Istituto Affari Internazionali
Inspiring Ideas for Italy, Europe and the World

ENERGY: A CHANGING WORLD

CHALLENGES AND OPPORTUNITIES OF THE ENERGY TRANSITION

UNIVERSITÀ DEGLI STUDI DI FIRENZE
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ENERGY: A FUNDAMENTAL RESOURCE

A strategic asset

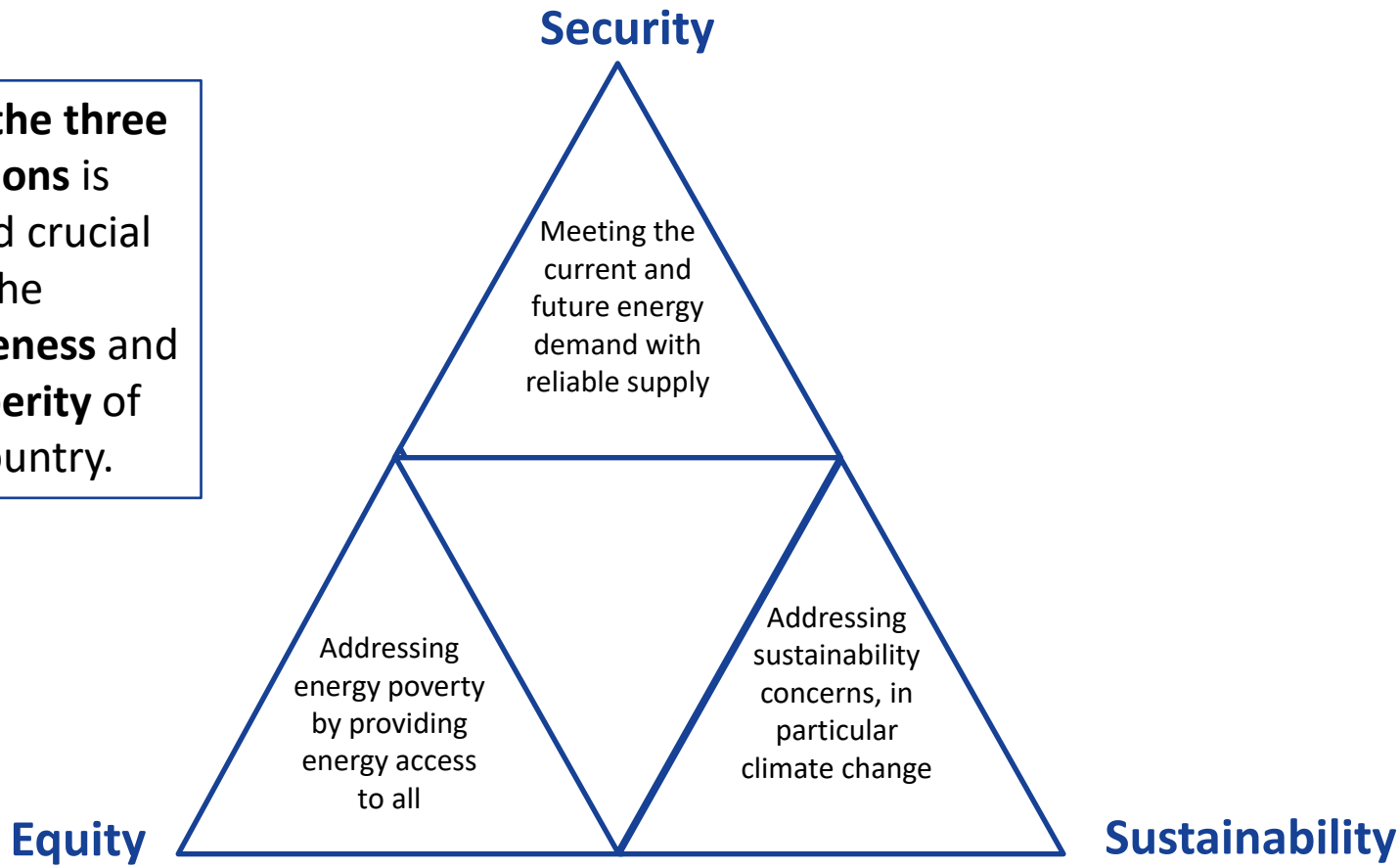
Energy is a crucial driver of social, technological and economic development…

…and, in turn, it depends on social, technological and economic development.

Availability, accessibility & security
of energy supply
define our everyday life.

The Energy Trilemma

Balancing the three dimensions is considered crucial for the **competitiveness** and the **prosperity** of every country.



Energy = Development (1)

On 25 September 2015 the United Nations approved the Global Agenda for Sustainable Development and its related 17 "**SDGs**", divided into 169 targets to be reached by 2030.

"No-one left behind"

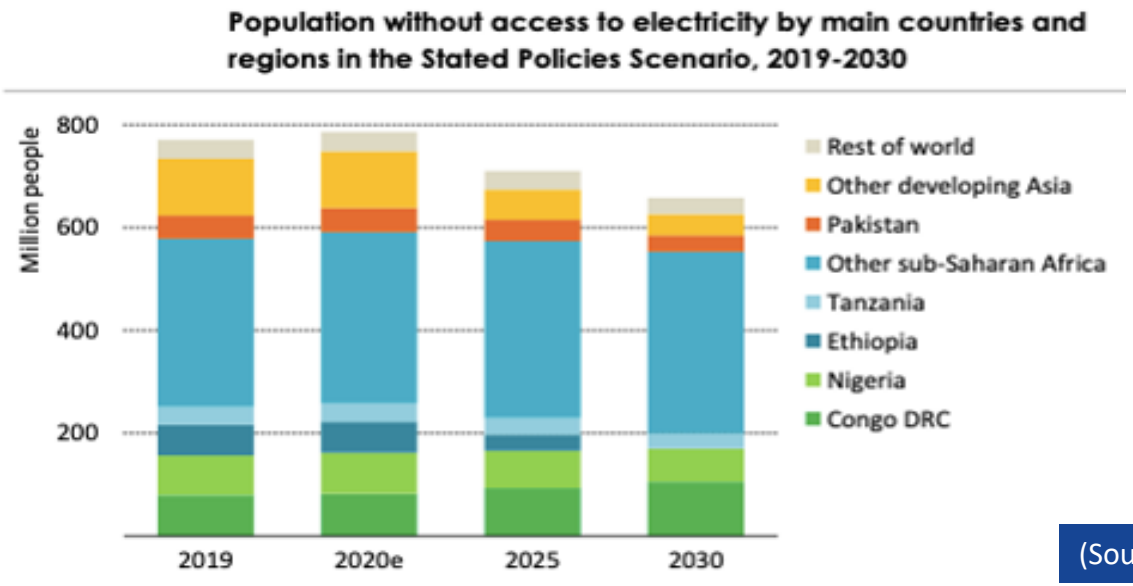
Goal n.7
seeks to ensure everyone an affordable, sustainable and modern access to energy.

Polluting but cheap energy? Society pays through **negative externalities!**

Energy = Development (2)

Yet... **energy** is also a cross-cutting issue that more or less directly intersects all the other sustainable development objectives.

Energy poverty (1)



(Source: IEA, 2020)

- Despite progress in terms of electrification, **in 2019 almost 770 million people still had no access to electricity**.
- Energy poverty is also an **European problem**: EU Energy Poverty Observatory launched in 2018. At present, around **50 million households in the European Union do not have fully adequate energy services**, such as heating, cooling and lighting, or do not have the means to power their household appliances. The **poorest households spend around 10.4% of their total income on energy costs**.

Lack of secure and affordable energy can lead to crises

November 2019, Iran: the population takes to the streets and the protest rapidly becomes violent. Public opinion protests against the fuel price rise as President Rouhani, in the midst of the economic crisis led by the sanctions, approved an oil subsidies cut – which in 2018 accounted for $ 26 billion (16% of GDP).

The impossibility to maintain the traditionally low fuel prices is considered as an indicator of the government's inability to manage the economic crisis.

Energy is a "bridge" between countries and regions

Interconnections create relationships of **interdependence**. Buyers depend on sellers and vice versa, with **political, economic and security implications**.

Gas pipelines in Europe
(Source: Isabella Ruble, 2017)

…but it is also a powerful platform for dialogue

- The **European Coal and Steel Community (ECSC)**, created in 1951, was the first step of the European integration. It included Belgium, France, Italy, Luxembourg, the Netherlands, and West Germany and it aimed to deal with production of coal – the main energy source for European countries in those years. It was followed by several other institutions (e.g. European Atomic Energy Community).

- **East Med Gas Forum (EMGF)**: Egypt, Cyprus, Greece, Italy, Israel, Jordan and the Palestinian National Authority discuss how to bring East Mediterranean gas on the market. A complex chessboard, but an important platform for dialogue - in which Italy could even play a strong mediating role.

- The association of regulators, **MedReg**, includes Israel and Palestine working together for the gas exchange along the pipelines between the Gaza Strip and Israel. “Technicians" can, in some cases, go further than politics;

DRIVERS OF ENERGY DEMAND

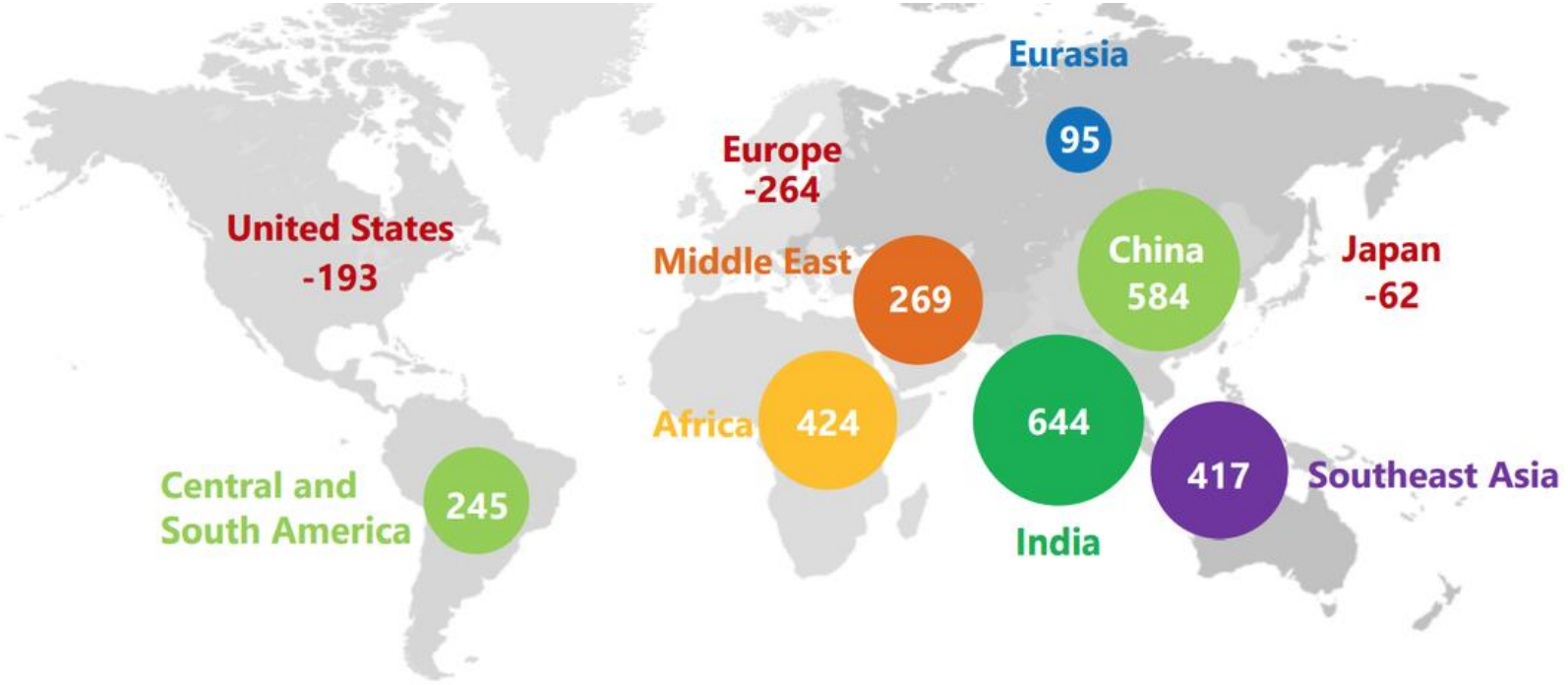
Key drivers (1)

The growth rate of **economic activity and population** are some of the main drivers of **energy demand**.

- The **world GDP**, following the forecast of a sharp contraction in 2020 and a recovery in 2021, will grow by 0.6% in 2021 compared to 2019.
- and the **population** will increase from 7.8 billion in 2020 to 9.2 billion in 2040 (Source: IMF, 2020; World Population Prospects 2019).
- **Urbanisation** trends are also a key indicator (68% world's population expected to live in urban areas by 2050)
- In 2019 estimates showed that energy demand was going to increase by 1.3% each year until 2040 according to IEA (WEO 2019).
- The impact of the pandemic has led to a 4% estimated reduction in 2020 and pre-crisis energy demand levels are expected to be reached by early 2023 (WEO 2020).

Key drivers (2)

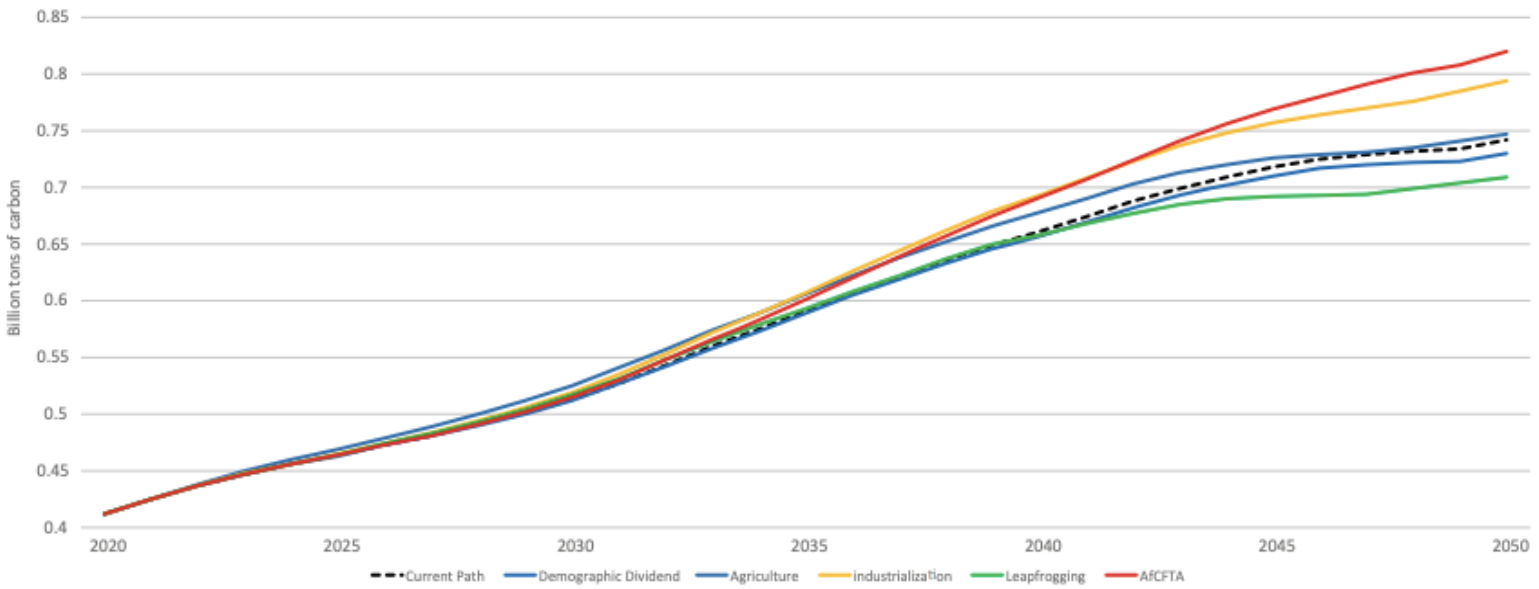
Non-OECD countries lead the rise in energy demand: in the next twenty years demand will stabilize in industrialized countries, but not in India or China, and it will considerably rise also in Eastern and Southern Mediterranean countries.



