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Observations on energy security concerns in an ever-changing geopolitical context: The EU strategy”.

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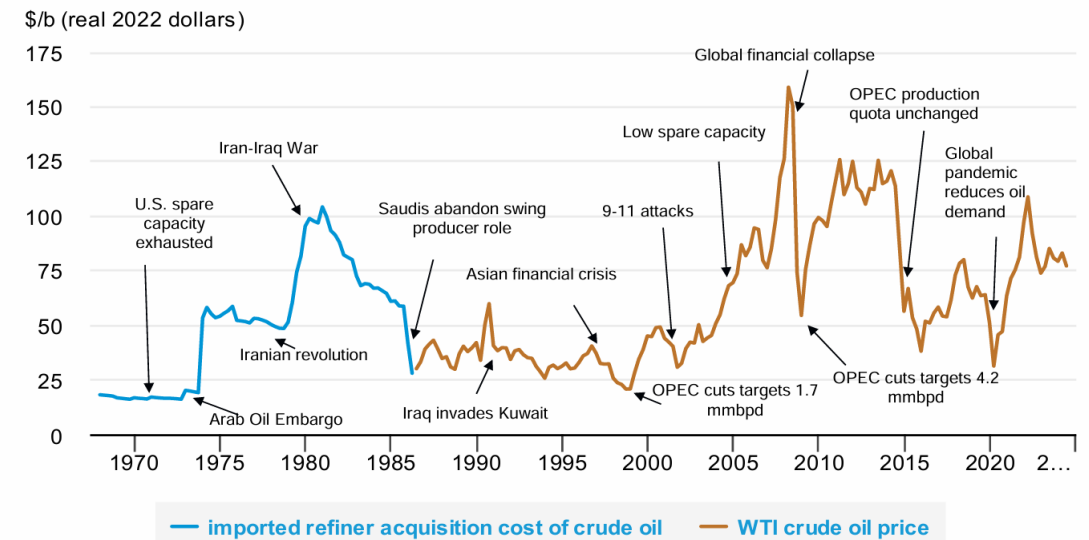
Introduction to Energy Security Challenges

Key Points:

- Energy security is a pressing strategic issue for the EU.
- Current challenges include geopolitical instability (e.g. Ukraine & Middle East wars), lack of agreement on climate goals & financing.
- Outcome of 2024 U.S. elections and elsewhere, COP29, further complicate the energy landscape.
- Geopolitical events often have sizable impact on energy prices

impact of major geopolitical events (Ukraine war, Covid19, etc) on energy prices;

