LNEG
Laboratório Nacional de Energia e Geologia, I. P.

Novidades do Regulamento AFIR

Teresa Ponce de Leão

2023, 28th January

CONVERSE

The Black Swans

Climate Changes

Covid 19

Russian invasion on Ukraine (@ The Economist)

The world is missing its lofty climate targets. Time for some realism

Global warming cannot be limited to 1.5°C

The first big energy shock of the green era

There are grave problems with the transition to clean energy power

Reduced investment in RE

Geopolitics issues

Flawed design of regulation (Energy Markets)

Justin Metz

HR EX

NEG

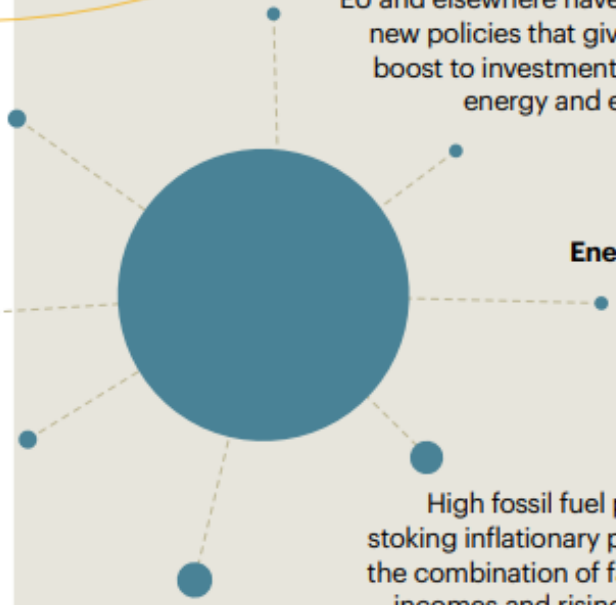
Russia's invasion of Ukraine is reshaping the energy world

Energy markets

High and volatile energy prices are hurting households and businesses, shifting the choice of fuels and setting back progress towards achieving universal access to energy.

Energy policy

Short-term responses have focused on securing available supply and protecting consumers, but many governments in the US, EU and elsewhere have adopted new policies that give a major boost to investments in clean energy and efficiency.



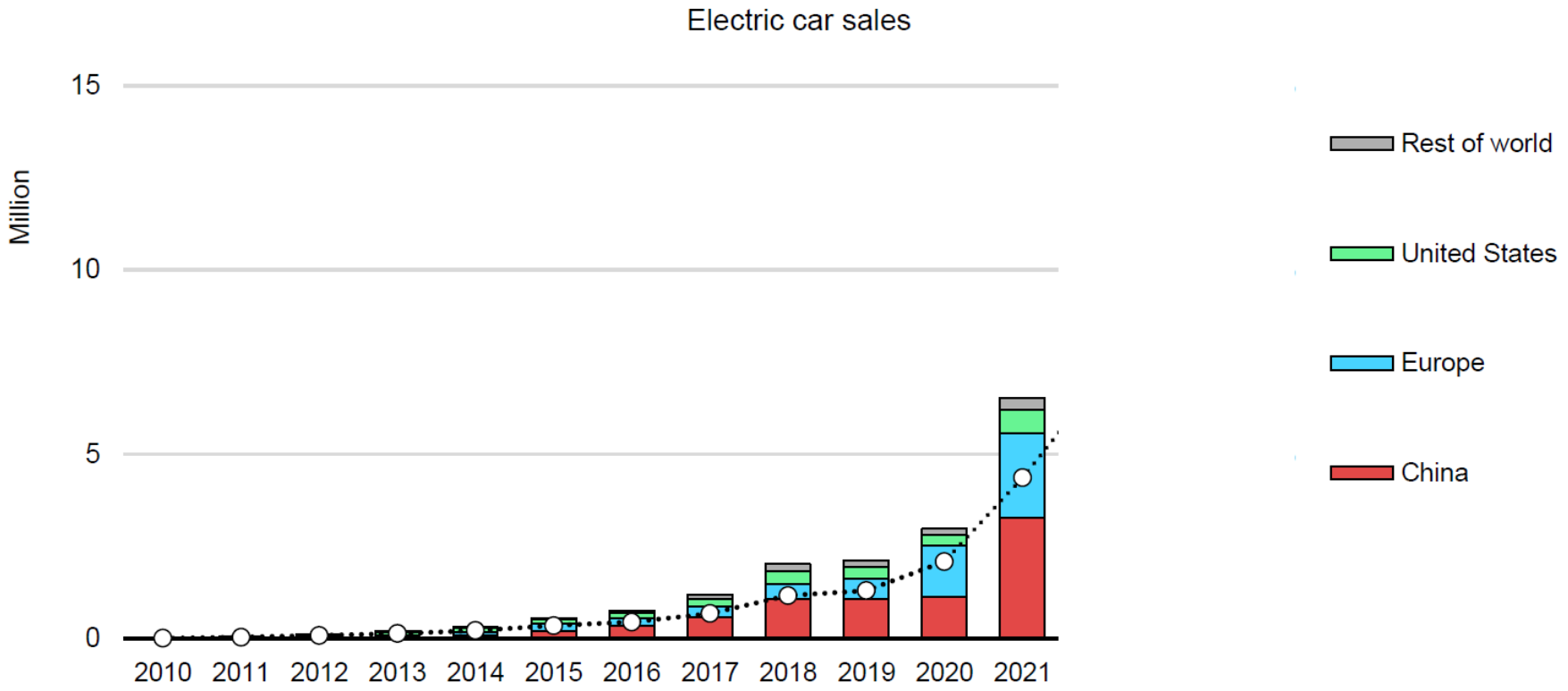
Energy trade

European sanctions on coal and oil imports and Gazprom's decisions to cut gas supply are triggering a profound reshuffling of trade flows around the world.