Change in energy demand in the Stated Policies Scenario, 2019-2040, Mtoe
(Source: IEA, India Energy Outlook, 2021)

Key Drivers (3)

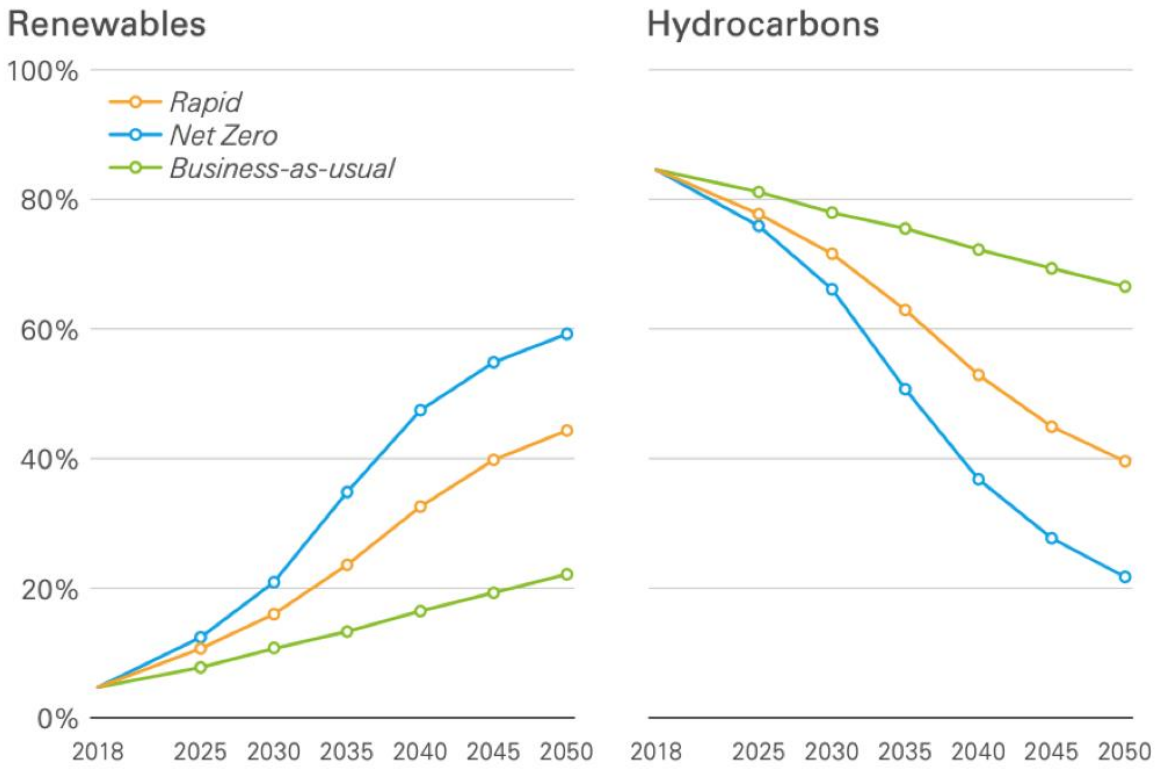
Africa has the among the world highest economic, demographic and urbanisation growth rates. By 2040 the African GDP will increase by 2,66 times and its population will almost double. What will be the effect on emissions? Interesting concept of "**energy leapfrogging**".



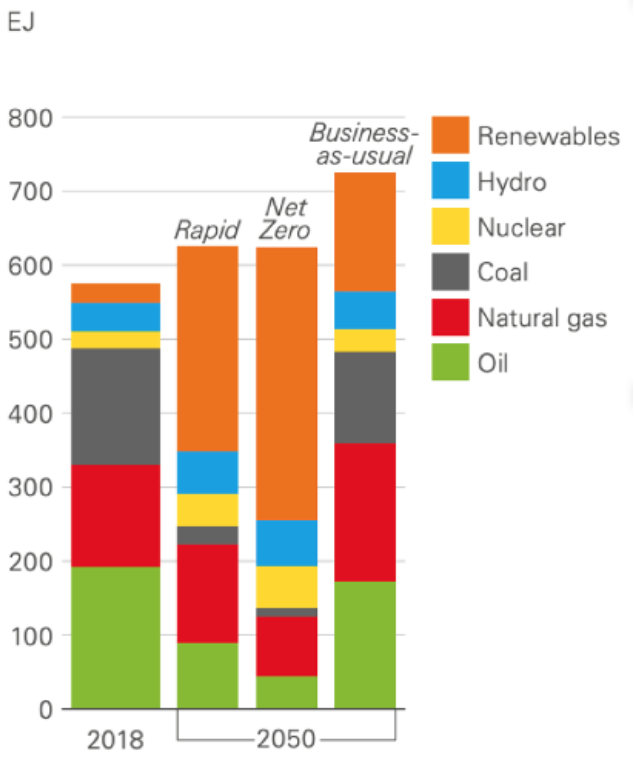
Different CO_2 scenarios in Africa according to IPCC
(Source: J. Cilliers, 2021)

THE ENERGY SYSTEM IS EVOLVING

Today's energy transition seeks to increase RES and reduce hydrocarbons



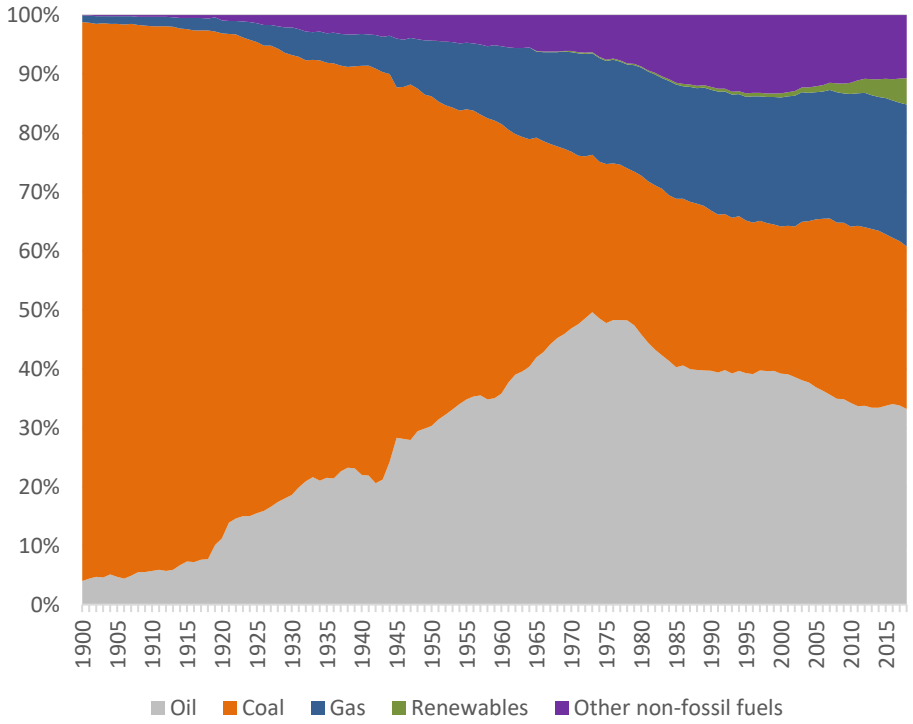
Share of world's primary energy
(Source: BP, 2020)



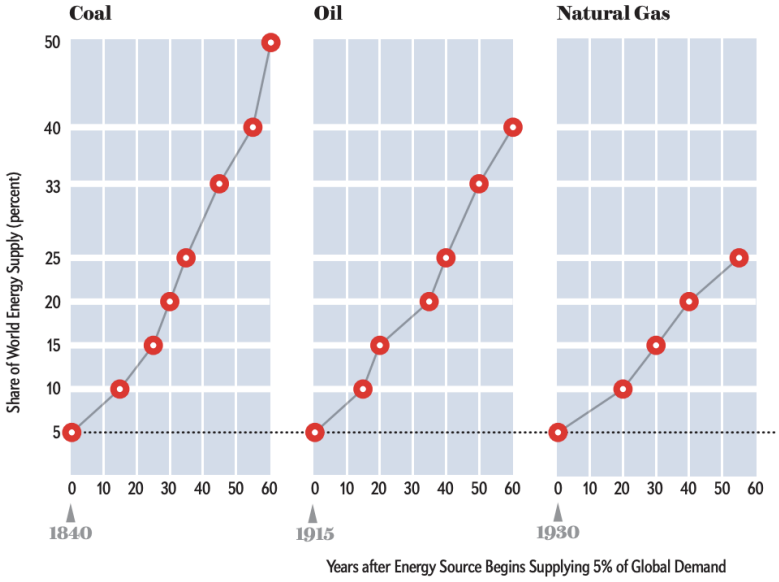
World's primary energy consumption by source
(Source: BP, 2020)

Energy has always evolved throughout history

- Energy has experienced a "**permanent revolution**" since XIX century;
- **Energy transitions take time**. **Each major energy source** that has dominated world supply **has taken 50 to 60 years to rise to the top spot**.
  - Coal reached 5% of global supply in 1840 and gradually took over from wood, reaching 50% some 60 years later, around 1900.
  - Subsequent transitions to oil and natural gas have followed a similar pattern in reaching benchmark levels of supply, rising steadily after they achieve 5%.



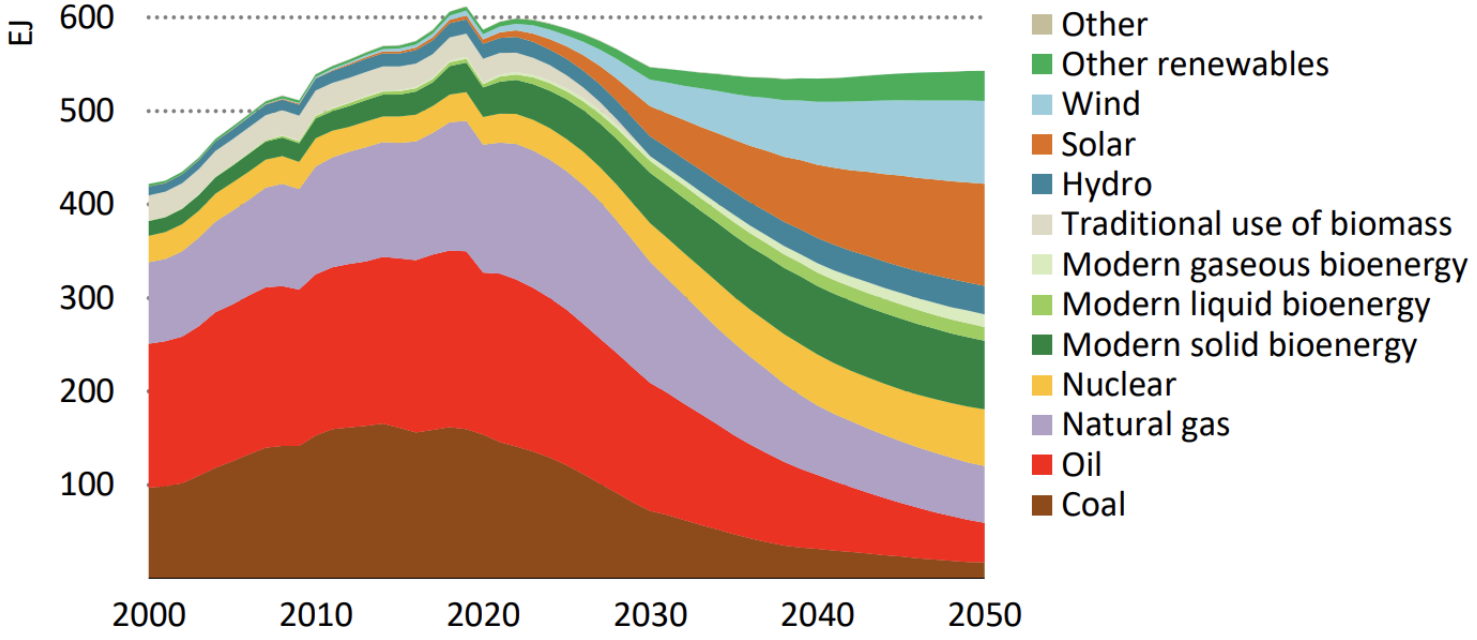
Shares of primary energy
(Source: BP, 2020)



Energy source scale-up and years
(Source: V. Smil, 2014)

Today's energy transition seeks to transform energy supply in a 30-year range

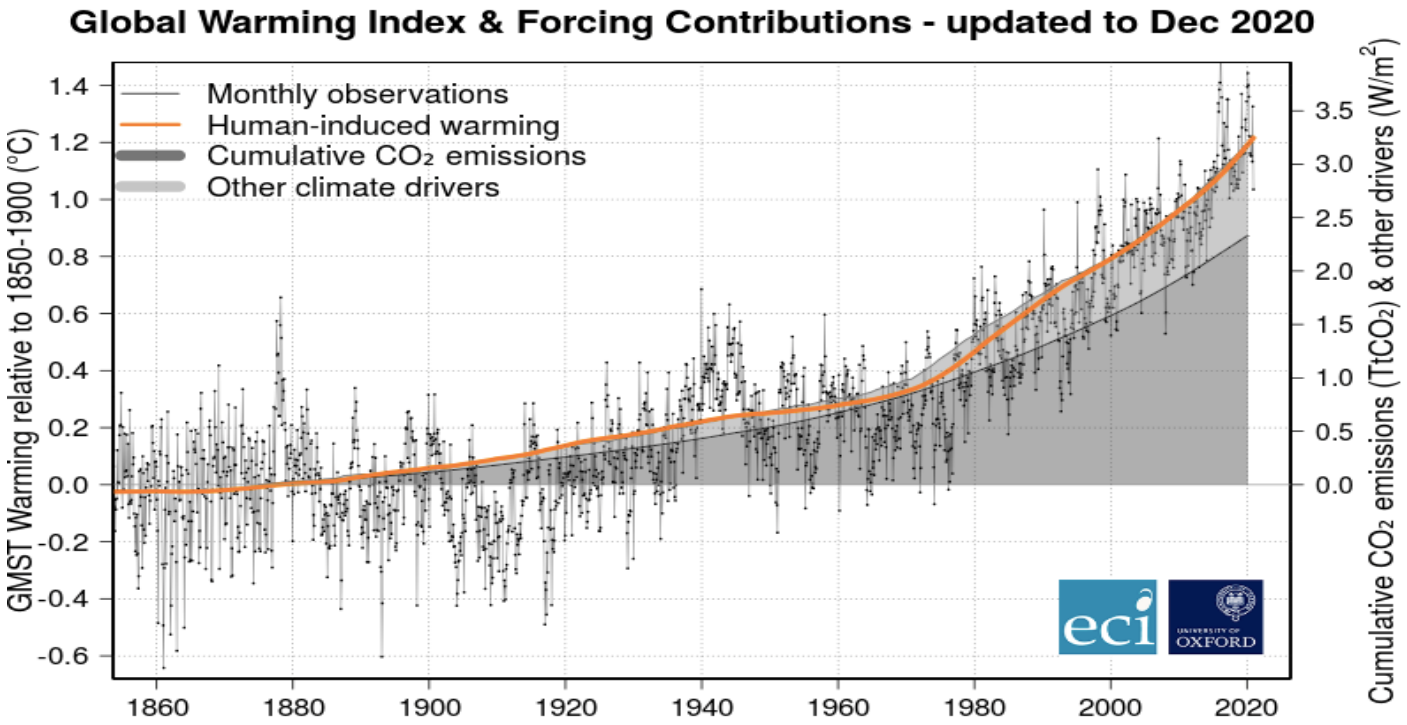
According to the IEA's NZE scenario, renewables and nuclear power displace most fossil fuel use, and the share of fossil fuels falls from 80% in 2020 to just over 20% in 2050.