Crude oil prices react to a variety of geopolitical and economic events

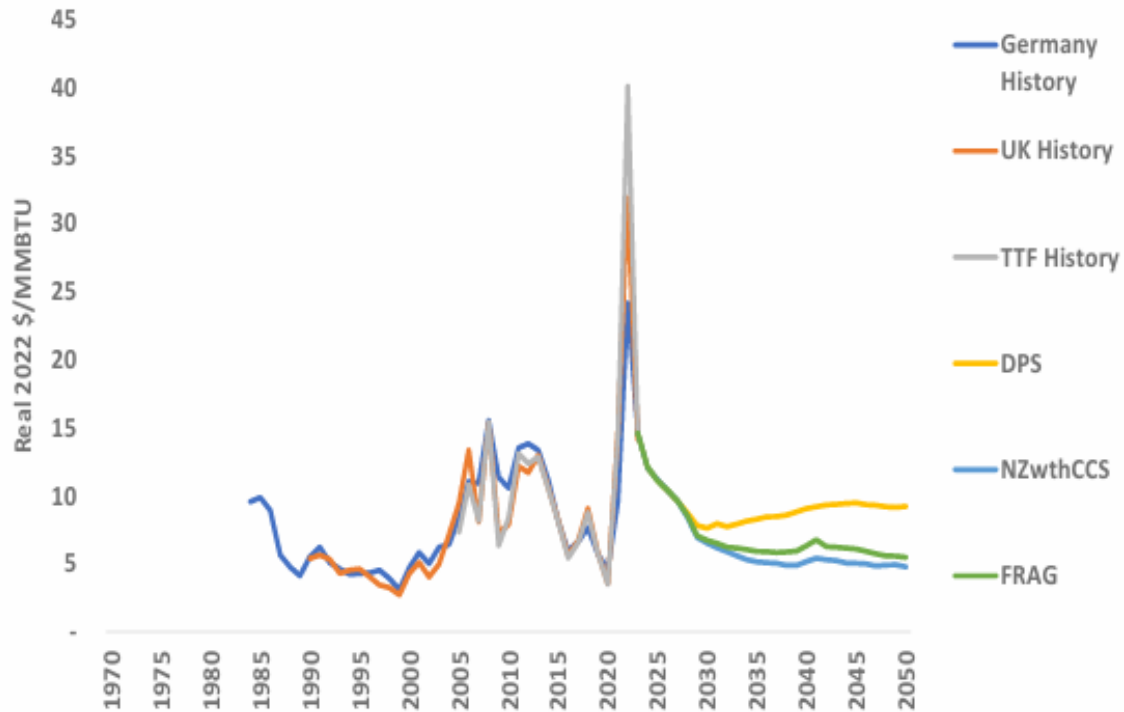


Next slide shows geopolitical impact on gas prices in 3 world regions

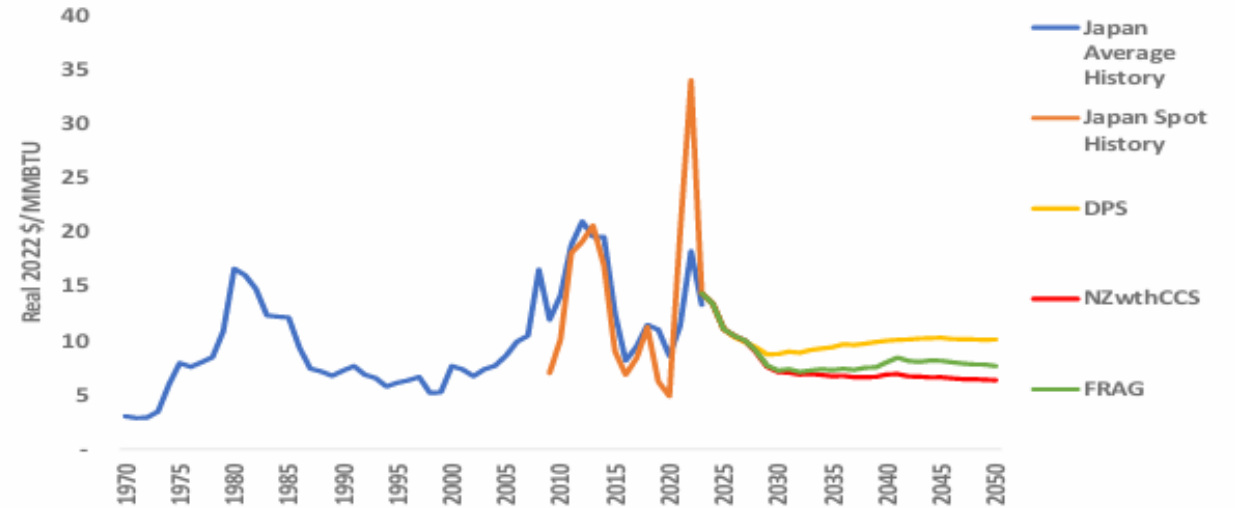


Longer Term Price Context

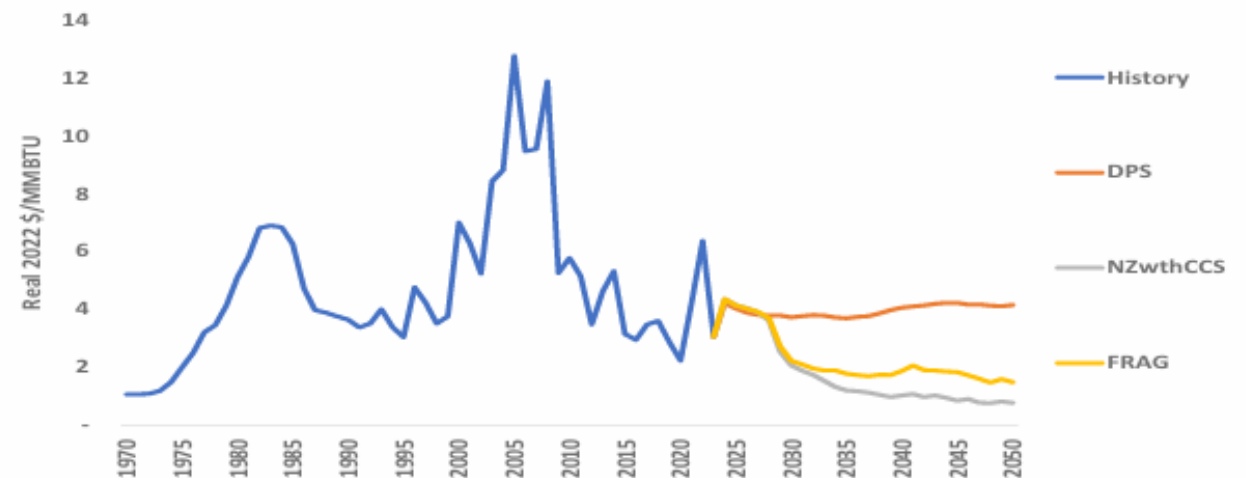
Europe Prices



Japan Prices



US Prices



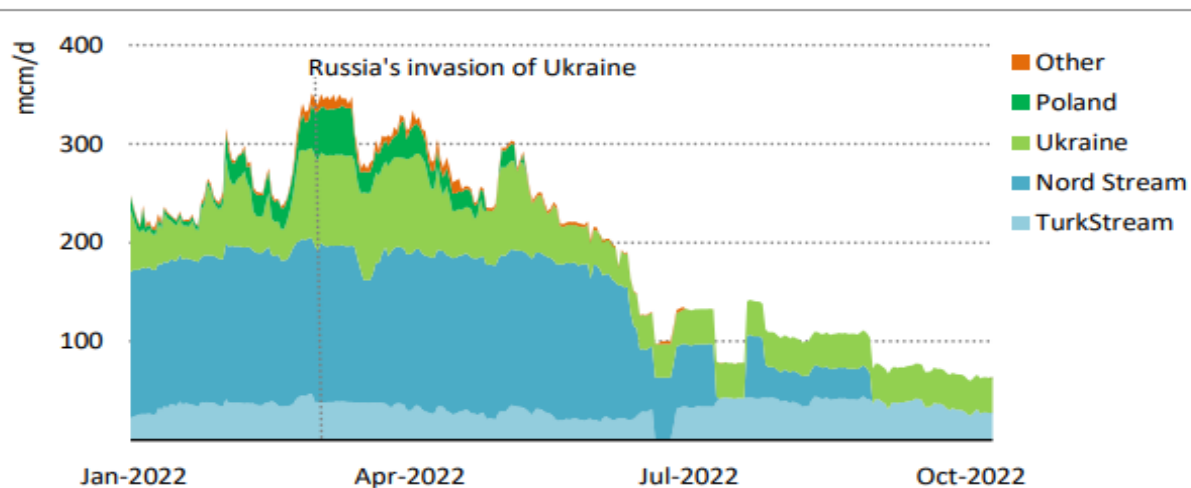


The Rising Importance of Energy Security

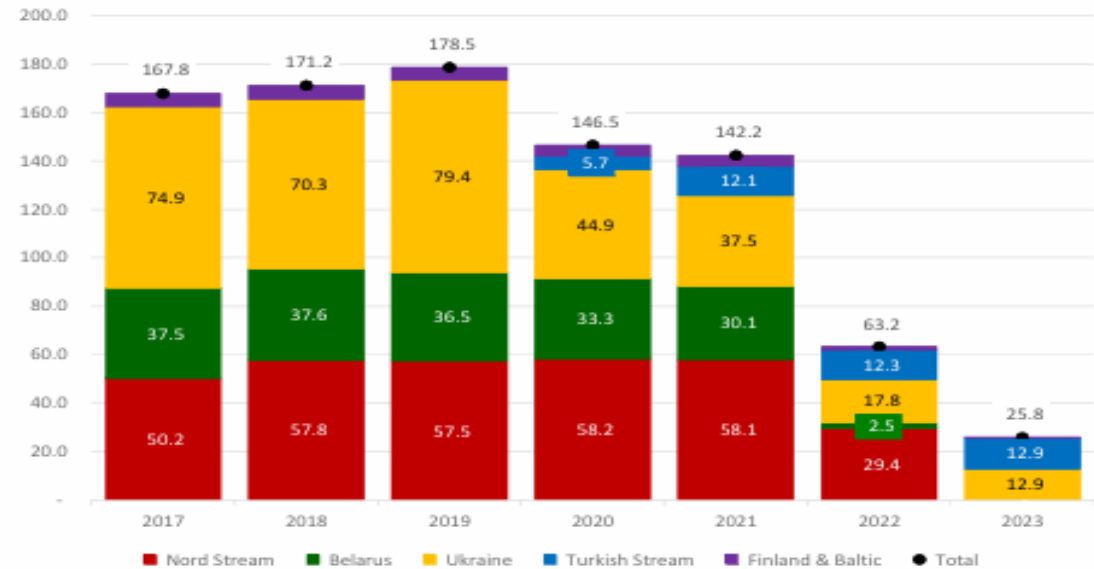
Key Points:

- EU's heavy reliance on Russian energy exposed its vulnerability.
- Middle Eastern volatility compounds energy market disruptions.
- Energy security is now central to EU policy discussions.

