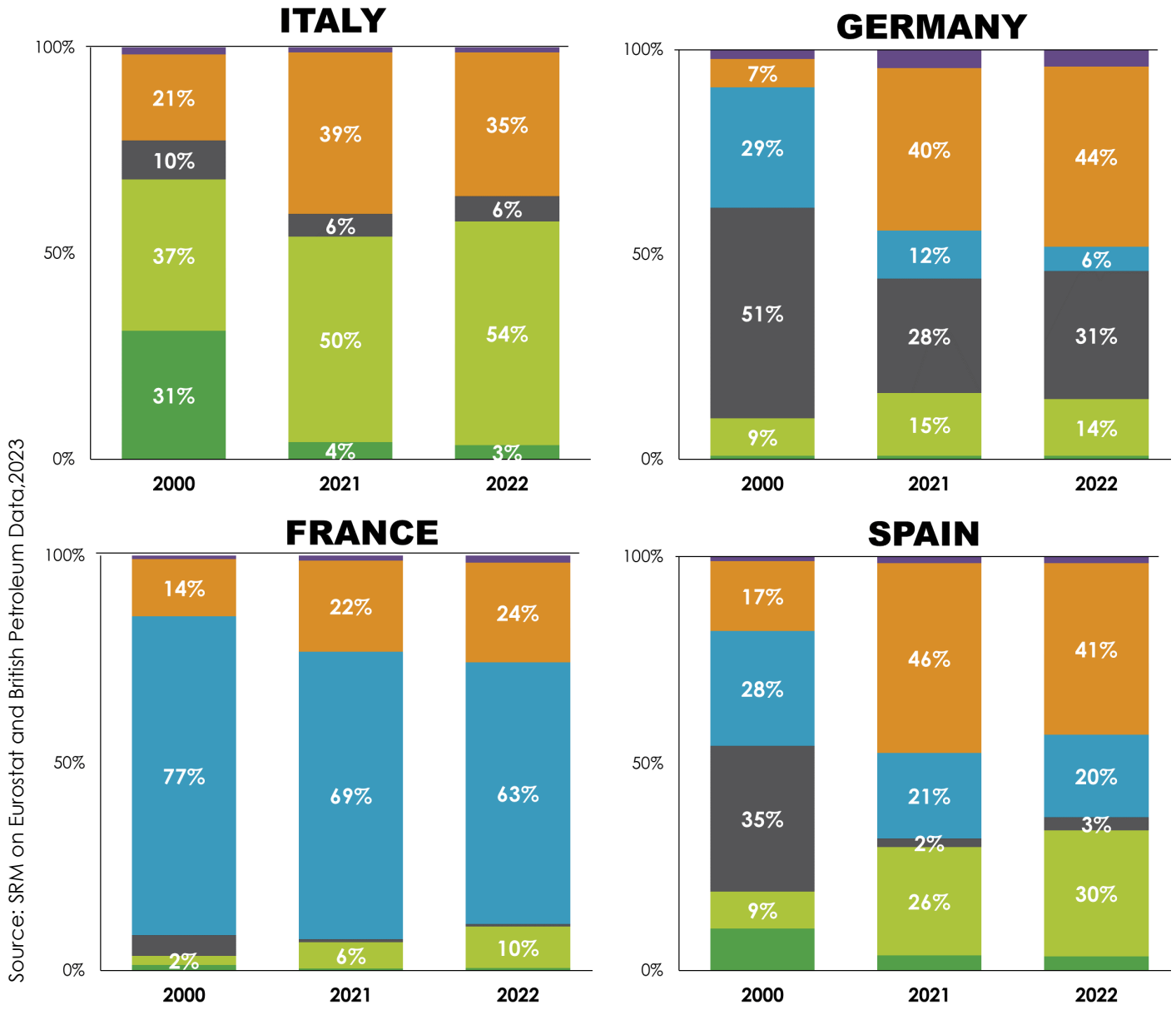
Electricity generation mix: Italy vs main partners

- **Italy:** significant use of gas and renewables. Nuclear not used.
- **Spain:** the most balanced mix.
- **Germany:** still significant use of coal and highest renewables.
- **France:** significant use of nuclear; low contribution of gas and Renewables less developed than other countries.