Total energy supply in the NZE
(Source: IEA, 2021)

Today's energy transition responds to a market failure?

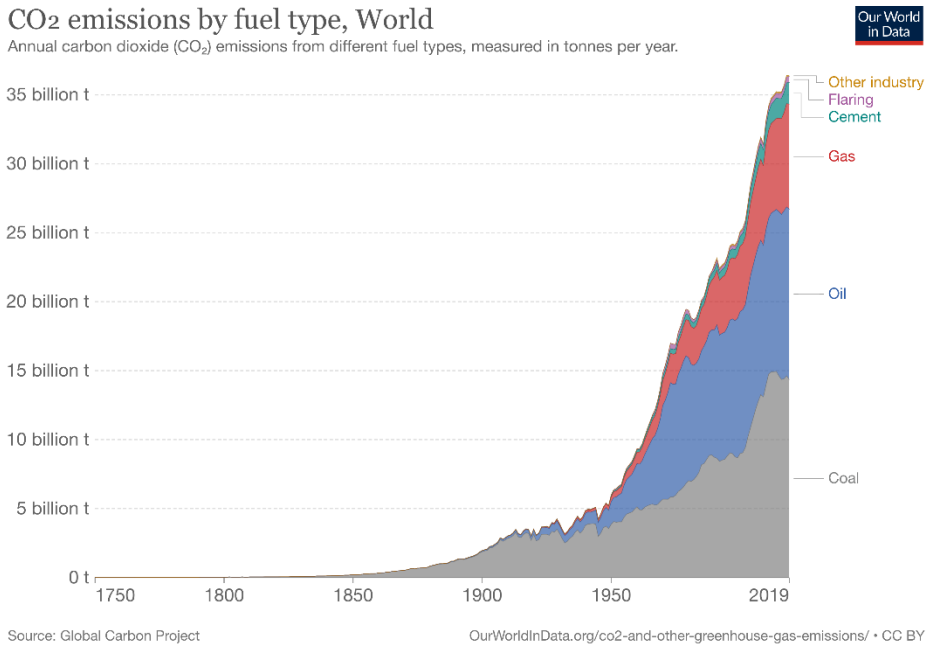
Global **temperature** and **CO_2 levels** in the atmosphere **increase in tandem**, with a spike after the Industrial Revolution and especially after 1950.

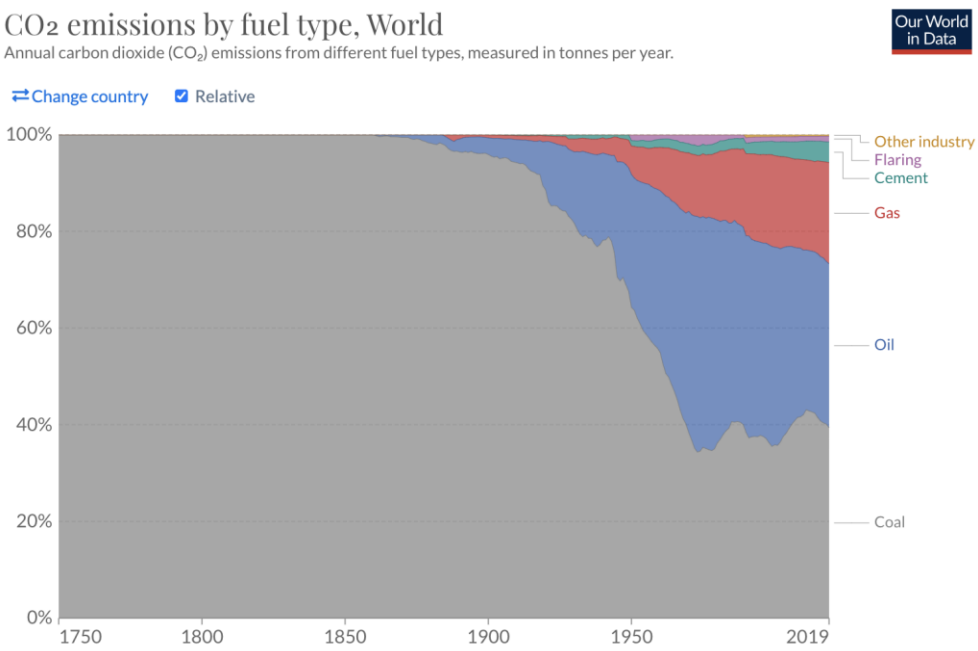


The current path leads to an increase in temperature of around 3°C by 2100

Changes in CO2 levels in the atmosphere and global temperature
(Source: University of Oxford, ECI, 2020)

What is the most CO_2 intensive energy source?



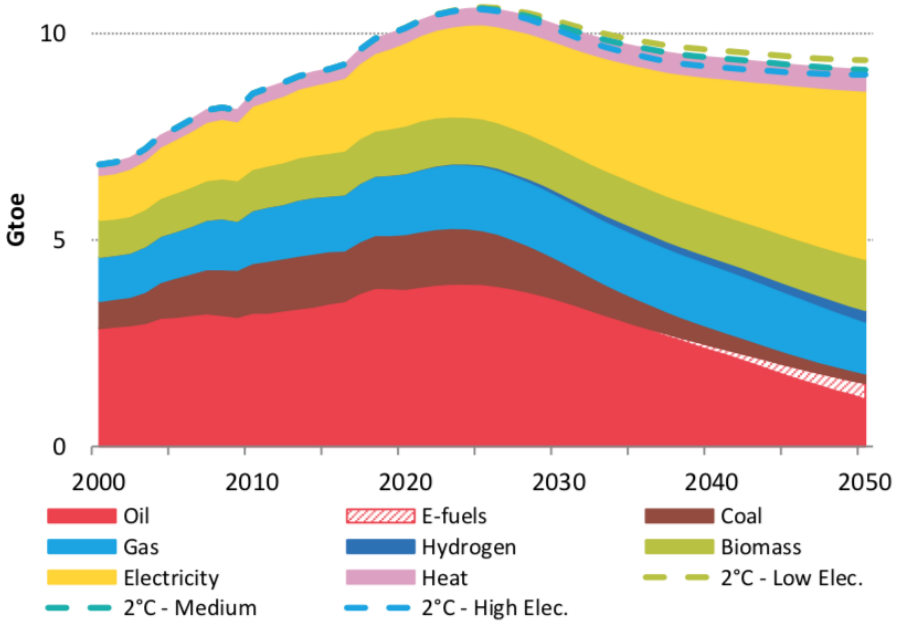


CO2 emissions by fuel type, World (tonnes per year)
(Source: Our World in Data – University of Oxford, 2018)

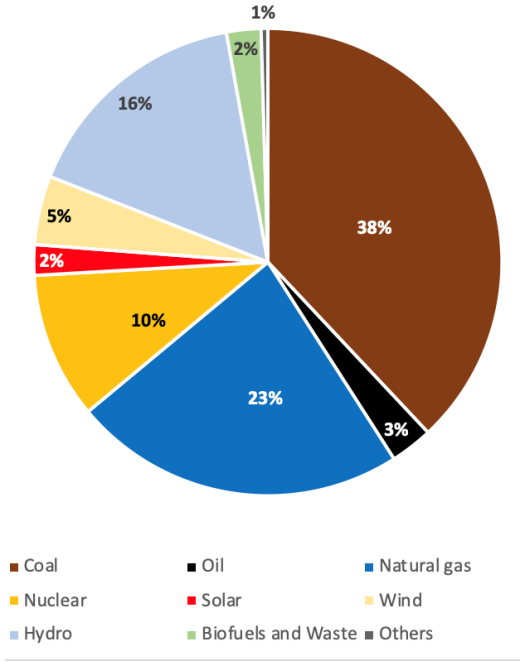
A changing demand (1)

To meet climate targets the global electricity consumption should increase from 20% in 2021 to **50% in 2050, out of which 86% from RES**

Electrification does not mean automatically less emissions! It depends on how electricity is produced.



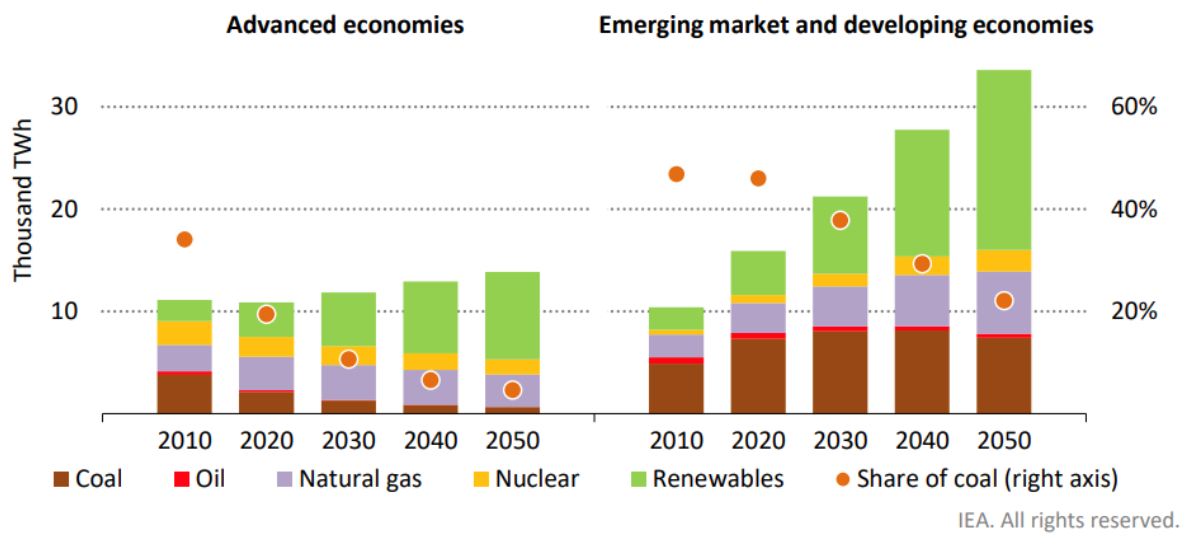
World total final energy consumption by fuels (Source: JRC, 2020)



Power Generation in 2018 (Source: IEA, 2021)

A changing demand (2)

Decarbonize electricity generation (first by phasing out of) coal



Emerging market and developing economies drive most of the increase in global electricity demand, met mainly by renewables and gas, though coal remains important

Electricity generation by fuel and share of coal in the STEPS
(Source: IEA, NZ Roadmap, 2021)

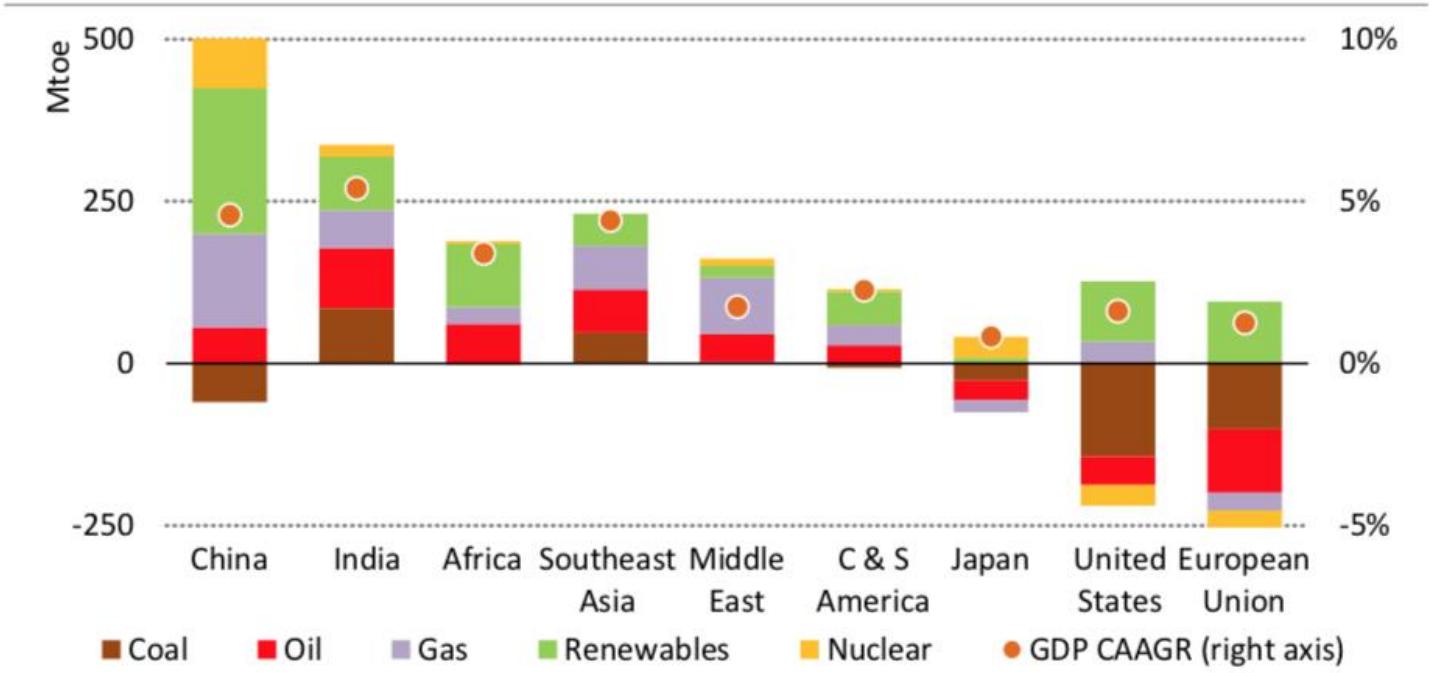
To meet global targets in 2050
(IRENA, 2021):