Figure 2.3 ▶ Natural gas pipeline flows from Russia to the European Union and Türkiye since January 2022



Russian Pipeline Gas Exports to Europe (Bcm per year)





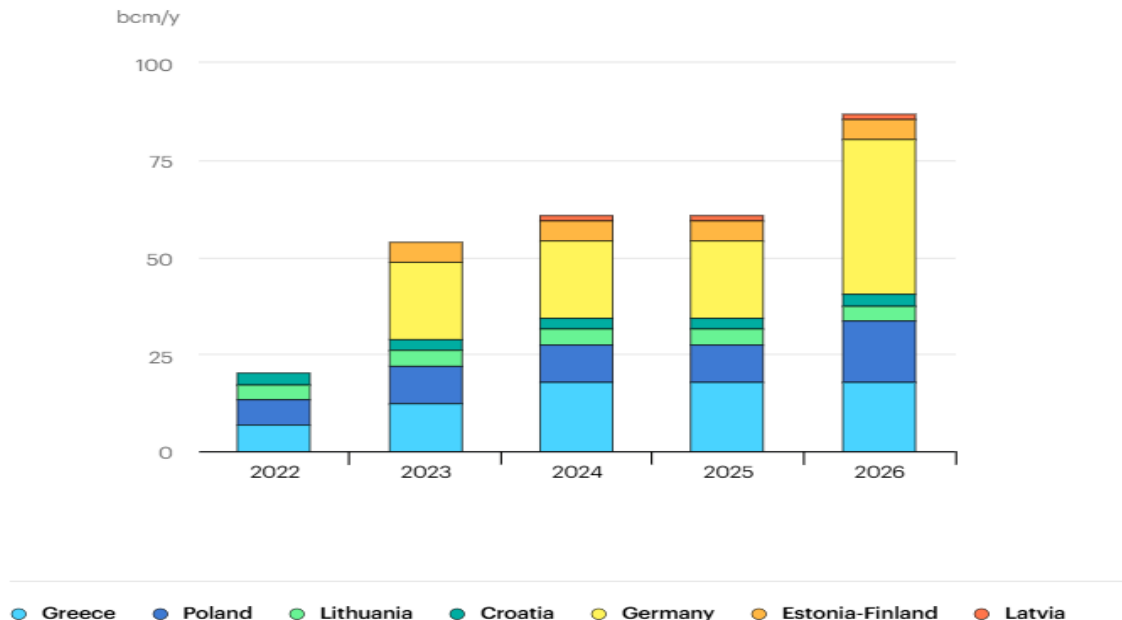
Europe's Response to the Crisis

Key Points:

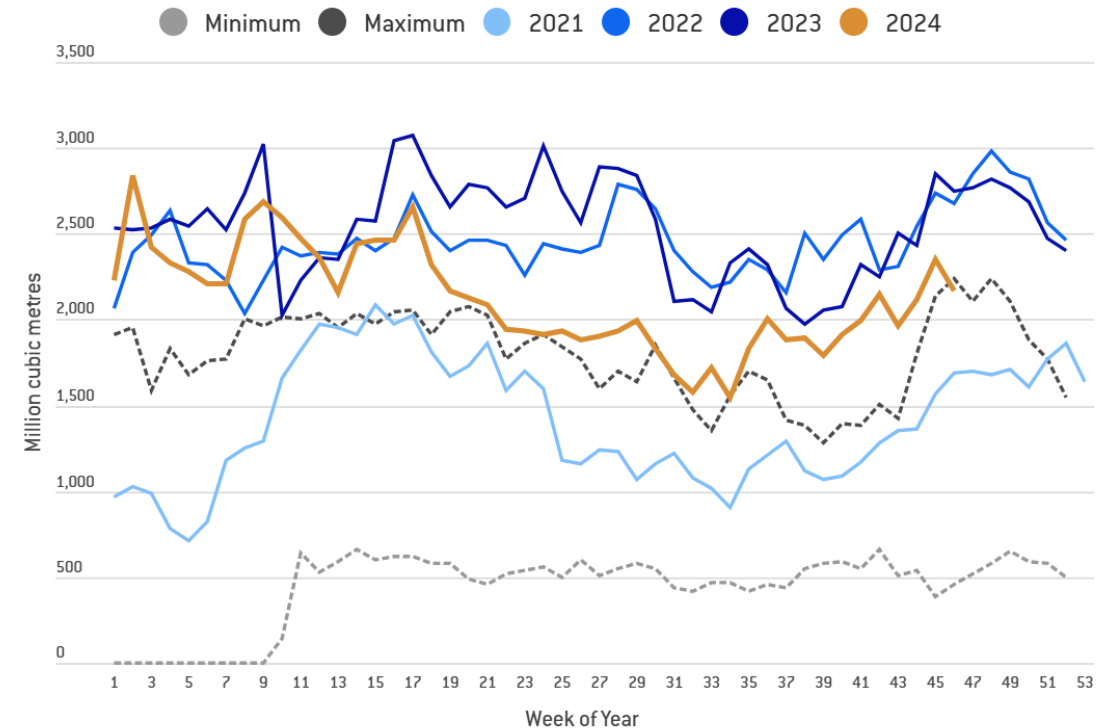
- Diversified energy imports, U.S., Qatar, NOR
- Accelerated renewable energy investments.

- Expanded LNG infrastructure; increased volumes of imports
- Focused on energy efficiency and conservation.

LNG import capacity in Central and Eastern Europe
2022 - 2026



comparing pre- and post-crisis LNG imports



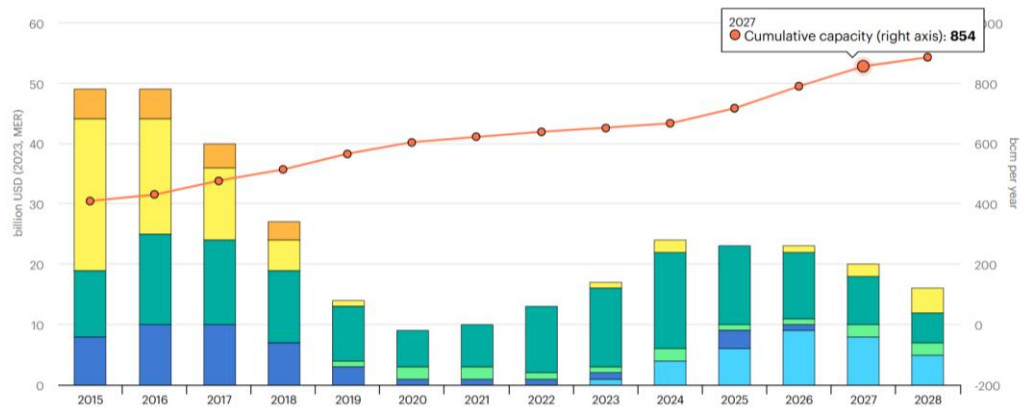


A Shift in Strategy

Key Points:

- Pragmatism over rigidity: integrating sustainability with energy security.
- Transition to a balanced approach that accommodates current realities.
- Investments in transition fuels (e.g. LNG and other low carbon sources(e.g. nuclear, hydrogen, CCS, CDR etc will be needed for an orderly growth-oriented transition

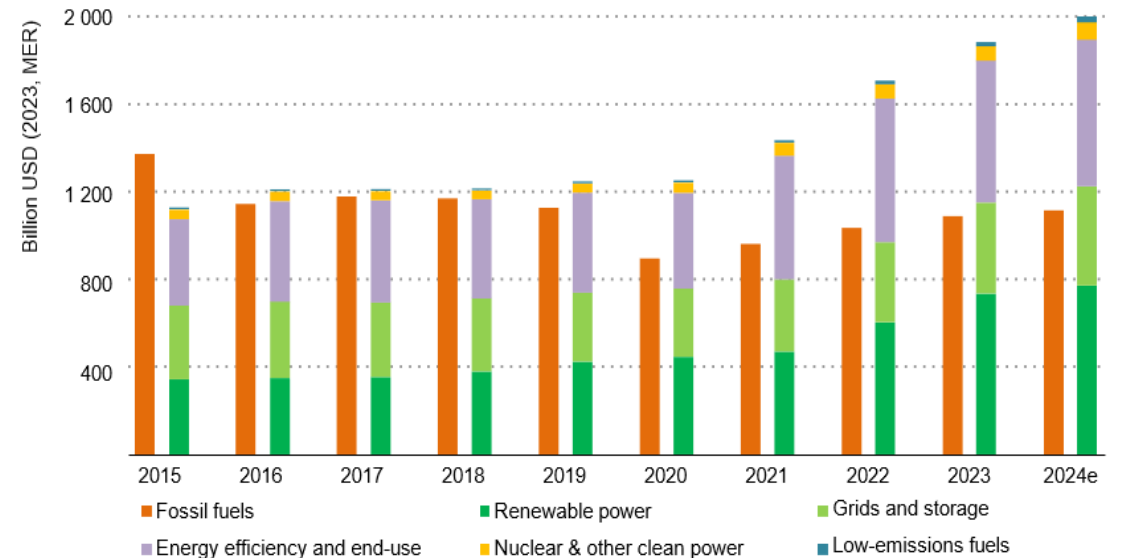
Investment and cumulative capacity in LNG liquefaction, 2015-2028



IEA Licence:

● Middle East ● Russia ● Africa ● North America ● Australia ● Others ● Cumulative capacity (right axis)

Global investments in clean and fossil fuels, 2015 -2024

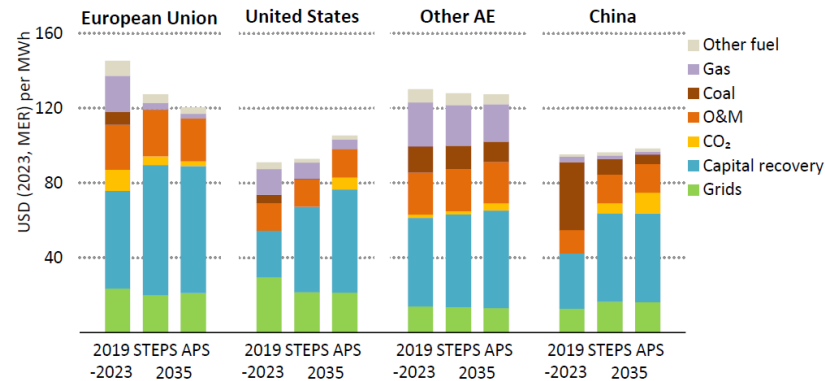




Important of balanced pragmatic approach to energy transition

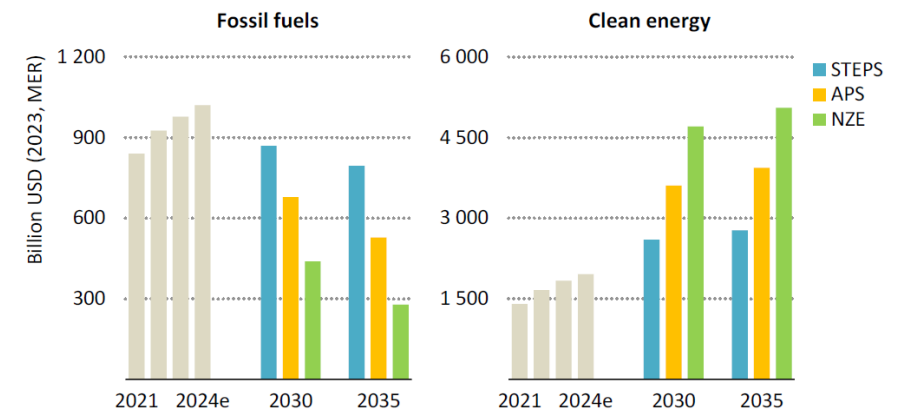
- System costs matter so does a balanced and gradual investment allocations
- This is necessary to avoid pushing cost of electricity higher and ensure a just, orderly and equitable clean energy transition for all

Total electricity system costs by component, region and scenario, 2019-2035



Average system costs have been higher in recent years in the European Union than elsewhere, but clean energy transitions present opportunities to close the gap

Annual investment in fossil fuels and clean energy by scenario, 2021-2035



Cutting investment in fossil fuels ahead of scaling up investment in clean energy would push up prices and undermine just, orderly and equitable clean energy transitions