Economic impacts

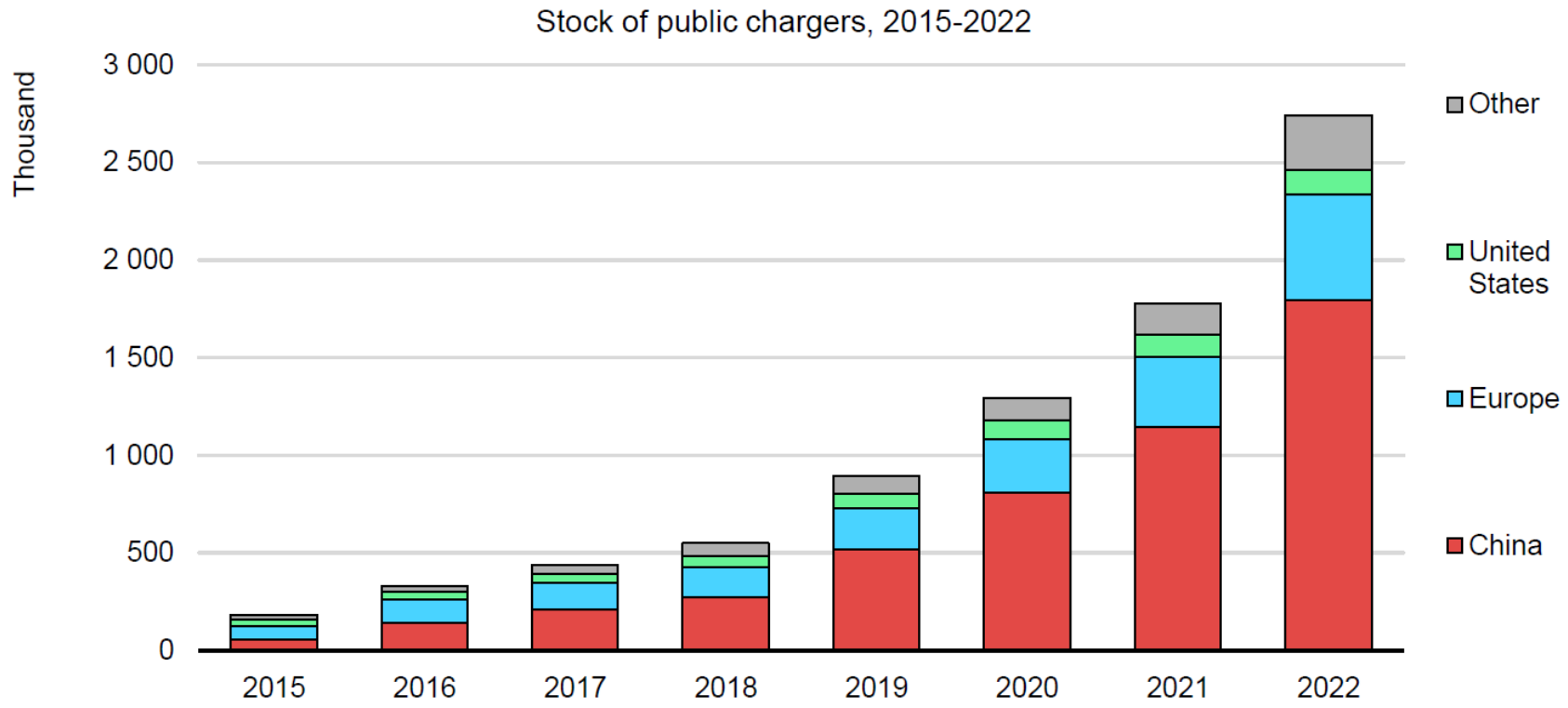
High fossil fuel prices are stoking inflationary pressures; the combination of falling real incomes and rising prices is creating a looming risk of global recession.

Electric car sales exceeded 10 million in 2022



Sales of electric cars were up 55% in 2022, led by China, Europe and the United States. 2023 is set to be another record year.

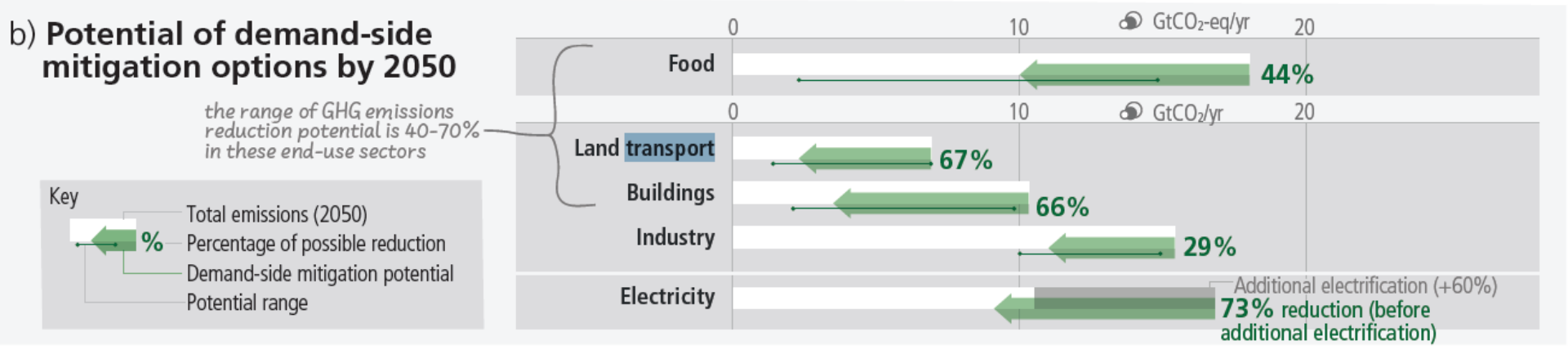
The global stock of public chargers has reached 2.7 million



Availability of public charging points has kept pace with electric car deployment, with the stock increasing 55% in 2022.