70%
of passenger road transport electrified

58%
of building sector electrified

Up to **35%**
industry sector electrified

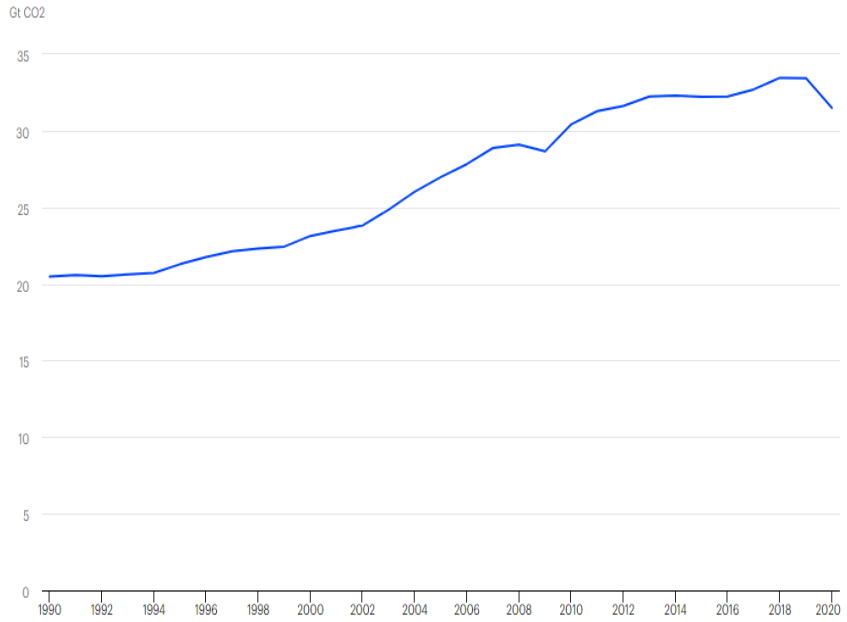
A changing demand (3)



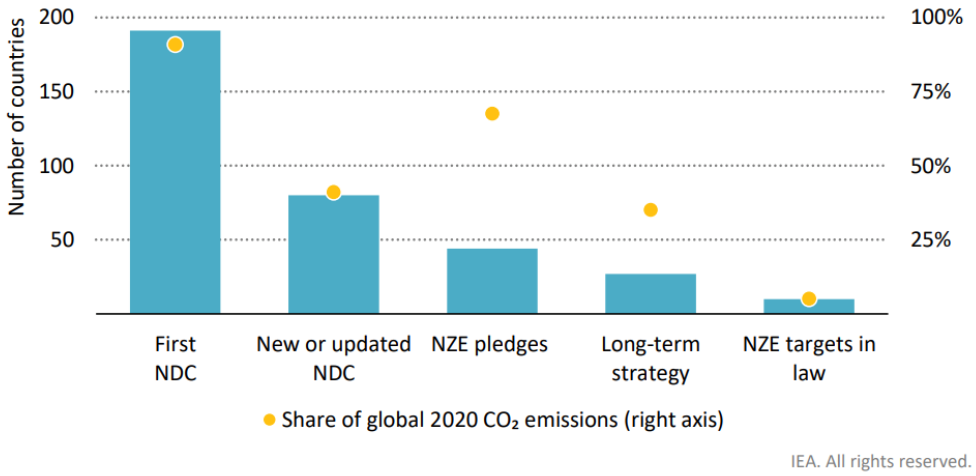
Changes in primary energy consumption by fuel and region in the STEPS, 2019-2030
(Source: IEA, 2020)

The impact of COVID-19

- Temporary reduction of CO2 emissions;
- Reduction of energy consumption due to lockdowns;
- Higher political commitment in favor to a green and sustainable recovery.
  - As of the second quarter of 2021, governments around the world have allocated around **$380 billion on clean energy measures** as part of their economic response to the Covid-19 crisis. This is **around 2% of the total fiscal support** in response to Covid-19.



Global energy-related CO2 emissions, 1990-2020
(Source: IEA, 2021)



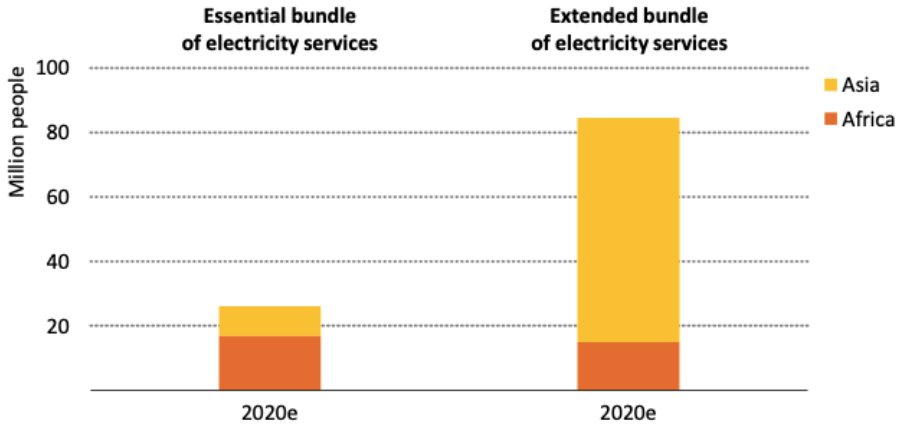
Around 40% of countries that have ratified the Paris Agreement have updated their NDCs, but net zero pledges cover around 70% of global CO_2 emissions

Number of countries with NDCs, long-term strategies and net zero pledges, and their share of 2020 global CO_2 emissions
(Source: IEA, 2021)

The impact of COVID-19 on Energy Poverty

Declining incomes for vulnerable households that currently do have access to electricity **means that many may lose the opportunity to access** it.

IEA estimates that more than 25 million people in Asia and Africa may lose the ability to afford essential electrical services by the end of 2020.



Number of people with access to electricity in Asia and Africa who risk losing the ability to pay for basic electricity services (Source: IEA, 2020)

In addition, it estimates that another 85 million people may lose the opportunity to pay for a wide range of electrical services.

In **2020**, in some countries of South Asia and Sub-Saharan Africa, **more than half of health care facilities have no access to electricity or face unforeseen interruptions** that prevent the provision of essential services.

PLAYERS AND CHANGING DYNAMICS

In international relations (1)

Producers are dealing with important changes:

- MENA, with the Arab Spring + MENA oil and gas producers, with volatility of oil prices > instability
- United States, with the shale oil and gas revolution
- Changing routes > Russia

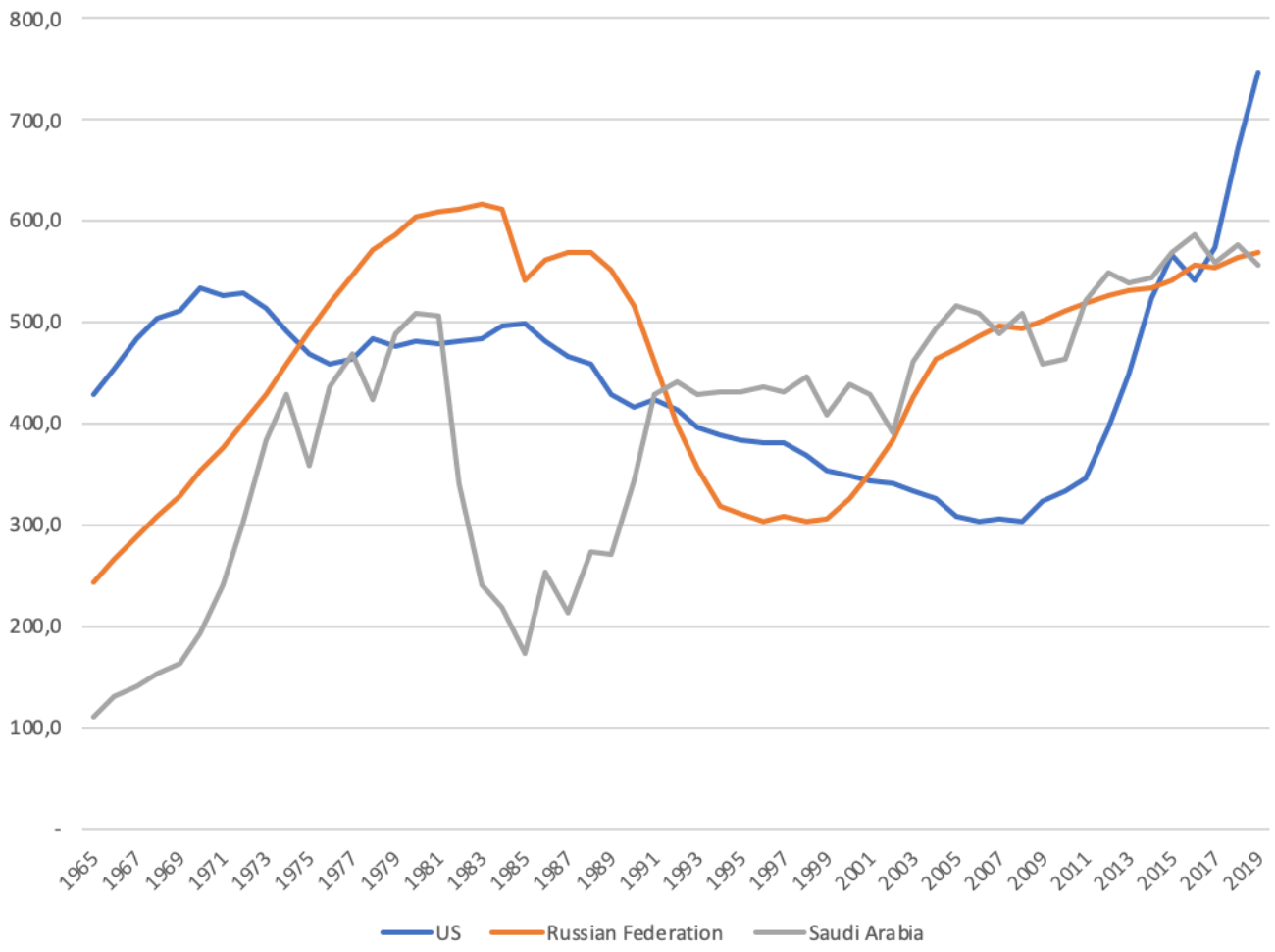
The routes: new strategies to "diversify" suppliers and transit countries

- Russia towards EU with NordStream2 following crises with Ukraine in 2006, 2009, 2014
- Russia towards China with Power of Siberia due to political confrontation with EU and European climate ambitions

Foreign policy: cooperation is or could be strengthened in the new regions

- Conflicting or coinciding interests towards the Eastern Mediterranean

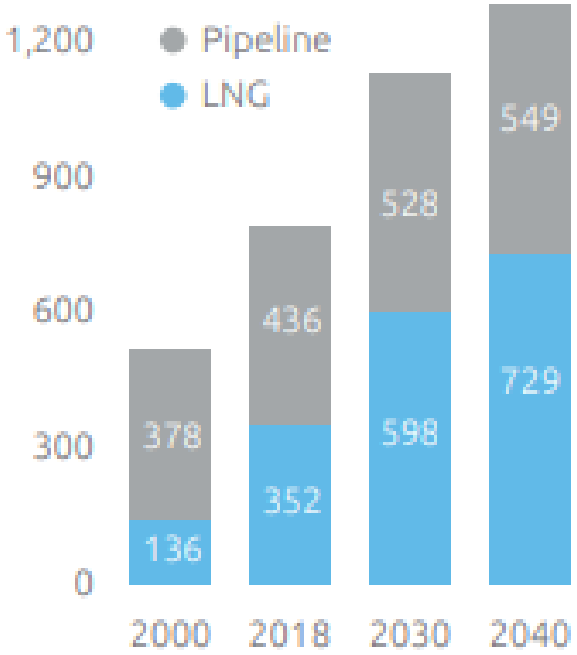
Oil production by USA, Russia and Saudi Arabia



Oil production by USA, Russia and Saudi Arabia (1965-2019), Mt
(Source: BP Statistical Review of World Energy 2020)

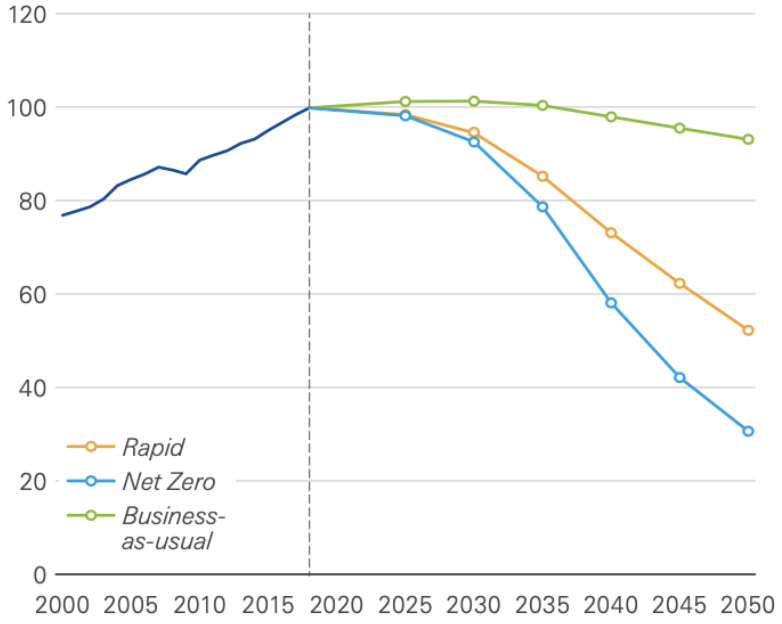
In energy markets

The gas market: beginning of a global market, due to changes in transport mode (from pipeline to LNG). Increase in the trade of gas in its liquefied form (LNG - Liquefied Natural Gas).



Natural Gas Trade (bcm)
(Source: Global Gas Report Snam,IGU,BNEF, 2021)

The oil market: passing from a 'sellers' market' to a 'buyers' market'. From an expected peak oil supply to a peak oil demand.