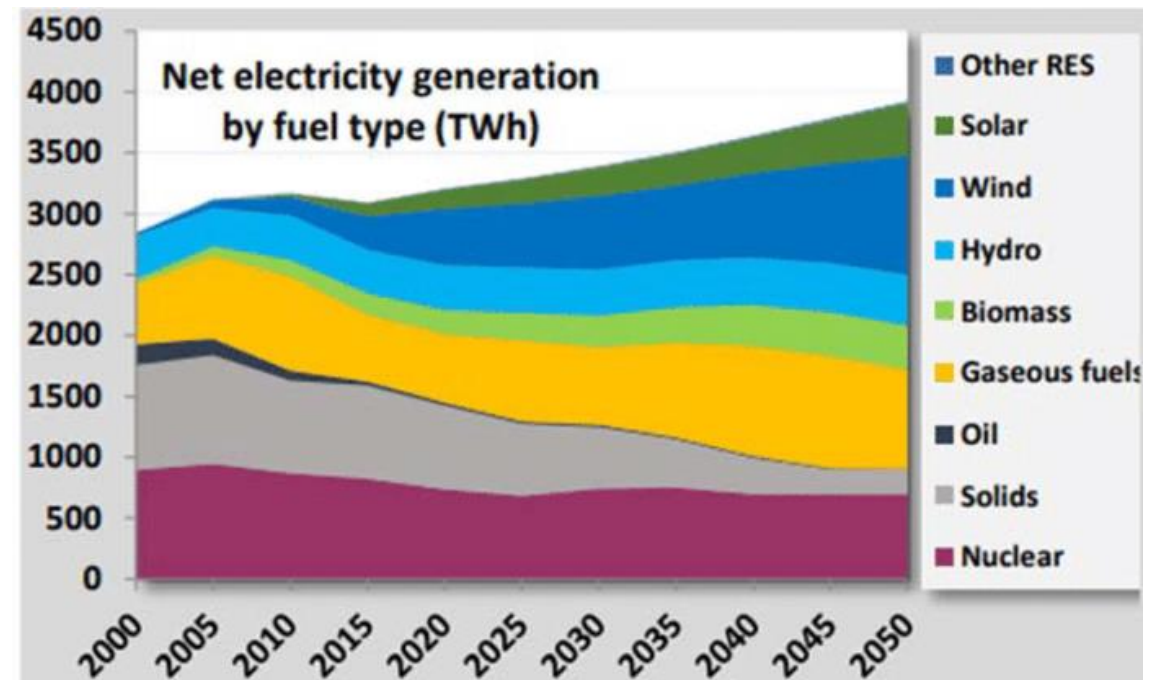


Transformative Changes in EU Energy Strategy

Key Points:

- Gas as a transitional fuel.
- Revitalization of nuclear energy (e.g., SMRs).
- Expansion of energy infrastructure.
- Investment in energy storage and grids.
- Strengthened external energy partnerships.

EU energy mix over time, projecting the rise of renewables and nuclear power - some clean fossil fuels remain part of a balanced transition:
Electricity generation



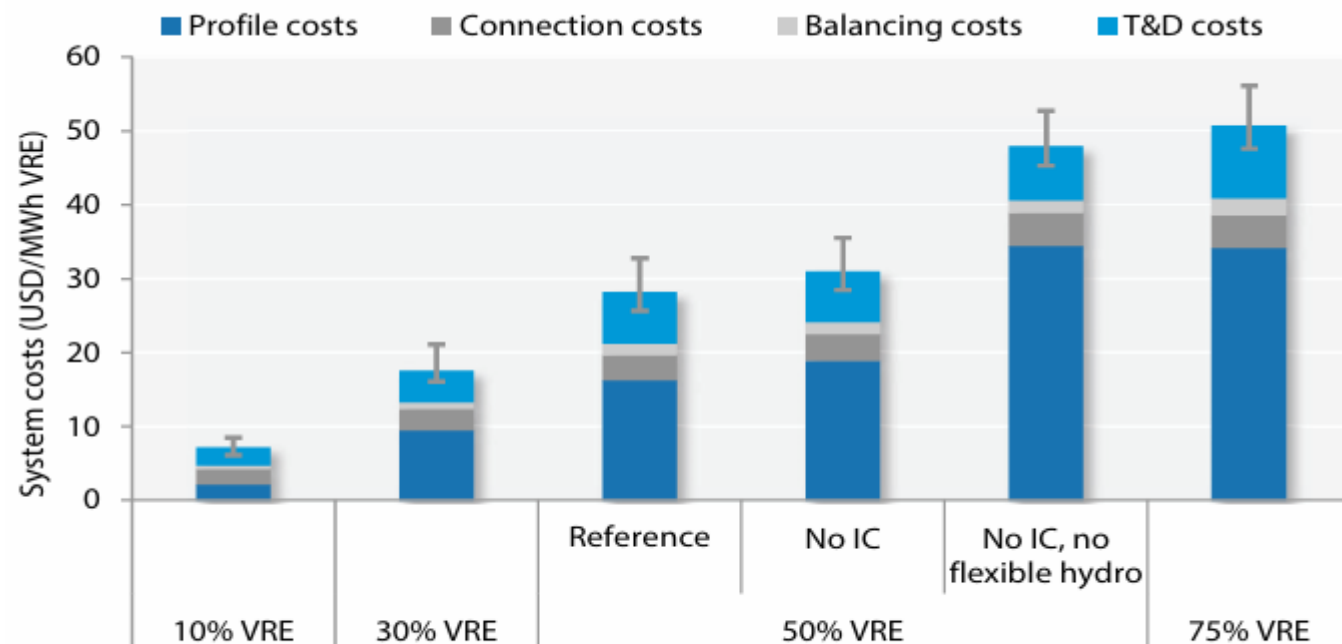


Are Current Measures Enough?

Key Points:

- LNG dependency: economic and environmental concerns.
- Renewables need support from nuclear, hydrogen, and CCUS, to avoid high system costs
- For successful energy transition globally, need removal of some of legacy CO₂, CDR
- Risks of fragmented EU energy policy.

System costs at different rates of VRE penetration



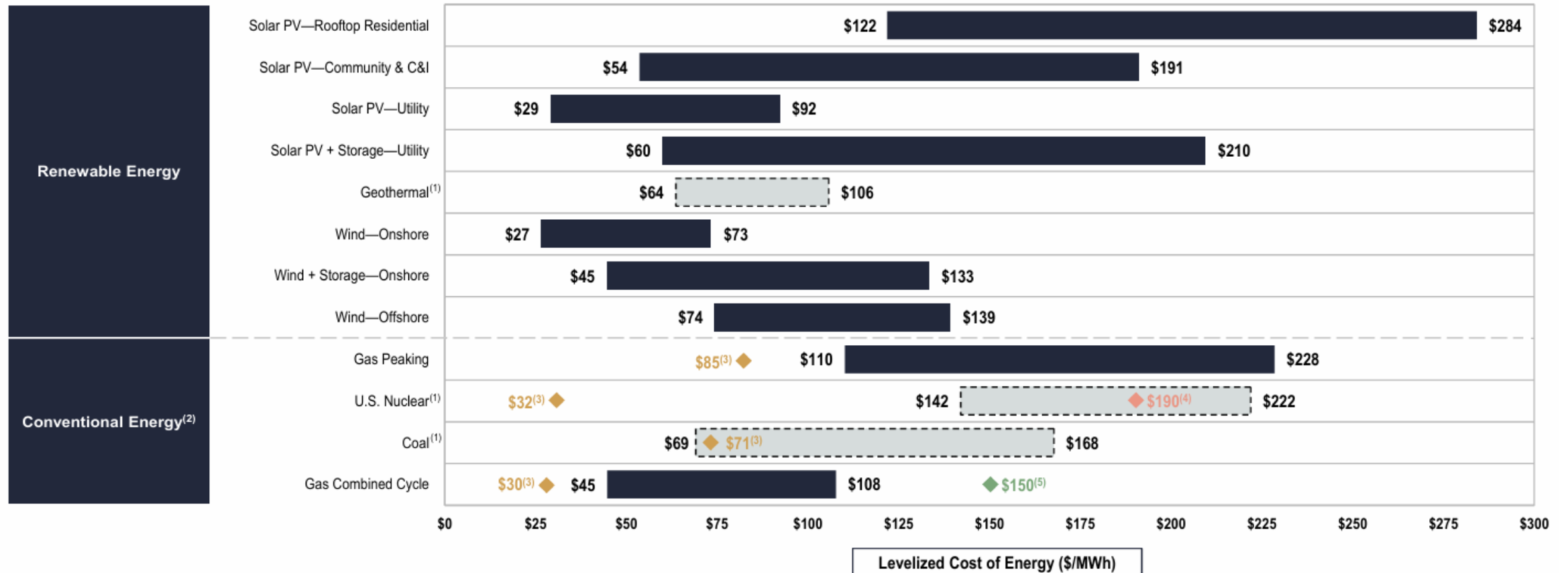
Source: NEA (2019).