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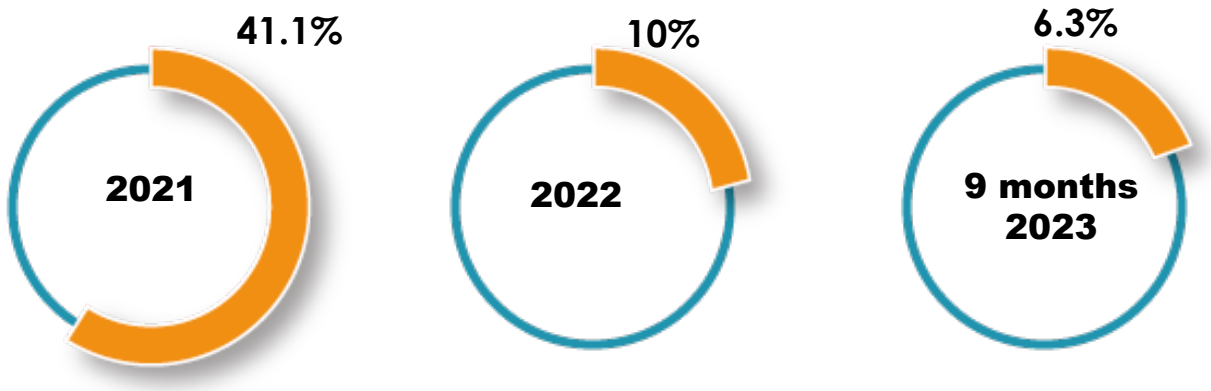
The impact of the war in Ukraine on supply security for EU and Italy