Liquified fuels consumption (mb/d)
(Source: BP energy Outlook, 2020)

Ukraine-Russia conflict > energy crisis

- The crisis brings the debate back to energy security, in particular how to **rapidly reduce dependence on Russia** > EU very dependent

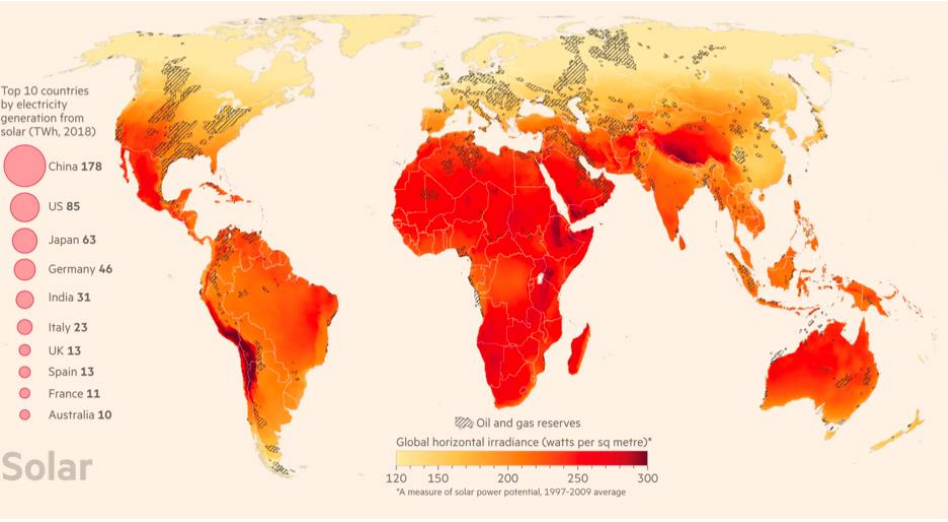
- Two steps: short term (Oct. 1°) > diversify suppliers and manage price increase
  long term > through decarbonisation we can get energy security and sustainability

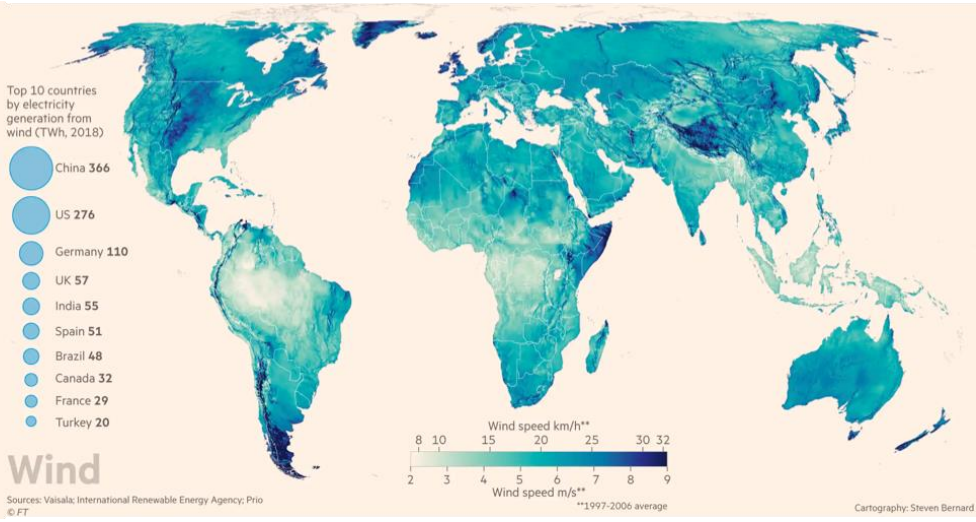
- REPowerEU – eliminating our dependence on Russian gas before 2030
  2 pillars: diversify suppliers (LNG) + more alternative fuels (biomethane and hydrogen); decarbonisation +energy efficiency

- IEA 10 point plan > coal last resource, we would delay the Green Deal

- Italy > very exposed but has more options compared to other EU countries
  Existing infrastructures towards Algeria, Libya and regasifires (Qatar LNG towards EU markets)

Renewables are much more distributed across the world compared to fossil fuels

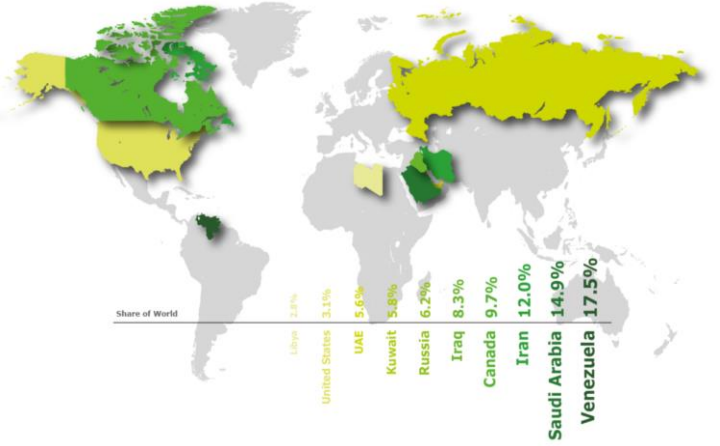




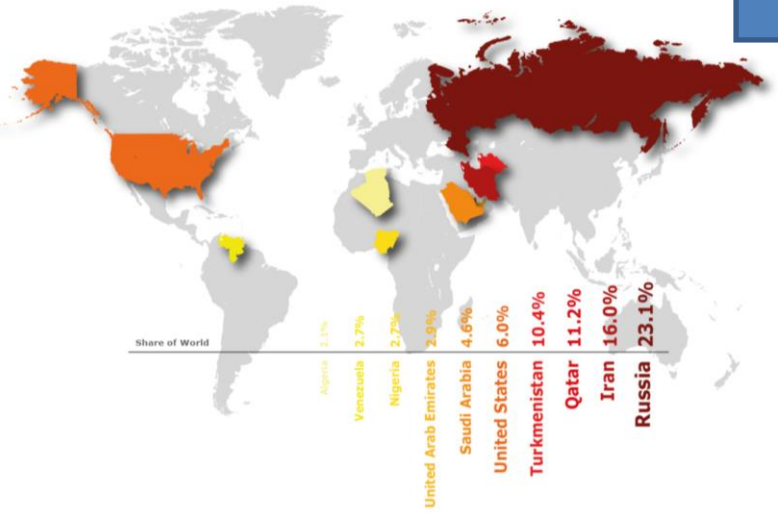
Solar and Wind potential
(Source: Financial Times, 2020)

A new geopolitical map is emerging (1/2)

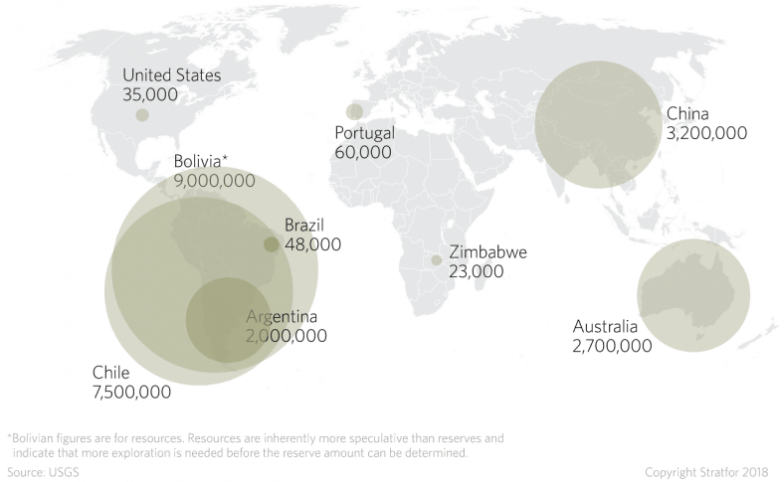
Oil reserves



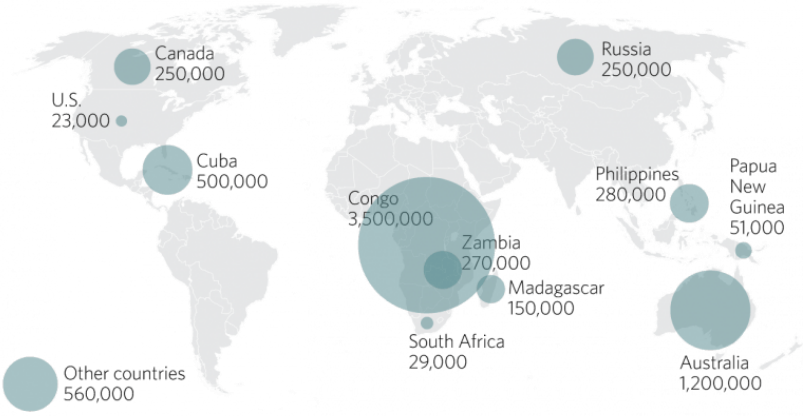
Gas reserves



Lithium reserves



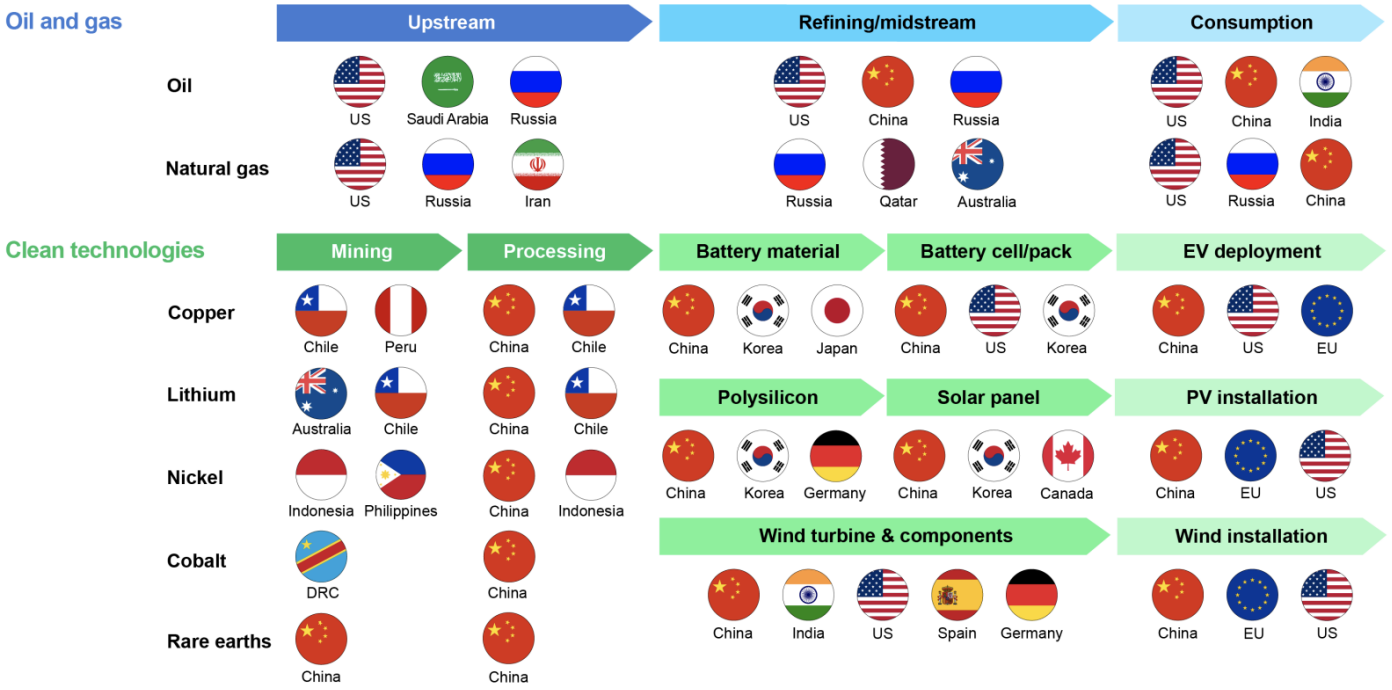
Cobalt reserves



Source:
ENI, 2021 & Stratfor 2020

A new geopolitical map is emerging (2/2)

- The transition to a clean energy system brings new energy trade patterns, countries and geopolitical considerations into play



Notes: DRC = Democratic Republic of the Congo; EU = European Union; US = United States; Russia = Russian Federation; China = People's Republic of China. Largest producers and consumers are noted in each case to provide an indication, rather than a complete account.

Indicative supply chains of oil and gas and selected clean energy technologies
(Source: IEA, 2021)

To harness RES potential, countries are investing (and competing) on technological and industrial know-hows

- Traditionally limited and geographically localised (oil and gas), energy has a strong **strategic and security component**: it is a source of instability and tension, vulnerability for producers, importers and consumers, volatility and speculation.

- The **concept of energy security** itself **is evolving**: regional networks are becoming more and more strategic; strategic dimension of value chains; new potential "leaders" emerging (i.e. those who are rich in gas in the short/medium term; those who have a high technical potential for the generation of renewables; those who are rich in minerals; those who are leaders in technological innovation).

In energy and climate policy

International commitments:

Paris Agreement: adopted by 196 Parties at COP21 in Paris in 2015, entered into force in 2016, it recognizes that climate change is a shared problem and calls on all countries to set emissions targets (Nationally Determined Contributions, NDC) with the goal of preventing the global average temperature from rising 2°C above preindustrial levels and pursuing efforts to keep it below 1.5°C.

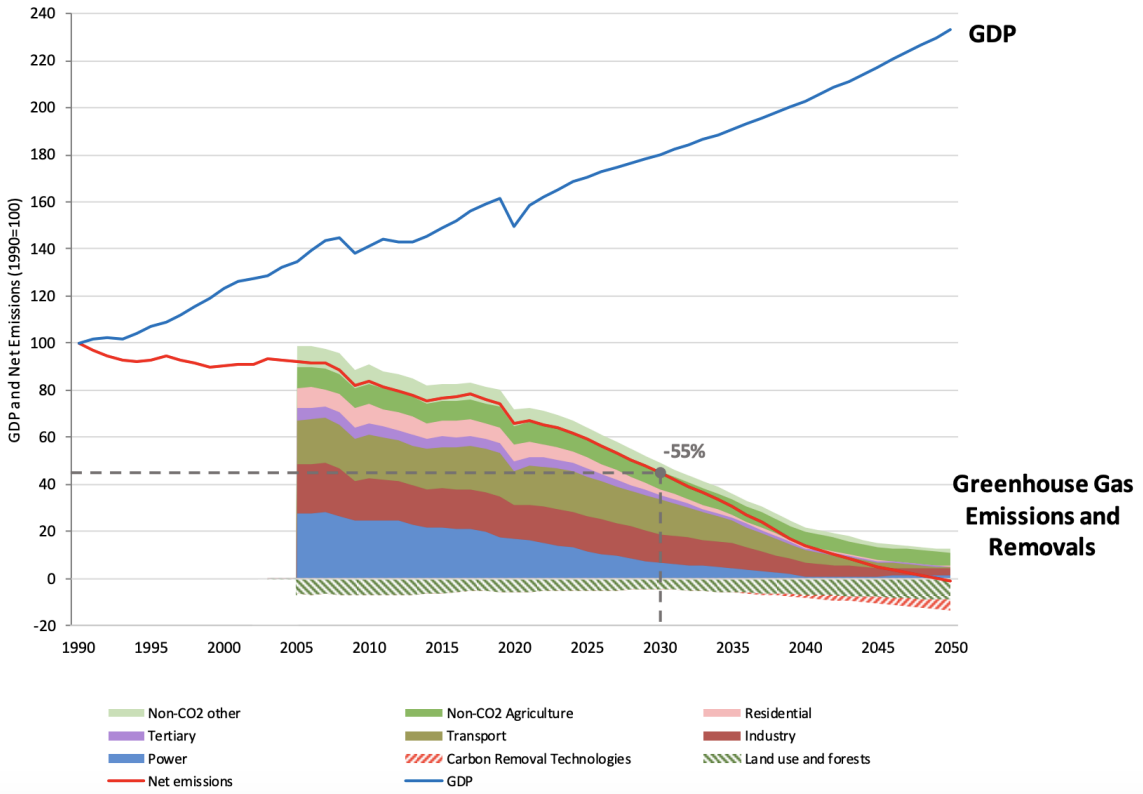
Politically a lot has changed since 2015:

- **USA:** Soon after his election president Biden has announced that the USA will return to Paris Agreement and that it will pursue a green recovery - what are the global implication?
- **China:** It is strengthening its commitment to fighting climate changes, even if it is the largest emitting country

COP26: UK Presidency in partnership with Italy. Main themes were: adaptation, loss & damage, climate finance, NDCs.