Lazard: Levelized Cost of generation comparison (delivered to the grid – JUN2024)

Levelized Cost of Energy Comparison—Version 17.0

Selected renewable energy generation technologies remain cost-competitive with conventional generation technologies under certain circumstances



Source: Lazard and Roland Berger estimates and publicly available information



Addressing Legacy CO₂ Emissions

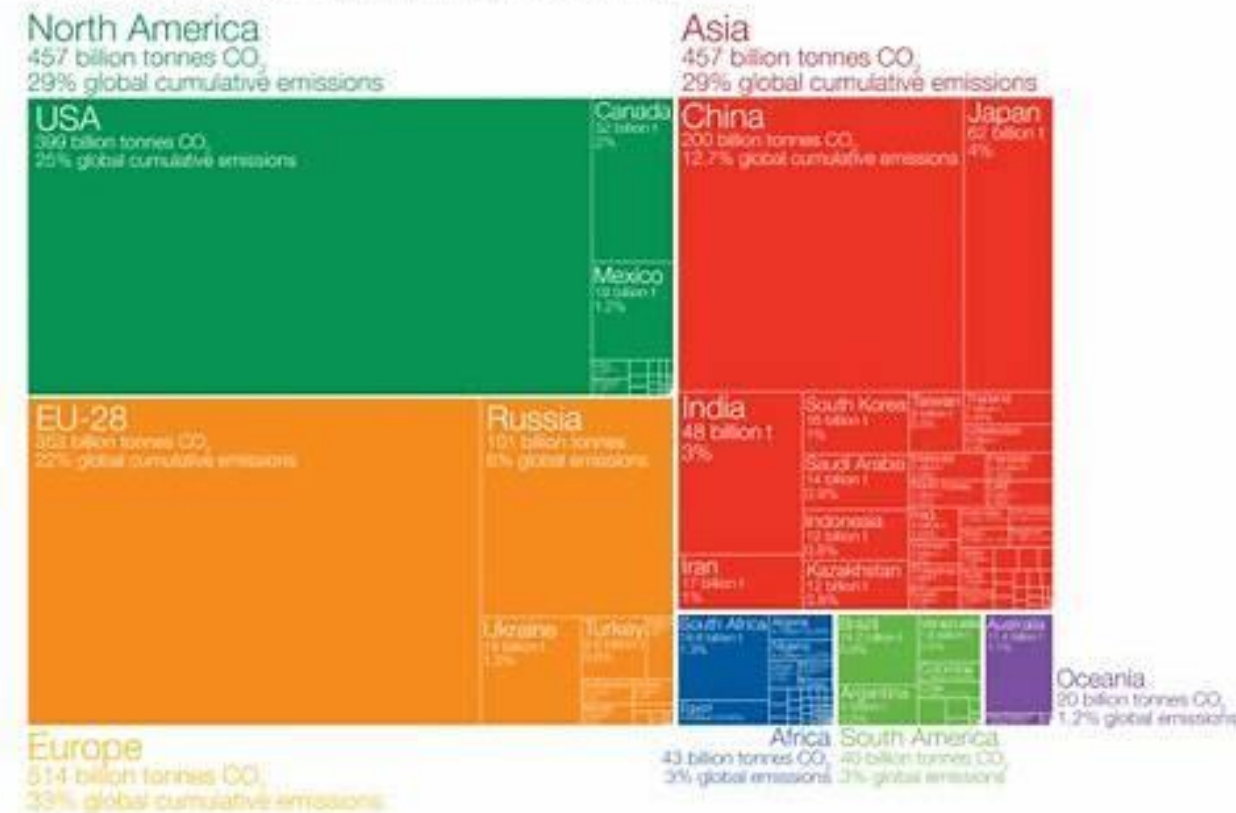
Key Points:

- Importance of technologies like DAC and CDR.
- Global North's responsibility for more 60% of historical emissions (total of 2500 Gt)
- Equity in climate strategies (justice for the Global South).
- Equity on Board of **Noa's Ark** of Environmental Salvation (NZE)

Who has contributed most to global CO₂ emissions?

Our World in Data

Cumulative carbon dioxide (CO₂) emissions over the period from 1751 to 2017. Figures are based on production-based emissions which measure CO₂ produced domestically from fossil fuel combustion and cement, and do not correct for emissions embedded in trade (i.e. consumption-based). Emissions from international travel are not included.



Figures for the 26 countries in the European Union have been grouped as the 'EU-26' since international targets and negotiations are typically set as a collective target between EU countries, which may not sum to 100% due to rounding.

Source: Calculated by Our World in Data from the Global Carbon Project (GCP) and Carbon Dioxide Information Center (CDIAC).

This is a visualisation from Our World in Data, where we host data and research on how the world is changing.