ipcc

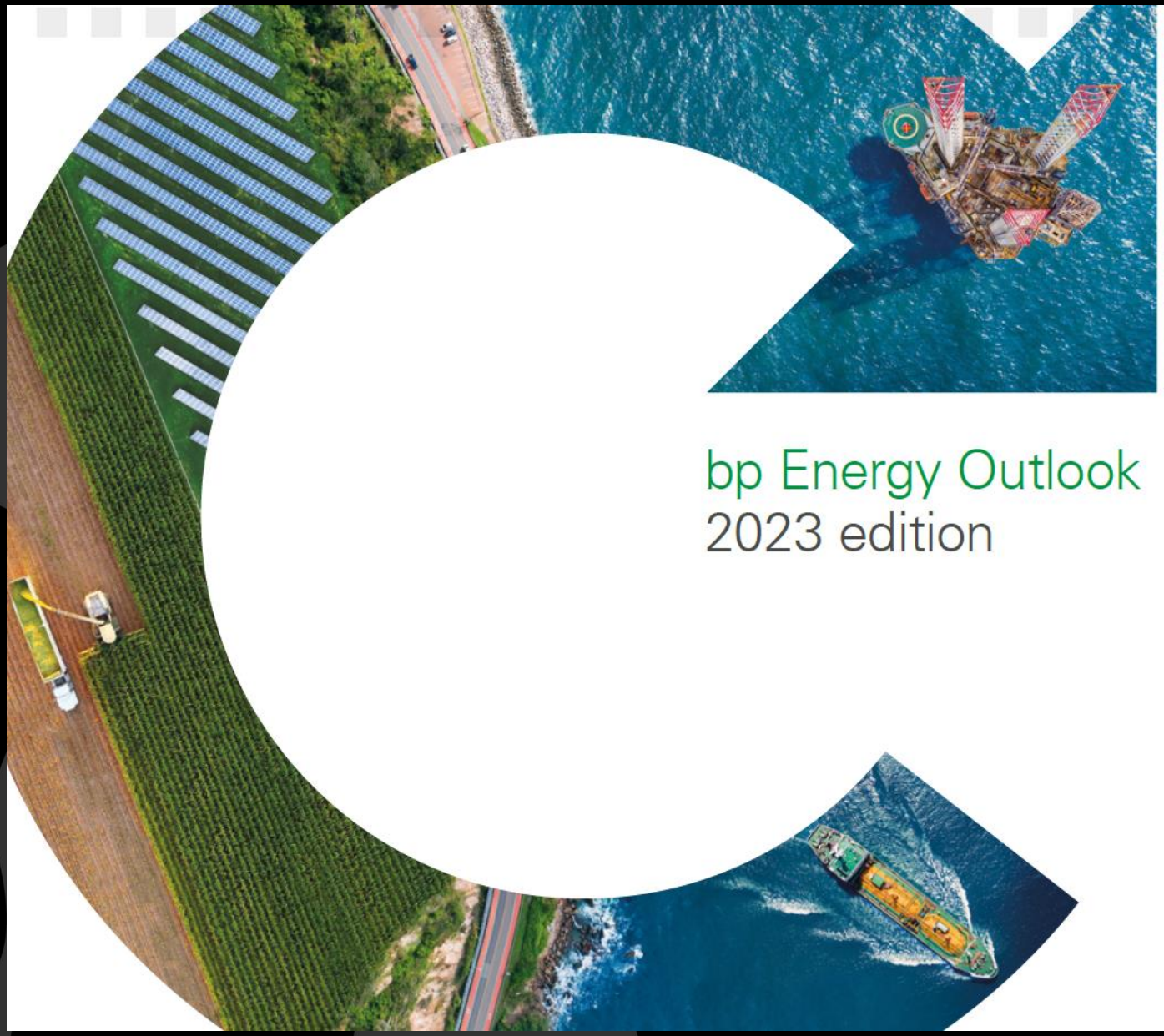
INTERGOVERNMENTAL PANEL ON climate change



HR EXCELLENCE IN RESEARCH

LNEG

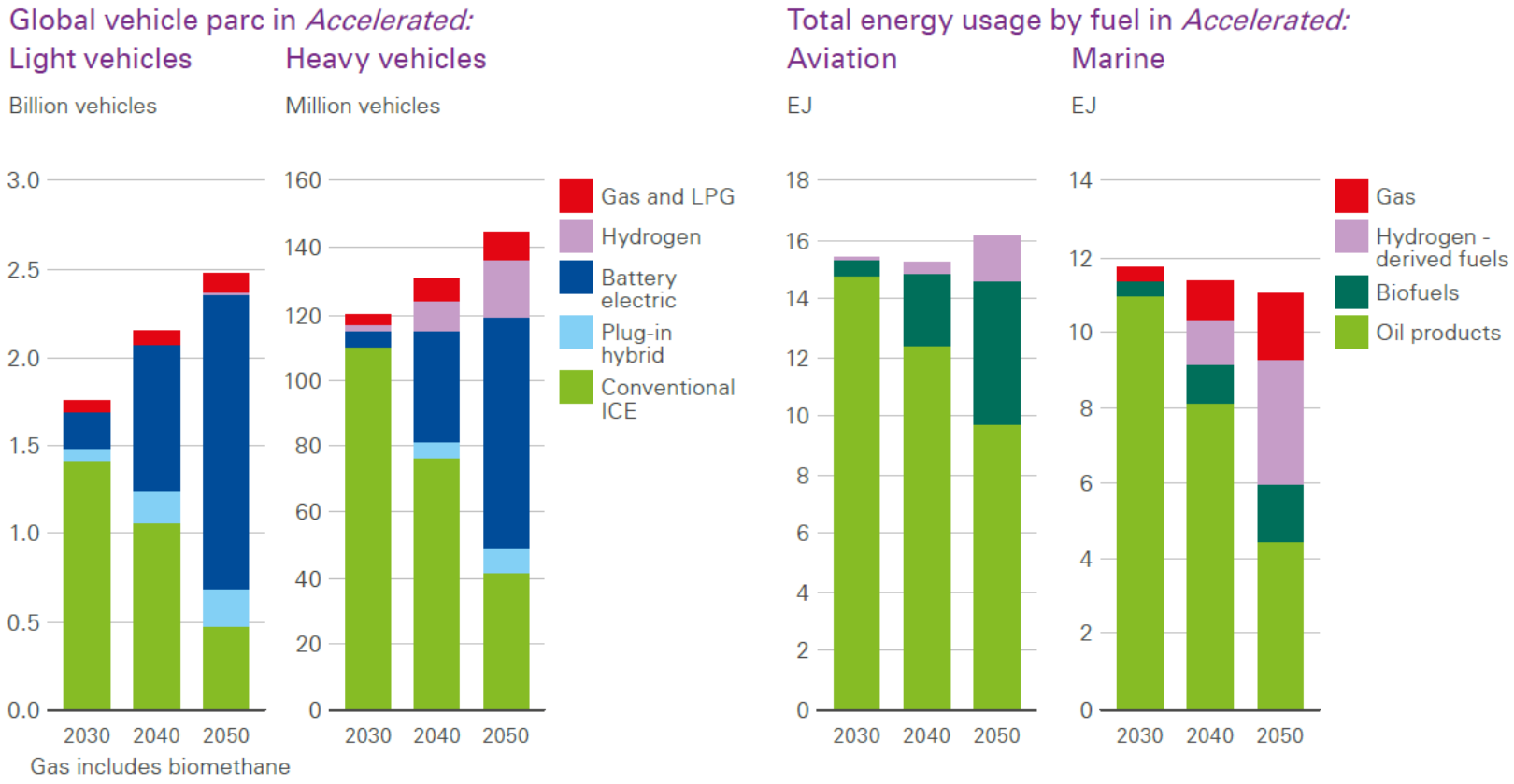
- The new energy economy brings opportunities and risks
- Governments are racing to shape the future of clean energy technology manufacturing
- Clean energy supply chains benefit from International Trade
- Critical minerals bring their own set of challenges
- Countries' clean energy industrial strategies need to reflect their strengths and weaknesses
- The story of the new energy economy is still being written – supply chains are central to the narrative