Russia's presence in Eu gas imports

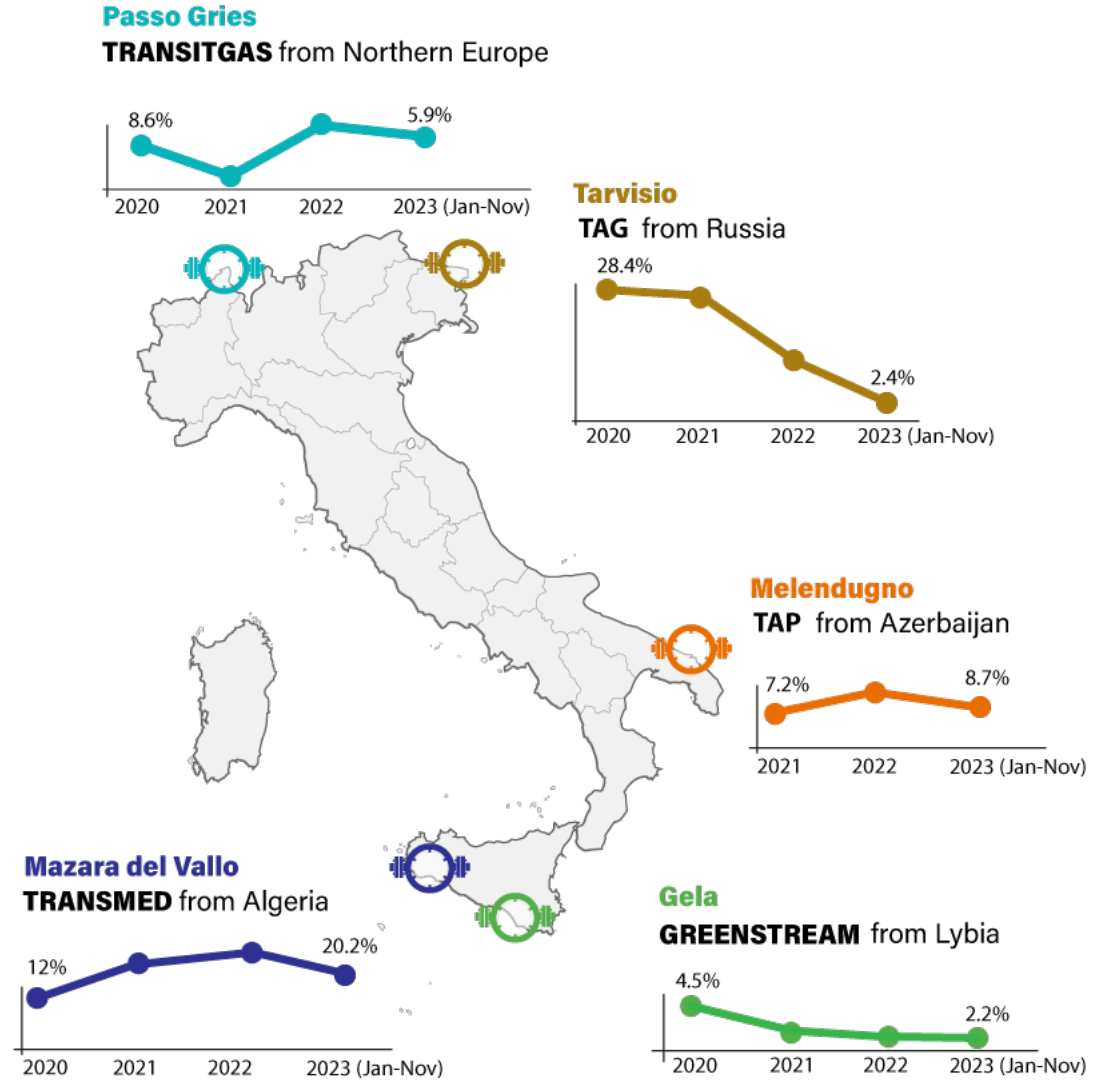
IMPORT of Natural Gas FROM RUSSIA



- **Russia's presence in Eu's energy mix was revised down as a result of the war**. **Russian gas** before the beginning of the war (**in 2021**) was **more than 41%** of the total gas import of the European Union.
- **In the first 9 months of 2023**, the import of Russian gas was around **6.3%** of the total for the EU.

Source: SRM on EUROSTAT

Algeria replaced Russia as the main gas supplier to Italy



Source: SRM on Mite, SNAM

A new crisis in the Middle East Region: low energy consequences up to now….
….. but increased risk for a region with a lot of vulnerable chokepoints

The main world oil trade chokepoints are a critical part of global energy security. Some of them are located around the Arabian Peninsula, in a "red area"

- A strategic route for Arab Gulf oil and natural gas shipments to Europe and North America: **12% of global trade, 10% of oil products and 8% of LNG maritime flows.**
- The **SUMED Pipeline**, connecting the Red Sea with the Mediterranean, transports **80% of the oil shipped from the Middle East Gulf to Europe.**

The closure of both would require oil tankers to divert around the Cape of Good Hope.

4% of EU gas imports pass through TURKEY

Israel redirected gas flows to Egypt to the ARAB GAS PIPELINE

Data in million b/d (BARREL/DAY)

SUEZ
5.5

HORMUZ
21

BAB EL-MANDEB
6.2

The world's most important chokepoint**: 20% of global oil and LNG trade.**

In the event of a shock only S. Arabia and the UAE have pipelines that can ship crude oil outside of the Arab Gulf and have additional pipeline capacity to circumvent the Strait.

Source: SRM on EIA, Sumed

The tension flared up again in the Middle East should remind us how urgent it is to speed up the energy transition. not only for climate change, but also to ensure energy security and strategic autonomy.

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War, political instability and energy shocks strengthen European transition toward **Renewables.**

These would help not only to reach **net zero emission** but also to **lower** the **EU energy dependency**.

But are there other security risks in this path?

And what consequences on the geopolitical context in particular for the Euro-Mediterranean Region?

THERE IS NO SILVER BULLET… AND THERE ARE SIDE EFFECTS THAT HAVE TO BE CONSIDERED FROM THE GEOPOLITICAL AND SECURITY PERSPECTIVE…

- The need of **Critical Raw Materials for Solar and Wind Plant constructions** (Cobalt, Copper, Lithium, Manganese; Natural Graphite, Nickel, Phosphorous, Platinum, Rare Earth) will increase future demand vs current supply.
- Their availability, **the role of the top three producer countries** for each and the increasing 2030 demand (deeply analyzed in chapter 6) will have great impact on security and geopolitics.