The EU aims at becoming the first continent climate-neutral with its Green Deal

- **Roadmap for a green and just transition of the EU to 2050**: climate neutrality target, with current proposal of reducing emissions by 55% by 2030 (decoupling GHG-GDP).
- Through its **Recovery Fund**, the EU has shaped post-pandemic recovery measures according to a **sustainability and ecological transition rationale, following the Green Deal approach.**
- **Inevitably, the EGD entails also an external and commercial**



The EU's pathway to sustained economic prosperity and climate neutrality, 1990-2050
(European Commission 2020)

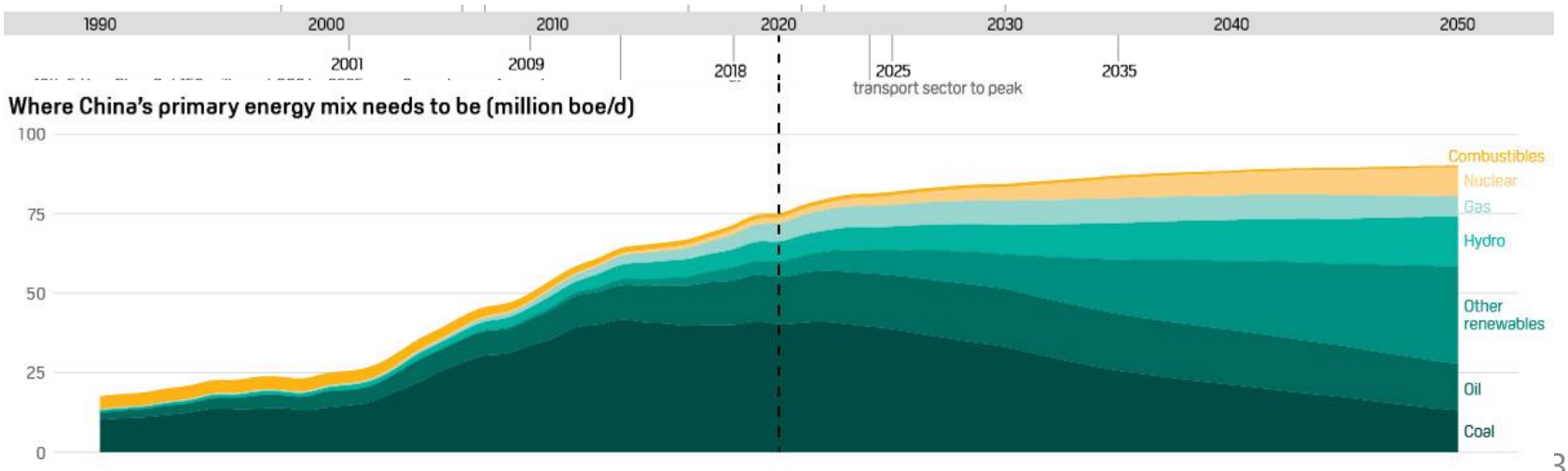
China: the most polluting country and, at the same time, major renewable player

China embodies a **dual and opposite condition**: it accounts for more than half of global **coal** use, while being **responsible for the strong declining costs of RES**.

Driven by strong political support, China expanded its **total installed renewable energy capacity** from 267.9 GW in 2011 to 894.9 GW in 2020;

Due to **air quality concerns**, government has **encouraged** the **use of gas versus coal**;

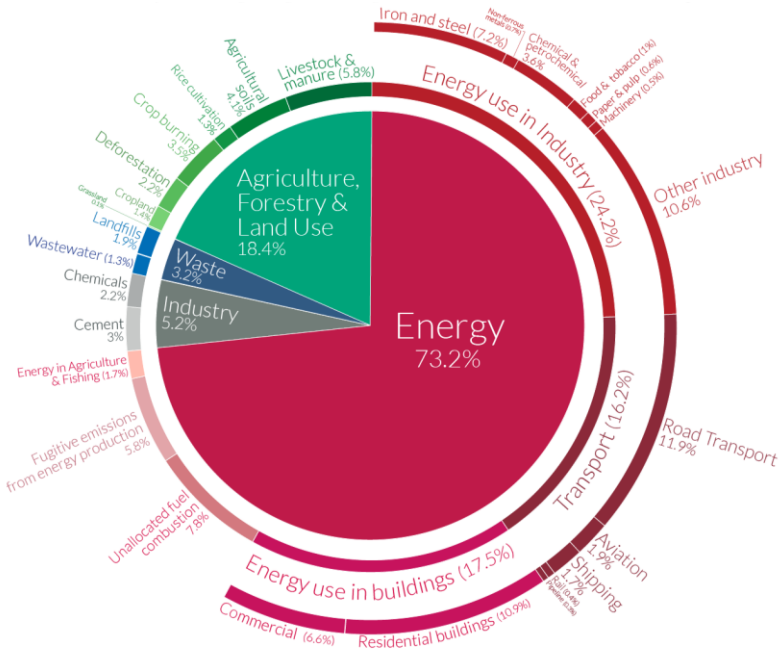
China has announced a plan to **achieve carbon neutrality by 2060**.



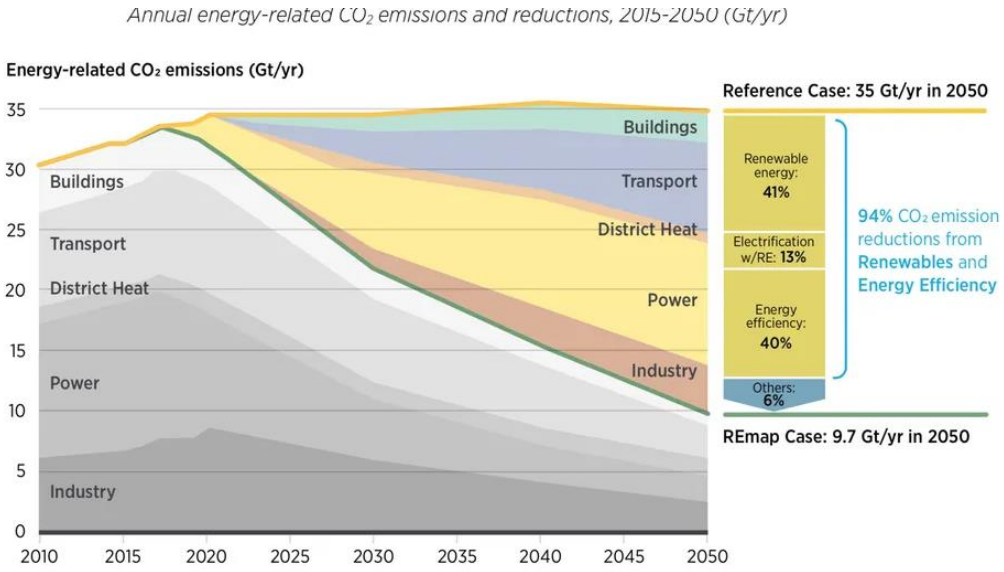
(Source: S&P Global Platts, 2020)

TRANSITION CHALLENGES

Energy sector: the most important source of CO2 emissions

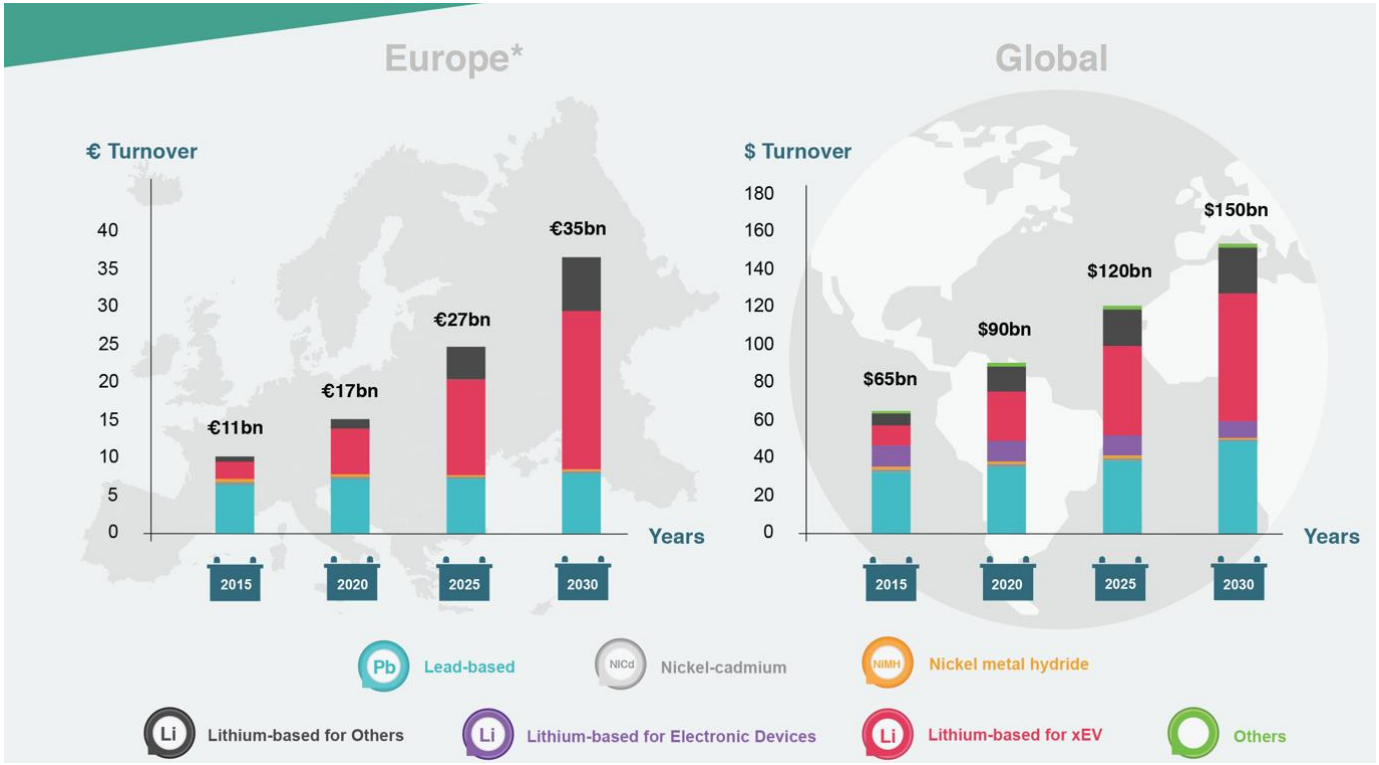


Global greenhouse gas emissions by sector in 2016
(Source: OurWorldinData, University of Oxford, 2020)



Energy-related CO_2 emissions (Gt/year)
(Source: IRENA, Global Energy Transformation 2018)

RES challenges

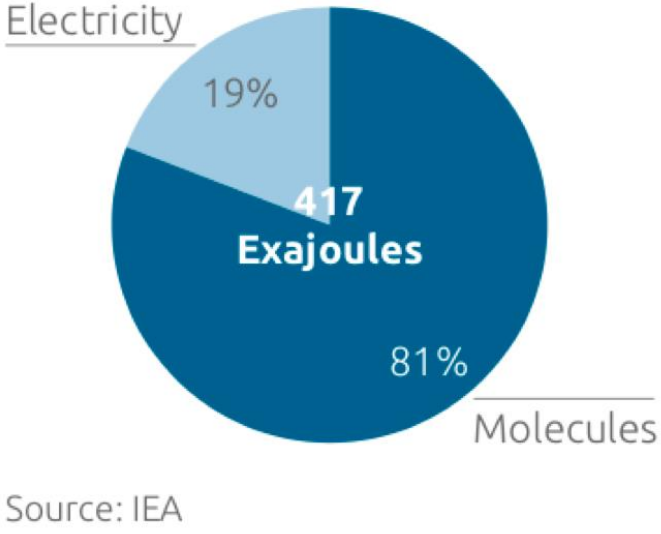


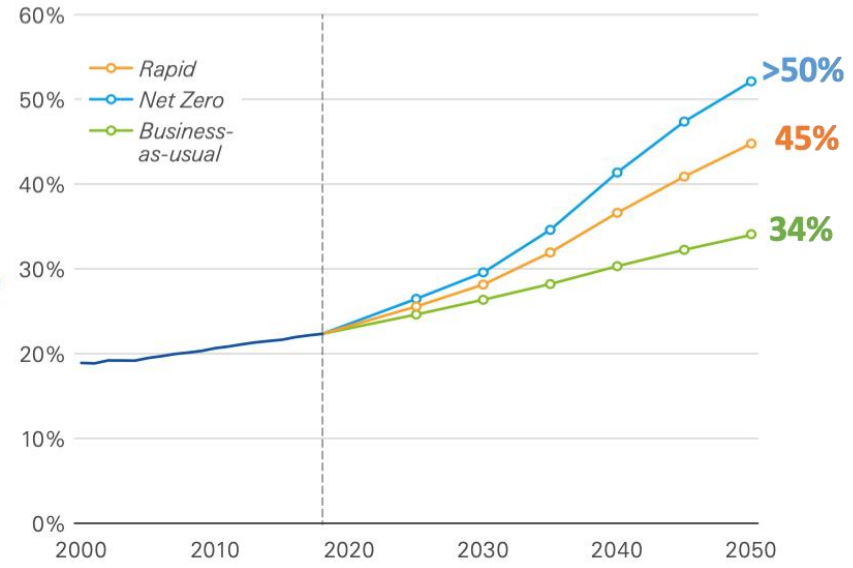
Battery market demand 2015-2030
(Source: Eurobat, 2021)

Some of the **major obstacles** associated with renewable energy sources:

- Intermittent generation,
- power storage
- sustainability of batteries,
- inadequate power grids
- issues of political sustainability (ex. NIMBY)

From a molecules-based to electrones-based consumption

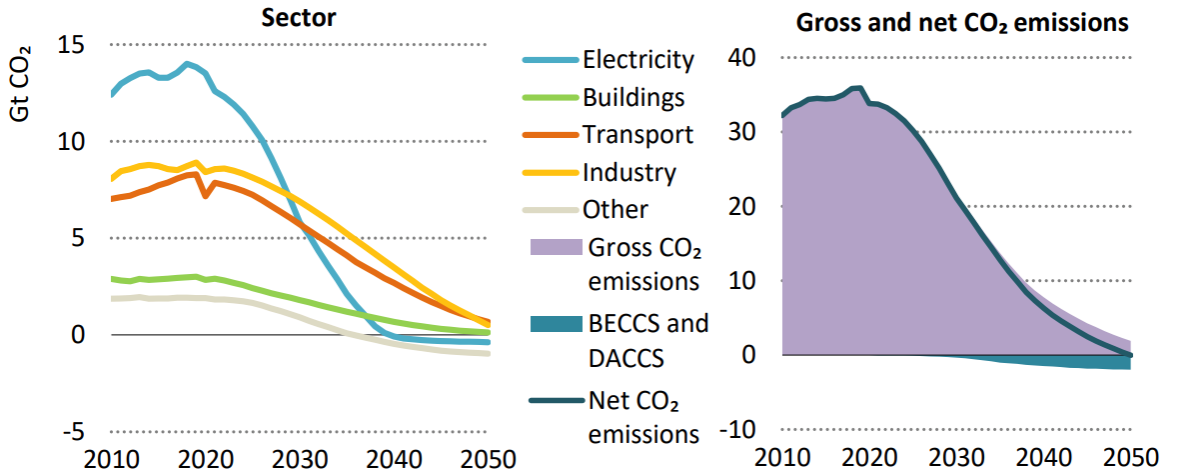




Global final energy consumption in 2018
(Source: IGU - Global Gas Report 2020)

Share of electricity in total final consumption
(Source: BP Energy Outlook 2020)

First, decarbonization of the power sector and then hard-to-abate sectors (heavy industry) and transport



Emissions from electricity fall fastest, with declines in industry and transport accelerating in the 2030s. Around 1.9 Gt CO_2 are removed in 2050 via BECCS and DACCS.