bp

bp Energy Outlook
2023 edition

The role of oil in transport declines as the world switches to lower-carbon alternatives



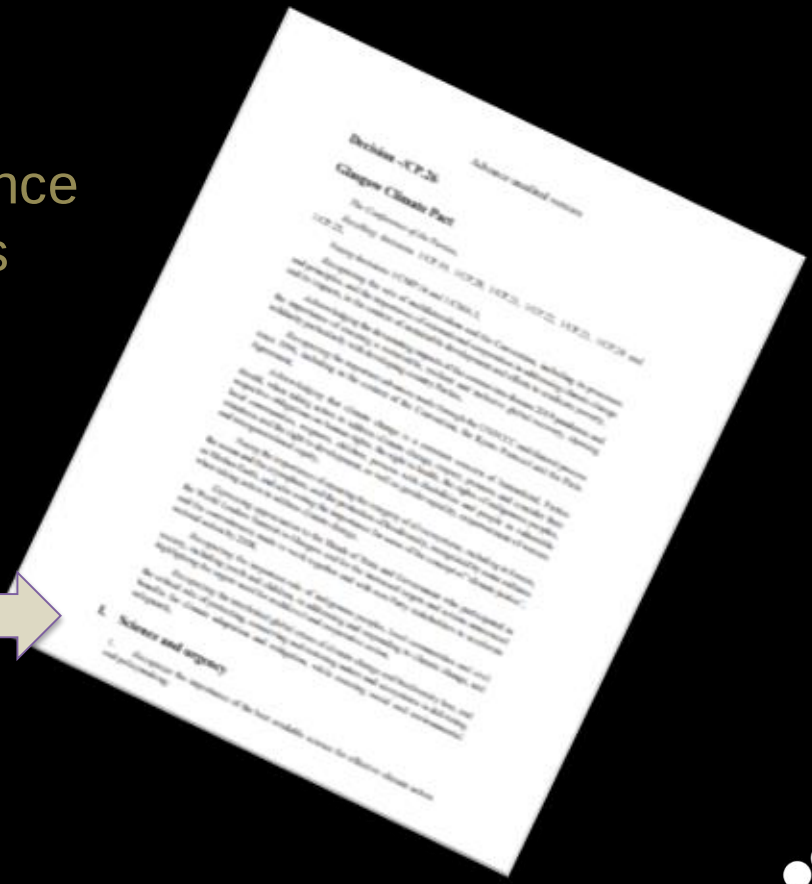
HR EXCELLENCE IN RESEARCH

LNEG

COP 26 | Science and technology role to public policies

Major focus and reliance on science and technology solutions towards deployment and development of renewable energy technologies

Glasgow Climate Pact



"Recognizes the importance of the best available science for effective climate action and policymaking"

HR EXCELLENCE IN RESEARCH

LNEG

Message from the UN Climate Change Executive Secretary Simon Stiell

- Demonstrate a transformation shift to **implementation** by putting negotiations into **concrete actions**
- Cement progress on the **critical workstreams** – **mitigation, adaptation, finance and crucially – loss and damage**
- Enhance the delivery of the principles of **transparency** and **accountability** throughout the process