A POSSIBLE WAY FORWARD TO OVERCOME DIFFICULTIES

- **From the technological point of view**: aiming for a **multi-commodity** energy system based on RES;
- **From geographical point of view:** moving away from the historical fossil-based dialogue among the Mediterranean shores to a **RES-based** (solar, wind and green hydrogen) **dialogue** (deeply analyzed in Chapter 2 and 3.

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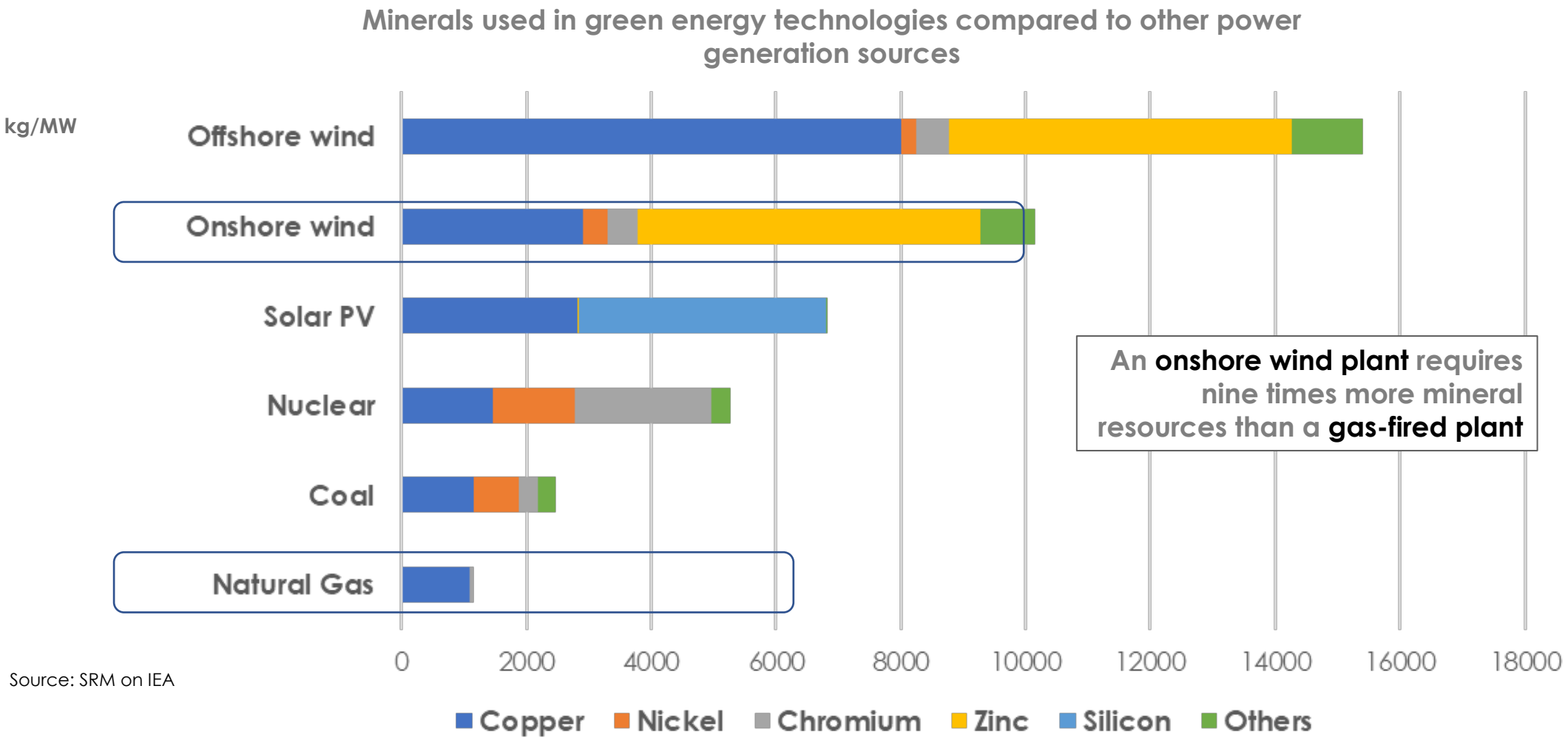
The shift to a green energy system is set to drive a huge increase in the demand for critical raw materials