Notes: Other = agriculture, fuel production, transformation and related process emissions, and direct air capture. BECCS = bioenergy with carbon capture and storage; DACCS = direct air capture with carbon capture and storage. BECCS and DACCS includes CO_2 emissions captured and permanently stored.

Global net-CO2 emissions by sector, and gross and net CO2 emissions in the NZE
(Source: IEA Net Zero Roadmap, 2021)

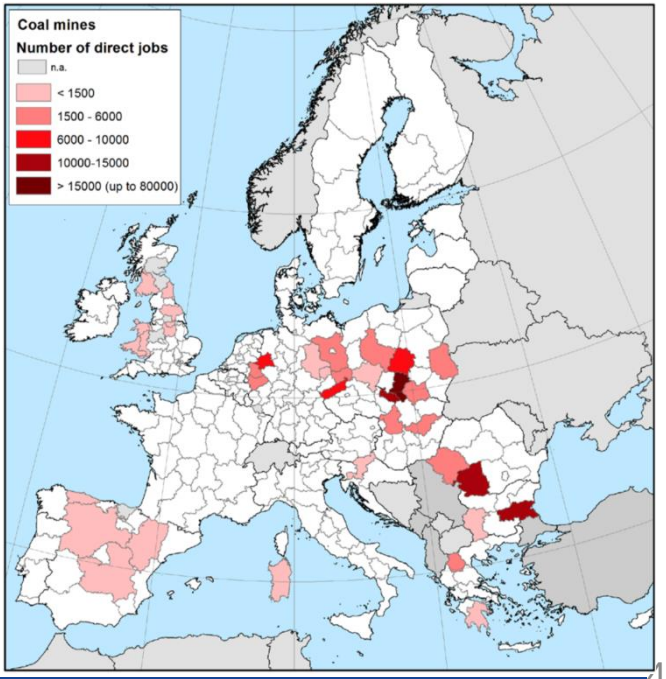
A just transition and the sociopolitical dimension

The transition towards a climate-neutral economy **cannot happen at the expenses of the most vulnerable communities** and most fragile social groups: this is the idea behind the concept of «**just transition**».

Governments need to **provide alternatives**, while **compensating** the most vulnerable communities and those most affected, such as coal workers. Otherwise, social unrest may take place (e.g. French Gilets Jaunes).

In 2020 the EU created the **Just Transition Mechanism** to finance the Green Deal. The goal of the Just Transition Mechanism is to support for instance **coal regions** in the EU, ensuring economic growth and new job opportunities.

The EC released in July 2021 the '**Fit for 55**' package, proposing to channel **25% of the revenues from the new ETS into** a **Social Climate Fund**, aimed at supporting building renovations and the uptake of clean cars by vulnerable families and small businesses, and to provide temporary lump-sum payments to vulnerable households to compensate for the increase in road transport and heating fuel prices.

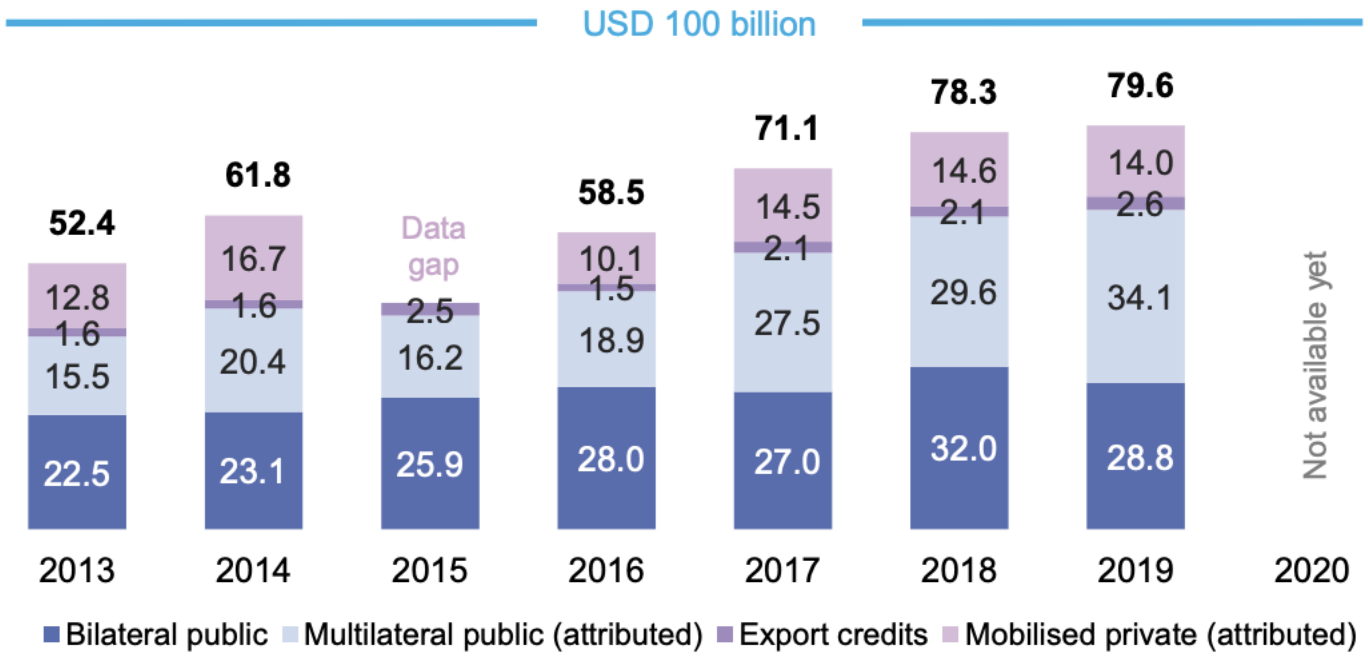


Employment in coal coal mines in Europe (Source: JRC ,2018)

The need for an external just transition

- In 2019, total climate finance provided and mobilized by developed countries for developing countries was $79.6 billion in 2019, an increase of 2% from 2018.

- A more than $20 billion annual jump would, therefore, be required to meet the $100 billion goal for 2020.



Climate finance provided and mobilised, US$ billion
(Source: OECD ,2021)

WHAT ANSWERS?

The main aspects

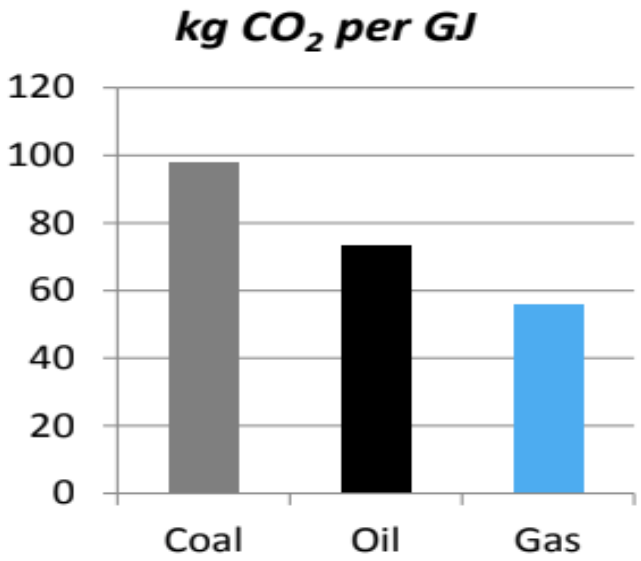
- **The key concept:** low carbon growth is the most effective economic growth.
- **The means:** the most convenient is energy efficiency**.**
- **The opportunity:** the post-pandemic recovery offers an unprecedented opportunity to build a low-carbon global system (green recovery).
- **The main tool:**
  the **renewables revolution**, their development, low cost and accessibility :

  The «democratic» aspect of renewables, which potentially makes it possible to overcome energy dependence or reduce it considerably.

Natural gas: the ‘transition fuel’ and ‘back up’

The role of gas: the least polluting of all fossil fuels.

It allows for continuity of service and the necessary timing for the development and use of renewable sources - gas as **"back up",** as **"bridging fuel"** in the energy transition, especially in the short term.



Natural gas also plays a role in the European energy transition strategy of the new Commission.

In addition, in the Green Deal, there is a strong focus on "**clean gases**" - mainly hydrogen and biomethane.

However, methane emissions will be increasingly under scrutiny due to environmental concerns.

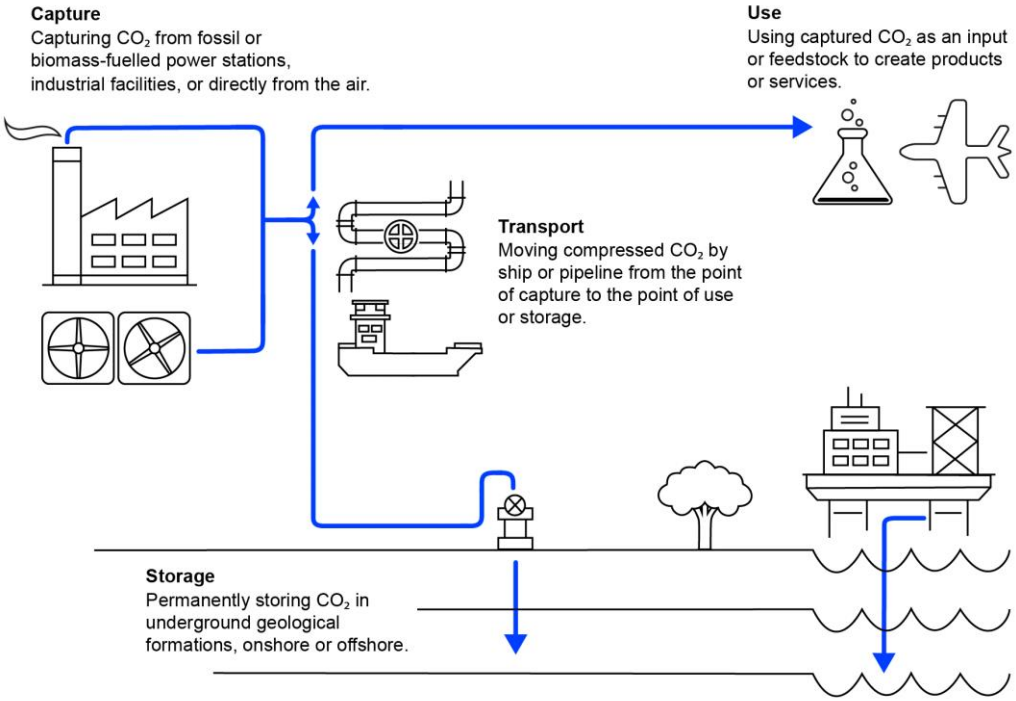
" Switching from coal to gas": in certain contexts, where possible and convenient to replace more polluting sources, in the short-term;

CCS: a role for gas in the low-carbon future?

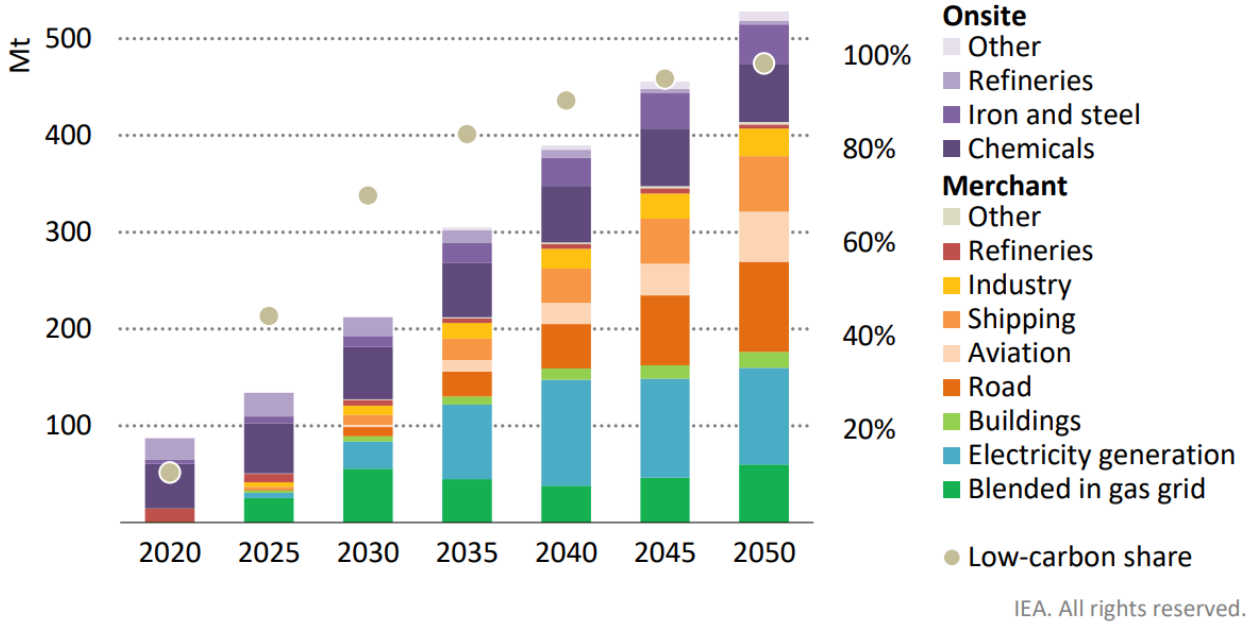
Despite being the the least polluting of all fossil fuels, also gas will need to be decarbonized in a low-carbon future.