HR EXCELLENCE IN RESEARCH

LNEG


COP27
WE ARE
WATCHING

Geopolitical state of Play for Europe

Source : United Nations

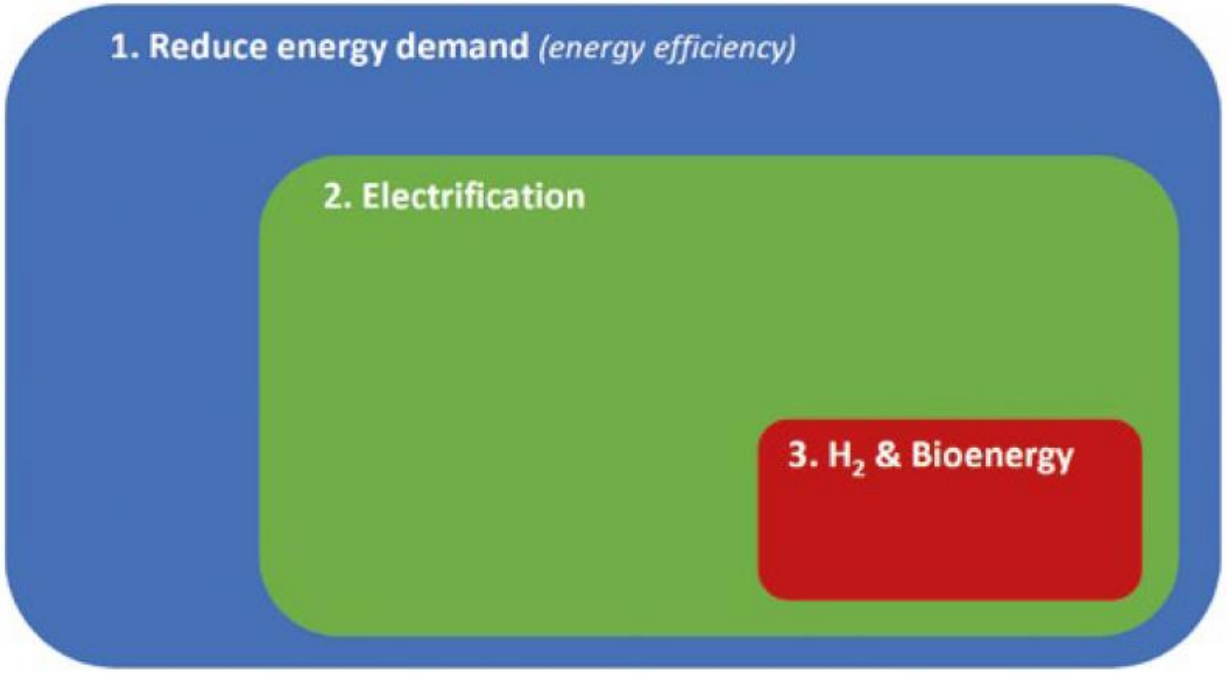
Social Acceptance

Global needs on energy to Net ZERO

The EGD

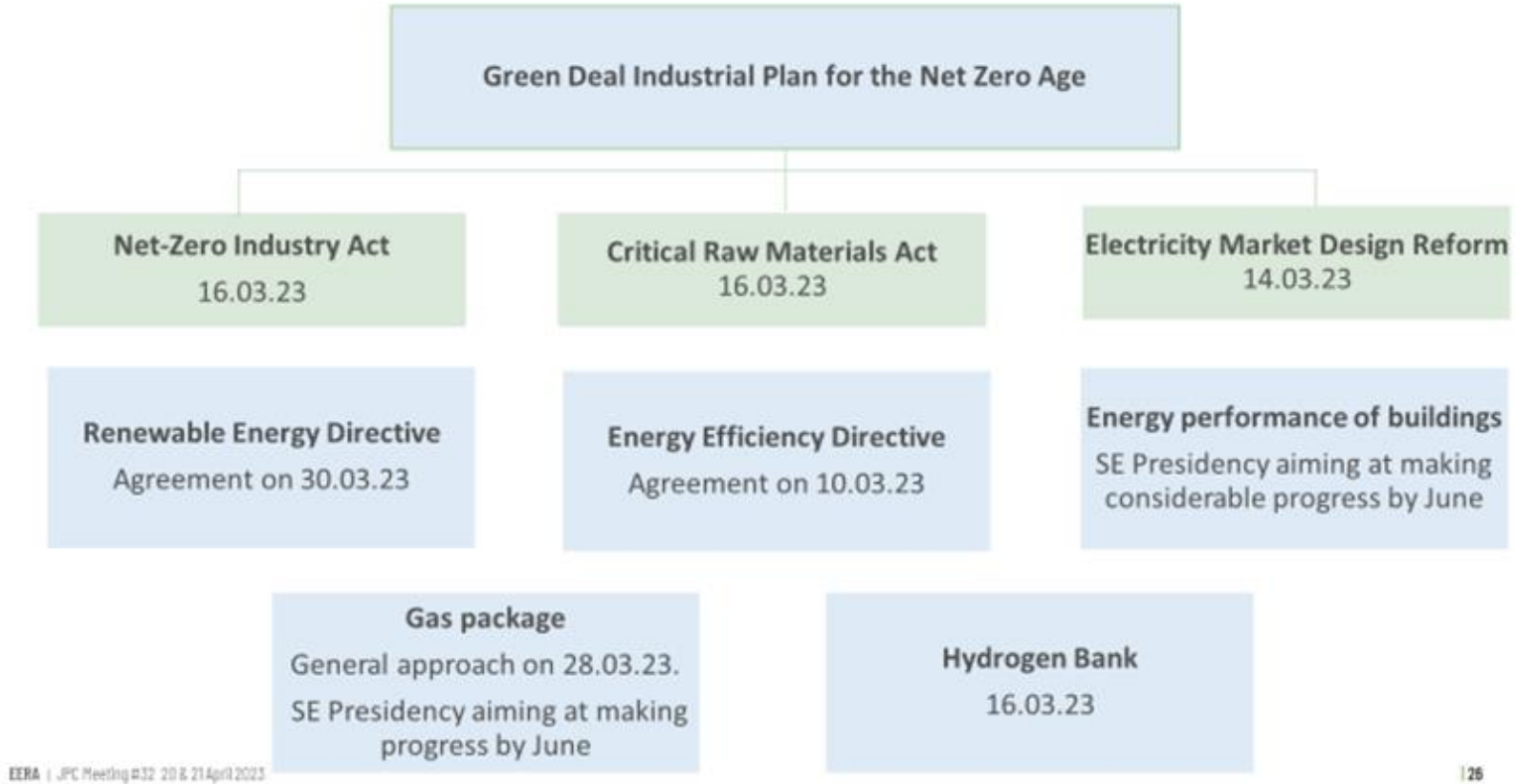
The EU strategy on energy system integration (July 2020)

3 Approaches:



Digitalization

The EU political reaction : EU Strategic Autonomy



Policies around the world

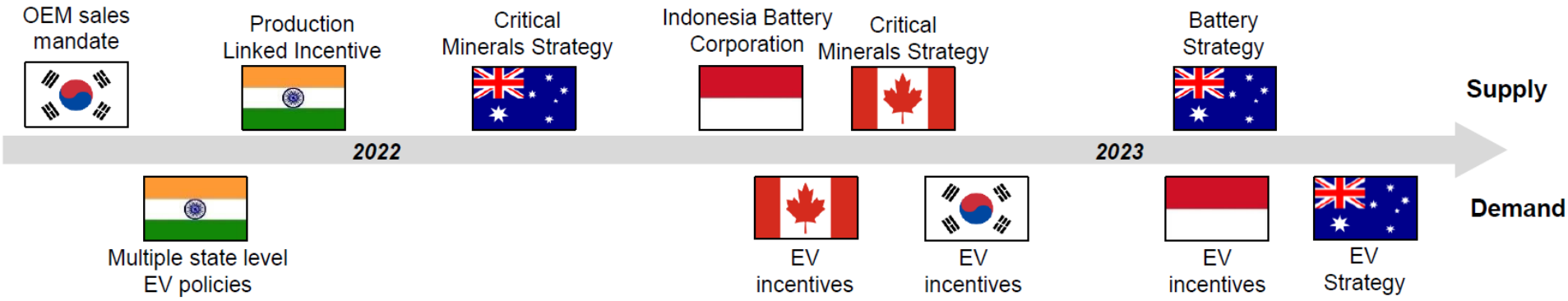
Suites of policies were released in major markets

Inflation Reduction Act
- Clean Vehicle Tax Credit
- Clean Heavy-Duty Vehicle Program
- Commercial Clean Vehicle Credit
- And others..