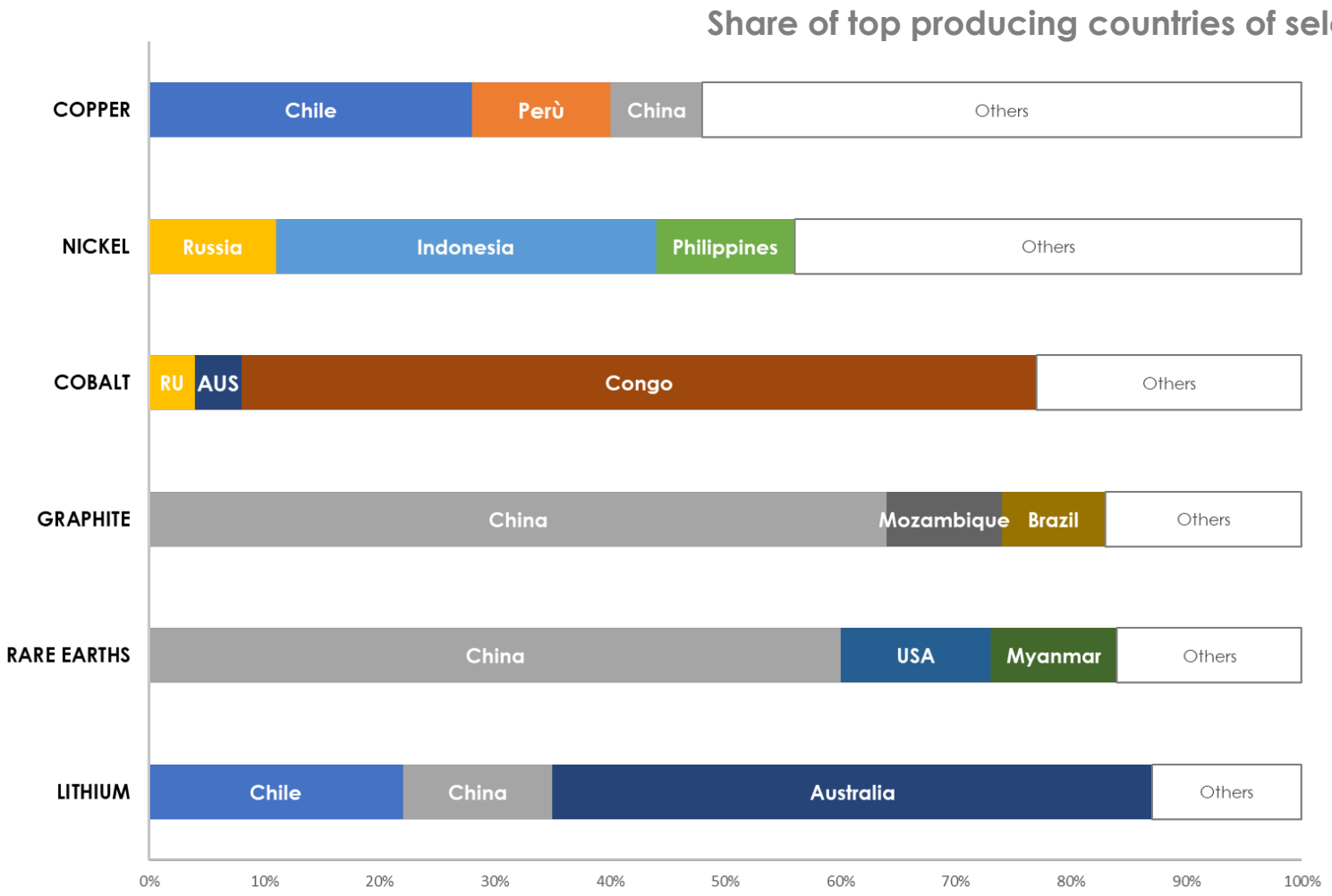


Source: SRM on IEA

- Since 2010 **the average amount of raw materials needed for a new unit of power generation capacity has increased by 50% as renewables increase** their share of total capacity addition.