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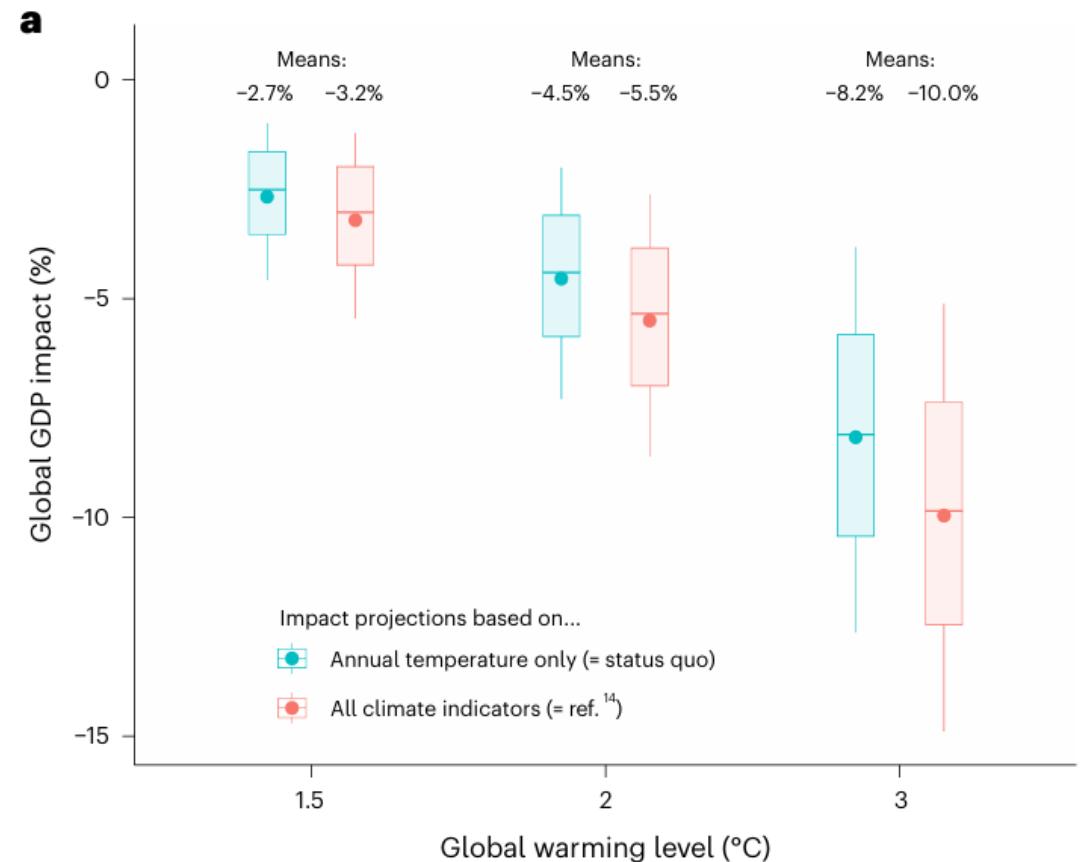


Economic Costs of Inaction

Key Points:

- Limiting warming to 1.5°C prevents severe economic losses.
- Study by a team at ETH Zurich (Nature Climate Change, JUL 2024): global GDP declines by ~ 3.2% from 1.5 C, & up to 17% at 3°C warming.
- Climate action investments are far cheaper than the costs of inaction.
- World GDP @ 105 \$ trillion (2023),: **3-17 trillion cost of climate inaction**

Projected GDP impact vs. global warming





Military Spending vs. Climate Action

Key Points:

- 2023 global military spending: **\$2.4 trillion**. Cost of climate inaction: **\$ 3-17 trillion**
- Climate action funding lags behind significantly,
- At COP 29: New Collective Quantified Goal (NCQG) “calls for scaling up of financing to DC from all sources to at least \$1.3tn per year by 2035.” - **Only \$300 b/y by 2035**
- Scaling up DAC to 1Gt/y at 100\$/t calls for ~ \$ 100 billion/y
- Redirecting some of military budgets could transform climate outcomes.

2023 global military spending: \$2.4 trillion.