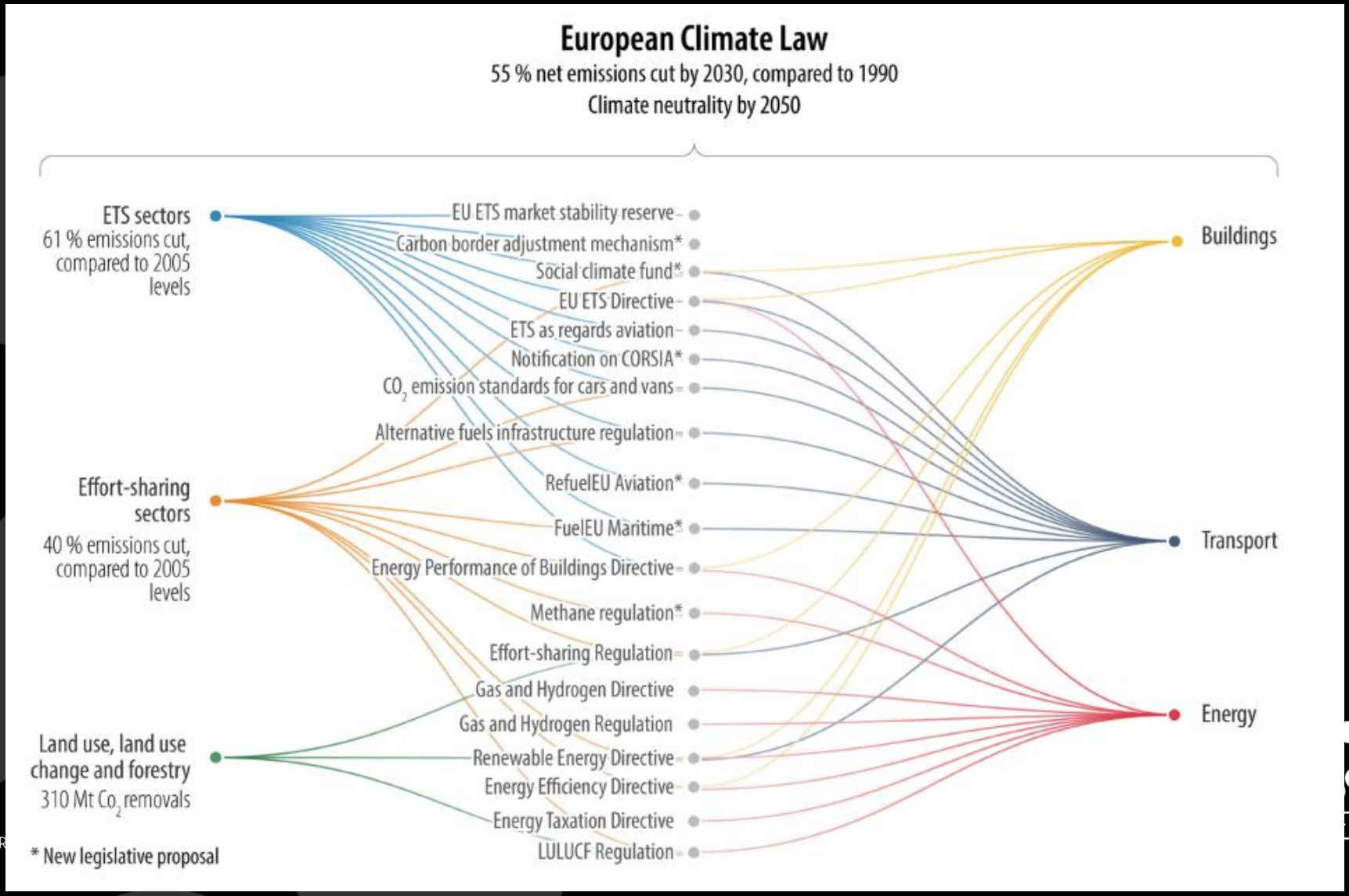
Green Deal Industrial Plan
- Net Zero Industry Act
- Critical Mineral Act
- EU Battery Directive

- Plus revised CO_2 standards, Euro 7 regulations, and the Alternative Fuel Infrastructure Directive

Examples of key EV related policies



Fit for 55 package as an answer for the EU Climate Law



Alternative Fuels Infrastructure Regulation

A **provisional agreement on the regulation** was reached between the European Parliament and the Council of the EU on 28 March 2023. On 25 May, the **text of the agreement** was adopted in the European Parliament's Transport and Tourism (TRAN) Committee.

- **Publicly accessible recharging infrastructure** must provide a power output of **1.3 kW** for each registered battery-electric car in a given Member State.
- **Fast recharging stations** for both light and heavy-duty vehicles must be installed every **60 km** along the trans-European transport (TEN-T) network.
- **Hydrogen refueling infrastructure** must be deployed from 2030 onwards in all urban nodes and every **200 km** along the TEN-T core network.
- **Maritime ports** and **airports** must provide electricity to vessels and aircraft.
- Operators of electric recharging and hydrogen refueling stations must ensure full price transparency.

- The European Commission will review this regulation by the end of 2026, specifically focusing on the targets for infrastructure supporting alternative fuels for zero-emission vessels and aircraft.

Alternative Fuels Infrastructure Regulation

- The initiative aims to ensure the **availability and accessibility of a comprehensive network of alternative fuels infrastructure across the EU**. It is essential for all users of alternative fuel vehicles, including vessels and aircraft, to be able to travel seamlessly throughout the EU. This requires the **establishment of key infrastructure** such as motorways, ports, and airports.

- The specific objectives of the initiative are: (i) ensuring the minimum infrastructure necessary to support the widespread adoption of alternative fuel vehicles across all transport modes and EU Member States, in line with the EU's climate objectives; (ii) ensuring the full interoperability of the infrastructure; and (iii) providing users with comprehensive information and convenient payment options.