Carbon capture and storage (CCS) will play a pivotal role on the path towards decarbonised gases and climate neutrality, in particular for hard-to-abate sectors such as heavy-duty transport, energy-intensive industries and heating.

Despite some challenges, some CCS projects are being set up or under consideration. In Europe, some projects are located in the North Sea (e.g. HyNet North West in the UK).



Decarbonizing the industrial sector: hydrogen



The initial focus for hydrogen is to convert existing uses to low-carbon hydrogen; hydrogen and hydrogen-based fuels then expand across all end-uses

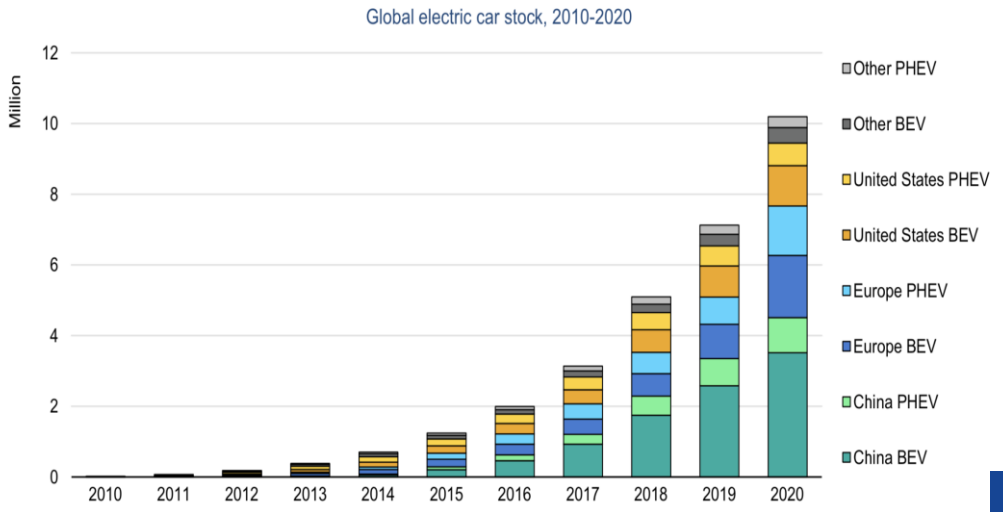
Note: Includes hydrogen and hydrogen contained in ammonia and synthetic fuels.

Global hydrogen and hydrogen-based fuel use in the NZE
(Source: IEA Net Zero Roadmap by 2050, 2021)

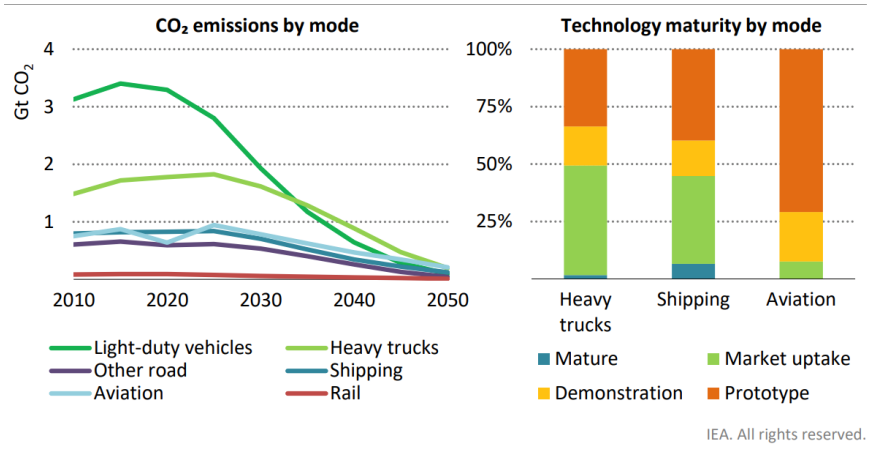
Decarbonizing the transport sector: EV

- Decarbonisation of the transport sector in the NZE relies on policies to promote modal shifts and more efficient operations across passenger transport mode;
- Policymakers need to stimulate investment in supply infrastructure and to incentivise consumer uptake.
- Transport has traditionally been heavily reliant on oil products, which accounted for more than 90% of transport sector energy needs in 2020

More than 10 million electric cars were on the world's roads in 2020 with battery electric models driving the expansion



Source: IEA Global EV Outlook 2021



Passenger cars can make use of low-emissions technologies on the market, but major advances are needed for heavy trucks, shipping and aviation to reduce their emissions

Global CO2 transport emissions by mode and share of emissions reductions to 2050 by technology maturity in the NZE
(Source: IEA Net Zero Roadmap by 2050, 2021)

Disruptive changes

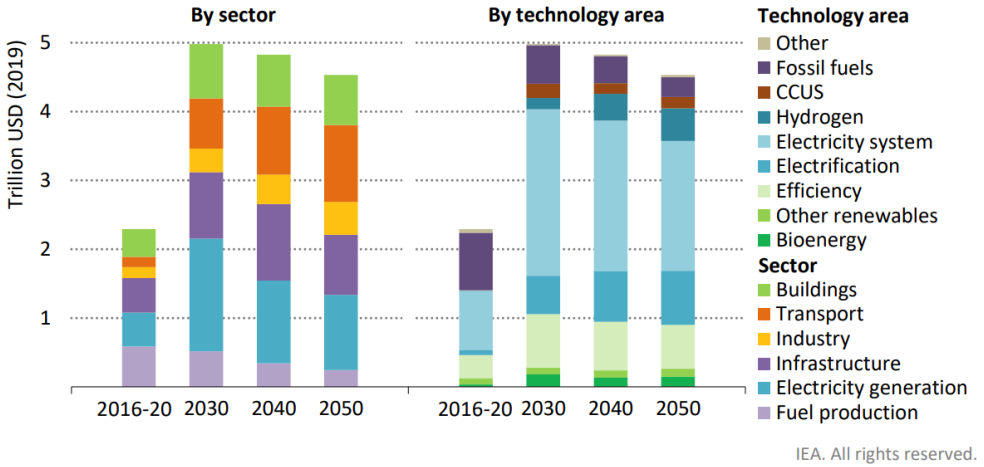
Easter Parade on Fifth Avenue, New York City

1900: spot the automobile

1913: spot any horse?

Financing the transition

- Global energy investments currently stand at around $2 trillion per year or 2.5 percent of global GDP, according to the International Energy Agency (IEA).
- This will have to rise to $5 trillion or 4.5 percent of GDP by 2030 and stay there until at least 2050 to reach net zero CO2 emissions by 2050.



Capital investment in energy rises from 2.5% of GDP in recent years to 4.5% by 2030; the majority is spent on electricity generation, networks and electric end-user equipment

Annual average capital investment in the NZE
(Source: IEA Net Zero Roadmap by 2050, 2021)

Private sector crucial in the fight against climate change

- The role of business is **fundamental** to achieve a solid energy transition, while fostering competitiveness and economic growth. Without the 2050 emissions reduction commitments by the industrial sector, it is not possible to reach the climate targets.

- Many companies have already started to produce their own **sustainability reports** or **long-term roadmaps** to decarbonise their business and set new targets for the conversion of other activities, following the idea of **Corporate Social Responsibility (CSR).**

Joining forces: finance, technology, civil society

TECHNOLOGY:

- **CC(U)S:** associated with the production of electricity from gas to integrate the supply from renewable energy sources;
- **Hydrogen:** Green hydrogen (from renewables) and blue hydrogen (produced by CO2 collected through Carbon Capture and Storage);
- **Batteries:** crucial for storage and smart mobility
- **Nuclear Energy:** a way to decarbonise, but has controversial aspects and high costs;
- **Supercalculation (HPC5)** as a support for upstream activities, for studies on renewables and to increase companies' energy savings (billions of operations per second with one watt of electricity).
- Ensuring **technological transfer**

ECONOMIC AND FINANCE:

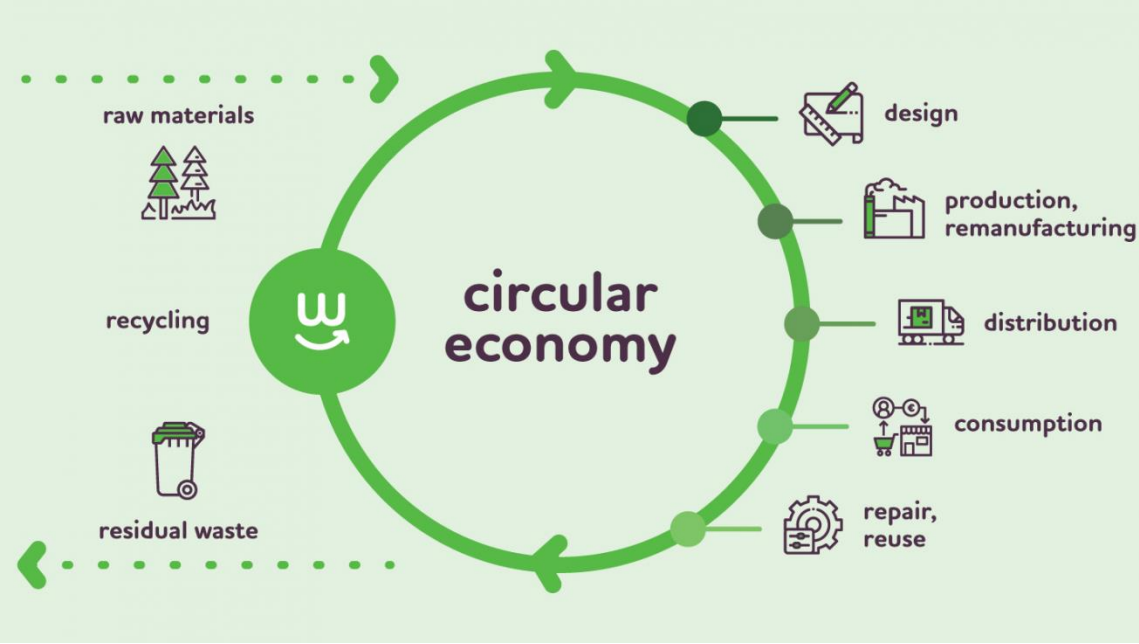
- **Carbon pricing:** ETS, CBAM
- **ESGs:** Finance, role of investors, ESGs
- **Supporting investments in renewables** throughout different channels to increase their competitiveness;
- Ensuring **access to credit**

NEW APPROACHES:

- **Circular economy:** Preserving the value of materials for as long as possible.
- **"Bottom up"**: role of the cities, local actors, centrality of vulnerable groups in the energy transition.

Circular Economy

- The circular economy aims to maintain the value of products, materials and resources for as long as possible by minimising waste production (there is an EU Action Plan for the circular economy (2/12/15)), which is essential to boost competitiveness by protecting businesses against resource scarcity and price volatility.



• **In the energy field:** reduction in the consumption of primary resources such as energy, use of sustainable raw materials, recycling, extension of the useful life; energy recovery of waste, waste-to-energy plants (management opportunities for waste that cannot be valorised for the material).

• **In the oil sector**: in the downstream sector it concerns refining, biorefineries, the so-called "waste to fuel".

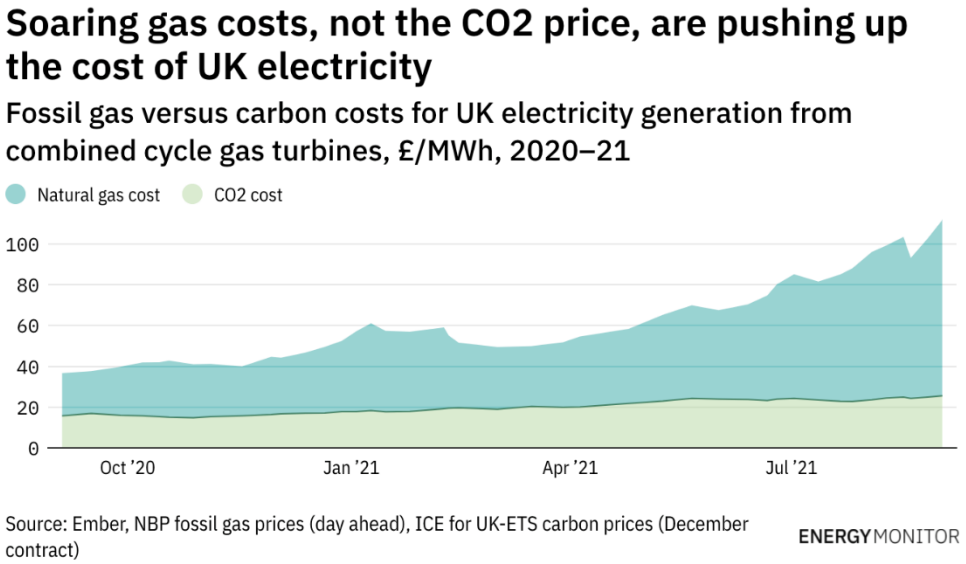
Carbon pricing

- Using market mechanisms, carbon pricing aims at reducing carbon emissions passing the cost of emitting on to emitters.
- It discourages the use of CO_2emitting fossil fuels.
- Carbon pricing instruments can take many forms. The most known are:
  - **Carbon tax** puts a direct price on GHG emissions and requires economic actors to pay for every ton of carbon pollution emitted.
  - **Emission trading system (ETS)**—also known as a **cap-and-trade system**—sets a limit ("cap") on total direct GHG emissions from specific sectors and sets up a market where the rights to emit (in the form of carbon permits or allowances) are traded.

- The EU is a frontrunner in carbon pricing:
  - The EU's **Emissions Trading System (ETS)** is the world's first international emissions trading scheme and the EU's flagship policy to combat climate change. The EU announced its expansion under the Fit for 55 package.
  - The EU proposed the creation of a **carbon border adjustment mechanism (CBAM)**, which would impose carbon tax on imports goods in order to prevent carbon leakage.

- In 2021, **China** launched **its national ETS**, which is the largest carbon market in the world by volume although it covers about 40% of the country's national carbon emissions.

As gas prices grows, carbon pricing is accused of being the main driver, but…



Source: Financial Times, 2021

Source: Energy Monitor, 2021

Thanks for your attention!

… you can visit our website on the "new horizons of energy", both in English and Italian: http://energy.iai.it

… and, to explore the current transformations, a few IAI readings:

- Towards COP26: Detangling the Knots of Climate Negotiations
- Stepping Up Climate Action in Sub-Saharan Africa: The Role of G20 and COP26
- Opportunities for Green Growth: In Search of Multilateral Coordination
- Geopolitica e politica estera italiana nell'era delle energie rinnovabili
- China's Quest for Global Clean Energy Leadership
- The Geopolitics of Critical Minerals
- Turmoil in South America and the Impact on Energy Markets
- Emerging Powers and Africa: From Development to Geopolitics
- The Gulf Cooperation Council's Shift to Gas. Avoiding Another Fossil Fuel Trap
- The Evolution of Energy Fluxes and Cooperation Models in the Middle East
- Financing Energy Access in Sub-Saharan Africa
- India's Institutional Governance and the Energy Transition

Let's keep in touch! Contacts:
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