… with potential new risk on geopolitical side

The supply chain for the green energy technologies and their raw materials is more geographically concentrated than that of oil or natural gas



- In some cases, a single country is responsible for around half of worldwide production. For **lithium**, **cobalt** and **rare earth elements**, the world's top three producing nations (**China, Congo, Australia**) control well over three-quarters of global output.
- **Congo** is responsible for some 70% of global production of **cobalt**, and **China** accounted for 60% of global **rare earths** production.
- The picture for **copper** and **nickel** is slightly more diverse, but **still around half of global supply is concentrated in the top three producing countries.**

Source: SRM on IEA

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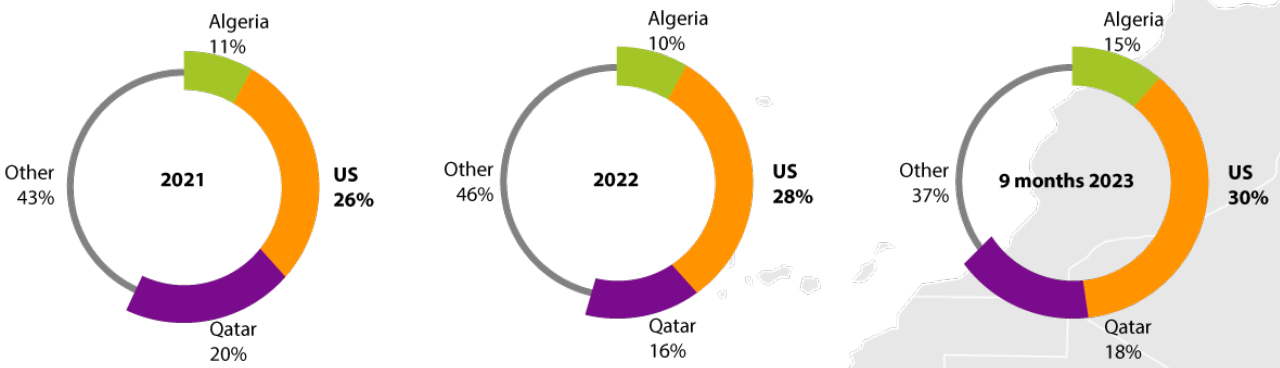
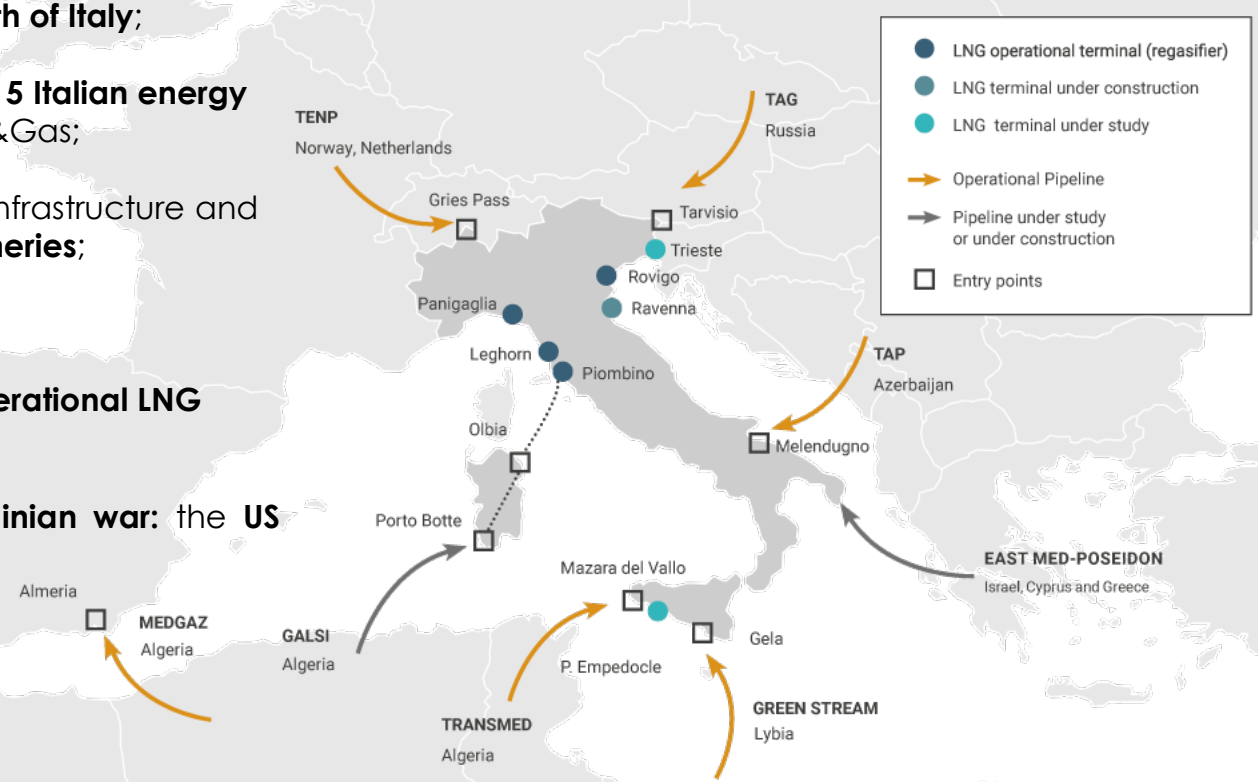
Ports are not only logistics nodes but also strategic energy hubs. Right now for fossil fuels, but in the near future…