Alternative Fuels Infrastructure Regulation

- **The AFIR initiative complements the ReFuelEU aviation initiative**, which focuses on promoting sustainable aviation fuels (SAFs) that do not require separate refueling infrastructure. The AFIR initiative includes provisions for electricity supply to stationary aircraft, addressing their energy needs.

- **The AFIR initiative also complements the revision of the Renewable Energy Directive (RED)** by addressing the lack of recharging and refueling infrastructure, which could hinder the wider adoption of renewable and low-carbon fuels in the transport sector where distinct infrastructure is required.

- The provision of electricity supply to stationary aircraft at airports

AFIR: key take aways

Binding targets to ensure that a minimum level of charging and refueling infrastructure is available

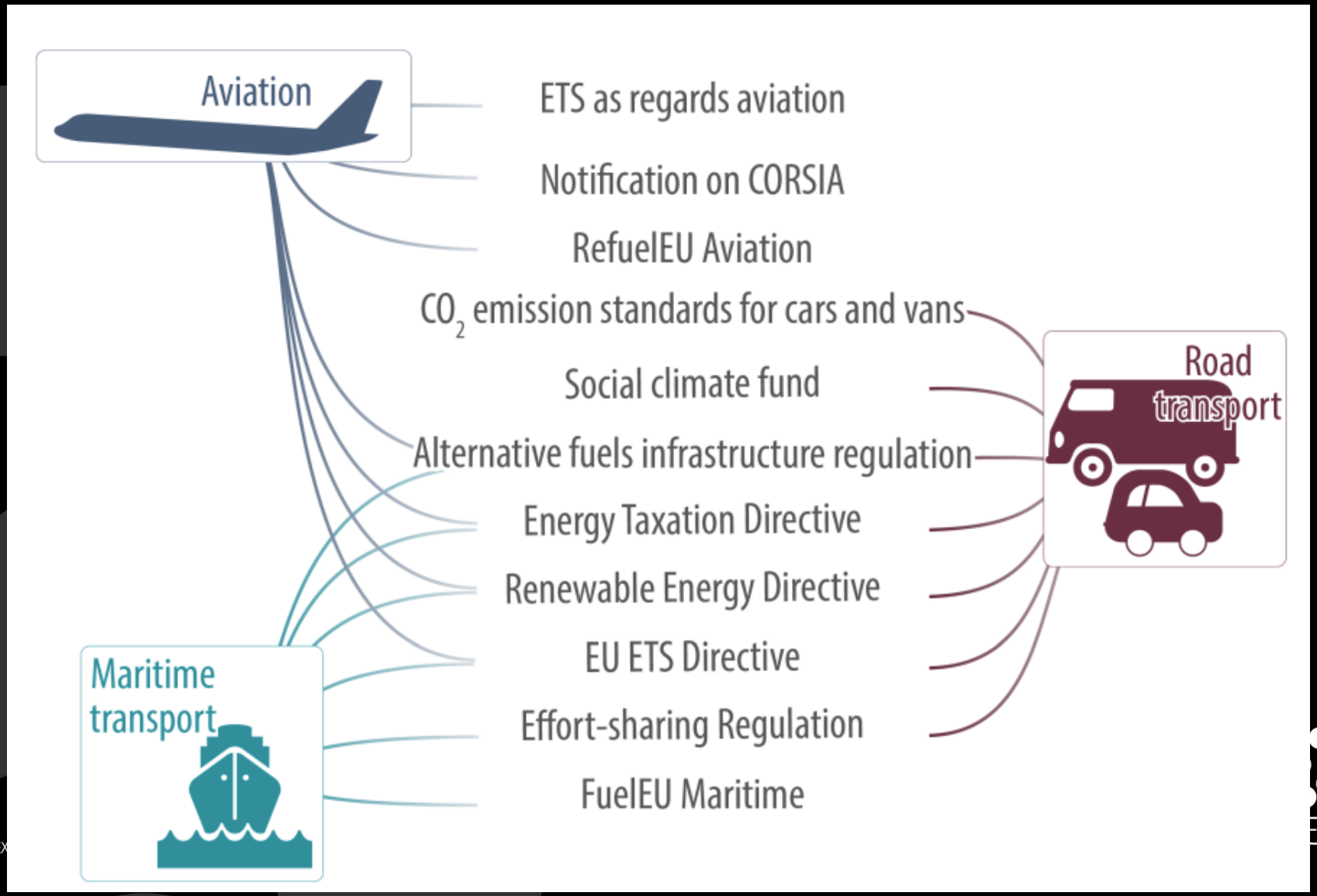
Accessible and **interoperable**

Funding mechanisms (combining a number of tools like loans, tax incentives, carbon credits and ppp)

Report on the progress mandatory

AFIR in the Fit for 55 package is a significant step towards enabling the widespread adoption of alternative fuels in the EU.

Fit for 55: towards more sustainable transport



Fit for 55: towards more sustainable transport

The EU ETS
covers approximately
10 000
companies

electricity and heat generation

energy-intensive industry sectors (e.g. oil refineries, steel industry, cement, glass and paper production)

commercial aviation (flights within the European Economic Area)

Fit for 55: reform of the EU emissions trading system

The **EU emissions trading system (EU ETS)** is the EU's key tool for reducing greenhouse gas emissions.

The reform of the system is a part of the 'Fit for 55' package – a set of proposals to revise and update EU climate, energy and transport legislation, which will contribute to the EU's climate goals of reducing net greenhouse gas emissions by at least 55% by 2030 and reaching climate neutrality by 2050.