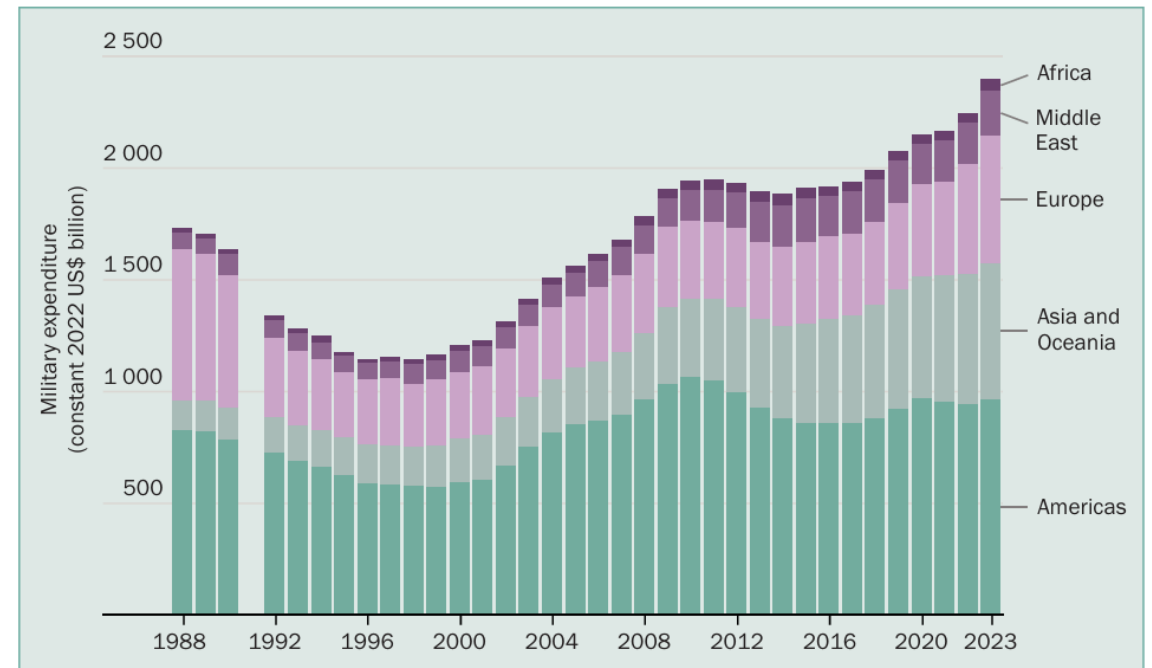


Figure 1. World military expenditure, by region, 1988–2023



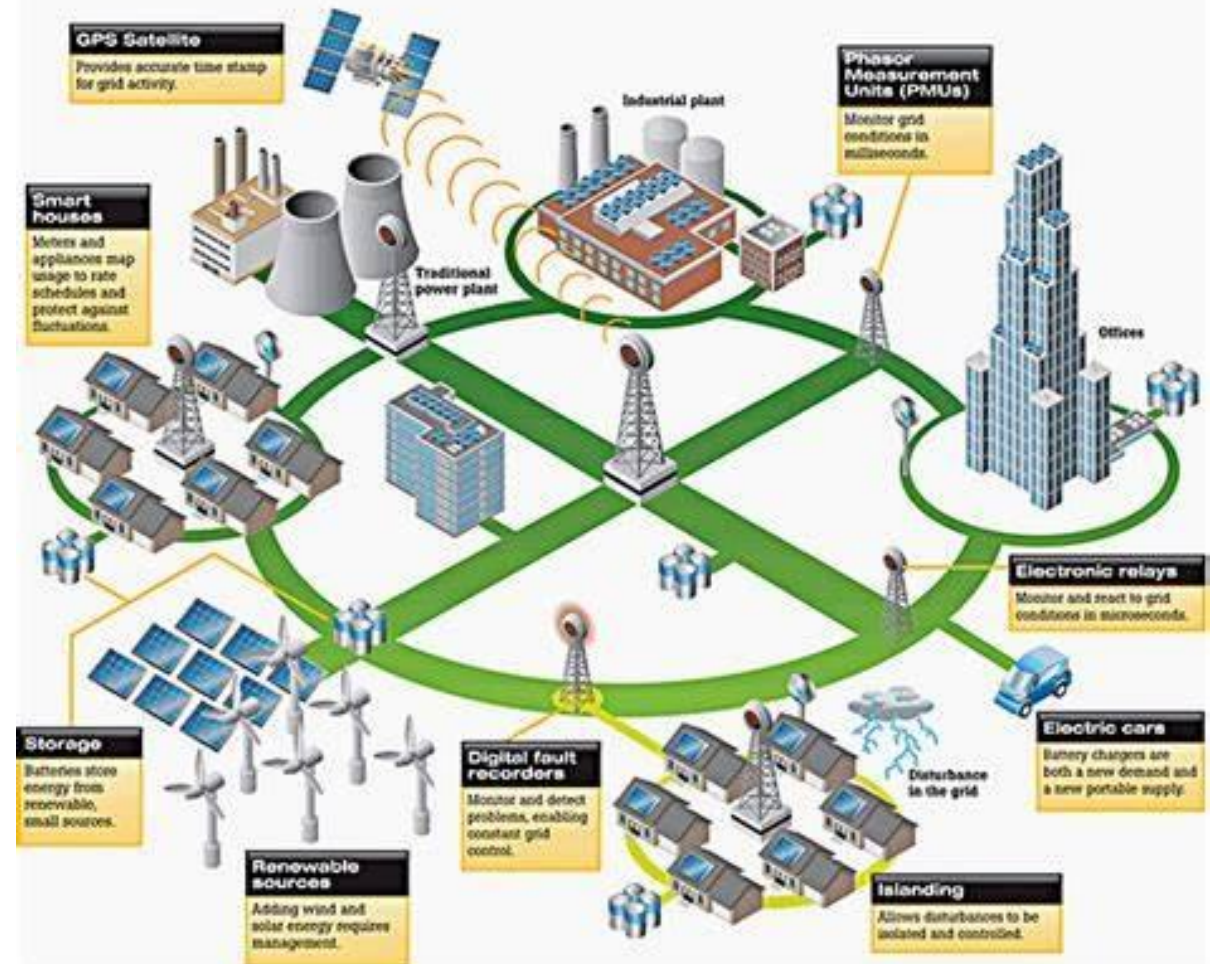
Europe's leadership

Key Points:

- EU can continue to lead by adopting a balanced energy strategy.
- Embrace diverse low-carbon technologies.
- Foster **global partnerships** and equity.
- Examples: Partnerships with North Africa, Sub-Saharan Africa and GCC

Smart Grid

A real-time, dynamic network of electrical demand, supply, and control





Diversification through Partnerships with MENA /GCC

Recent announcements with NA

- June 2024 Germany and Morocco formed **Climate and Energy Alliance** to boost renewable energy and green hydrogen production in Morocco, to support German green hydrogen import;
- **Italy, Germany and Austria** agreed, April 2024, to develop the **Southern Hydrogen Corridor** (Hydrogen transport network) to facilitate import of green Hydrogen

Recent announcements with GCC

- EU GCC Green Energy transition project announced during World Future Energy Summit in AD, April 2024,
- **1st Inaugural EU/GCC Summit (OCT 2024)** announced a **closer partnership** covering trade, investment, **renewable energy** amongst other things
- GCC have put in place **ambitious climate targets**, **launched impressive initiatives** and ready to be a partner with Europe in the clean energy transition set ambitious climate target



GCC energy transition in numbers | forefront of the energy transition



CCUS capacity in the GCC region could scale up **>5x by 2030 to 25MT** – equating to **30% of Europe's target**



The UAE, Saudi Arabia and Oman's combined clean hydrogen production target by **2030 is >50% of that of Europe** in aggregate



Saudi Arabia is developing the **world's largest green hydrogen plant** at NEOM, with a **30 year offtake agreement** of all the produced green ammonia secured



The GCC region's **renewable energy capacity** expansion plans imply a **~40% CAGR to 2030**, placing it among the fastest decarbonisation growth markets in the world



Qatar is pursuing the **largest LNG expansion globally**, with its market share of new total global LNG supply expected to reach **~40% by 2030**



Prevailing project pipelines and net zero targets, signal that **energy transition pending will similarly match conventional energy expansion** in the GCC region



MUFG



Conclusions

Key Points:

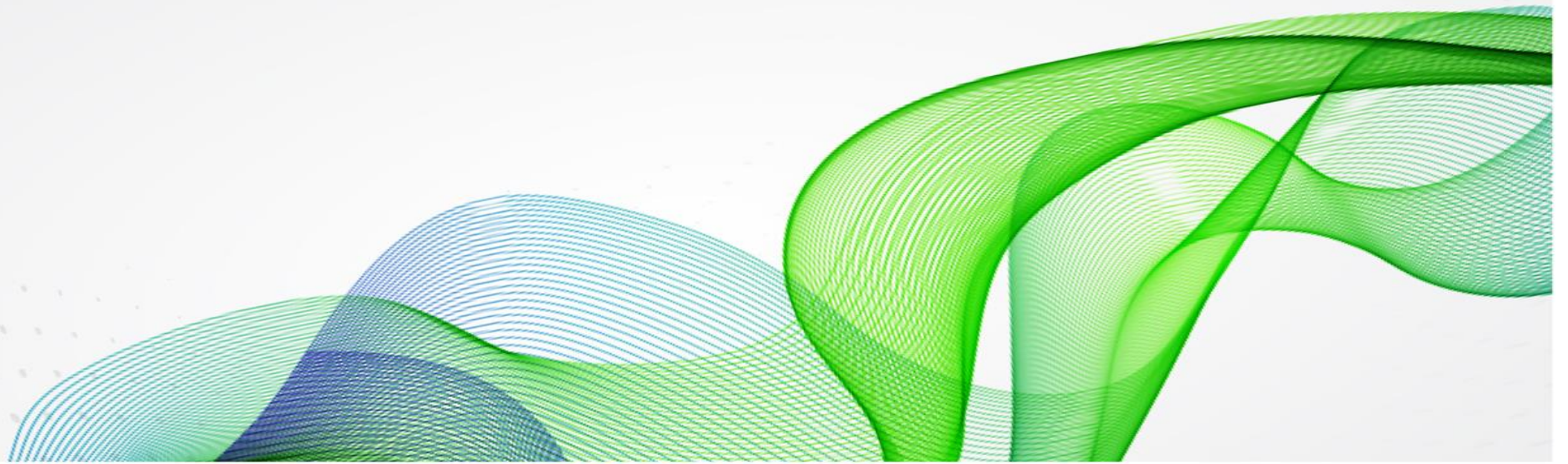
- Energy security intertwines resilience, justice, and responsibility.
- EU's role in aligning innovation, equity, and sustainability.
- A historic chance to lead in global energy and climate solutions.

EU's energy strategy highlighting its pillars: security, sustainability, and equity.





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