- **Ports are entrance points for oil & gas pipelines:** energy flows from North Africa and the Caspian area to Europe. **77% of the gas imported in Italy via pipeline arrives in the South of Italy**;
- **The top 30 European energy ports** move 740 million tonnes of Oil&Gas; the **top 5 Italian energy ports** (Trieste, Cagliari, Augusta, Milazzo and Genoa): 118 million tonnes of Oil&Gas;
- **Energy gateways:** refineries are access points to hydrocarbon transportation infrastructure and are usually located near ports; **13 plants** are active **in Italy,** including **2 biorefineries**;
- **Ports normally host the petrochemical industry plants**;
- **Ports are locations for LNG storage and/or production. Euro-Med area: 103 operational LNG terminals** (World: 178, source Clarksons);
- **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**.





Source: SRM on EUROSTAT

….. Ports are becoming essential hubs for green energy transition and strategic geopolitical tools.

- **Ports are becoming RES producers** (solar, floating solar, wind) **North European ports** are already producing renewables with **offshore wind plants. Mediterranean ports** now are starting to produce RES with **solar, inland or offshore plants**;
- **Ports can also be RES distributors with their own "*Energy Communities*"** in order to facilitate the energy transition process for the surrounding industrial areas and for shipping industry **powering *cold ironing*. 17 European ports** have **functional cold ironing technology**;
- **Close to ports is located the petrochemical industry** that have to be converted to biofuel;
- **Ports are ideal location for hosting the "Hydrogen Valley". 128 projects planning to produce green or blue hydrogen, methanol or ammonia** (with a planned energy output of 109 Mtoe by 2027). **69 are in Europe** (with a planned output of 79 Mtoe by 2027);
- **Critical Raw Materials** need ports and logistics to move over long routes;
- **It is thanks to ports new role** that the Euro-Mediterranean **dialogue can be reboosted**.

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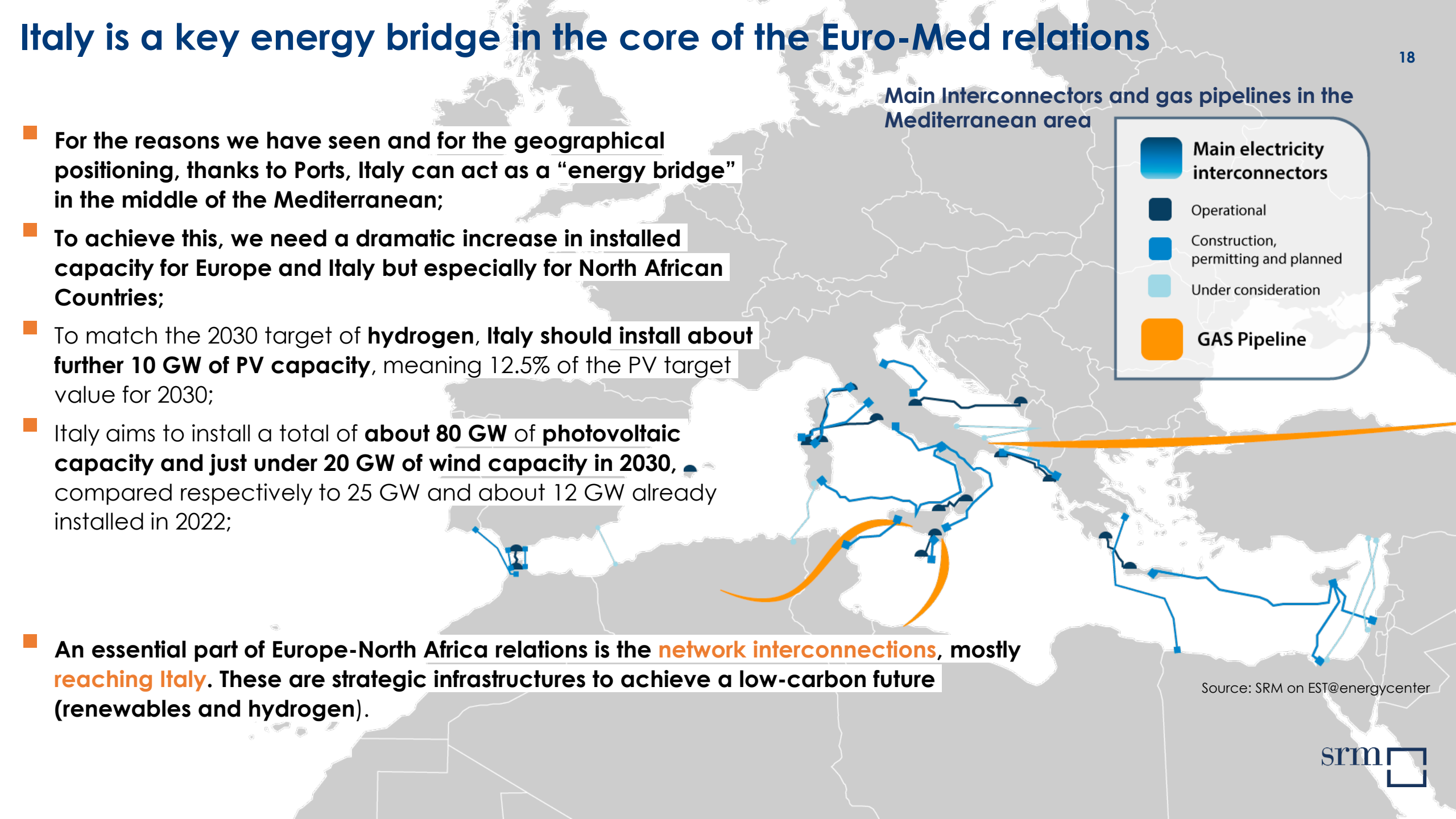
Italy is a key energy bridge in the core of the Euro-Med relations

- **For the reasons we have seen and for the geographical positioning, thanks to Ports, Italy can act as a "energy bridge" in the middle of the Mediterranean;**
- **To achieve this, we need a dramatic increase in installed capacity for Europe and Italy but especially for North African Countries;**
- To match the 2030 target of **hydrogen**, **Italy should install about further 10 GW of PV capacity**, meaning 12.5% of the PV target value for 2030;
- Italy aims to install a total of **about 80 GW** of **photovoltaic capacity and just under 20 GW of wind capacity in 2030,** compared respectively to 25 GW and about 12 GW already installed in 2022;

Main Interconnectors and gas pipelines in the Mediterranean area



- **An essential part of Europe-North Africa relations is the network interconnections, mostly reaching Italy. These are strategic infrastructures to achieve a low-carbon future (renewables and hydrogen).**

Source: SRM on EST@energycenter

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Thank you for your attention

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