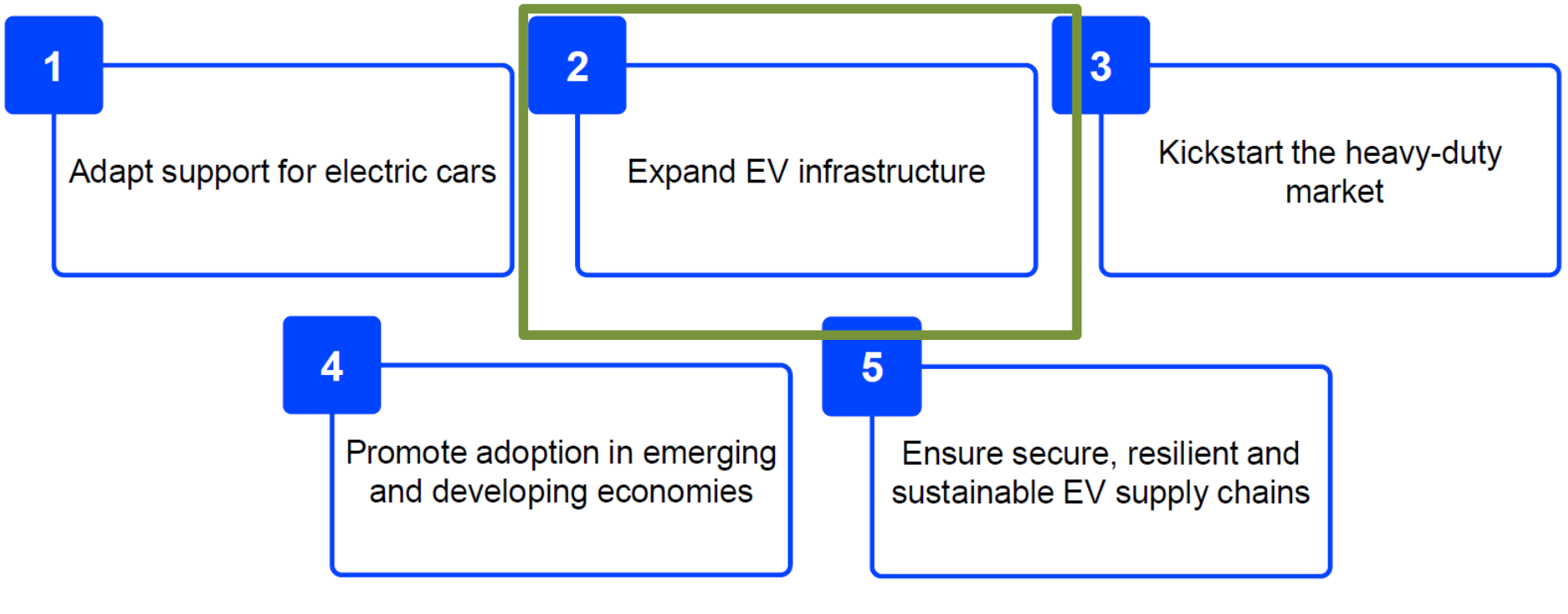
In December 2022, the Council and the European Parliament reached a provisional political agreement on ETS reform. The Council **formally adopted** the new legislation in April 2023.

HR EXCELLENCE IN RESEARCH

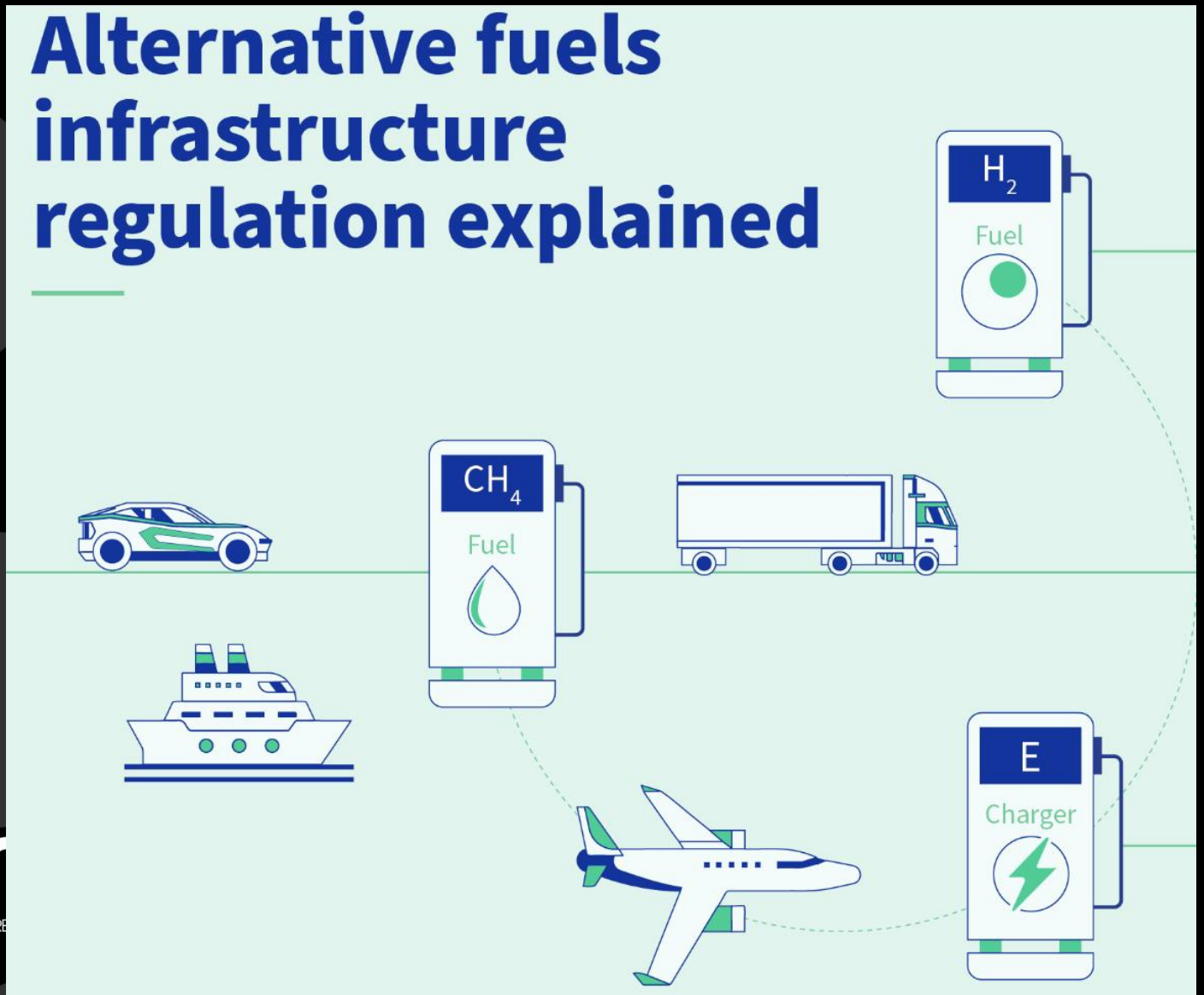
LNEG

Alternative Fuels Infrastructure Regulation

IEA recommendations



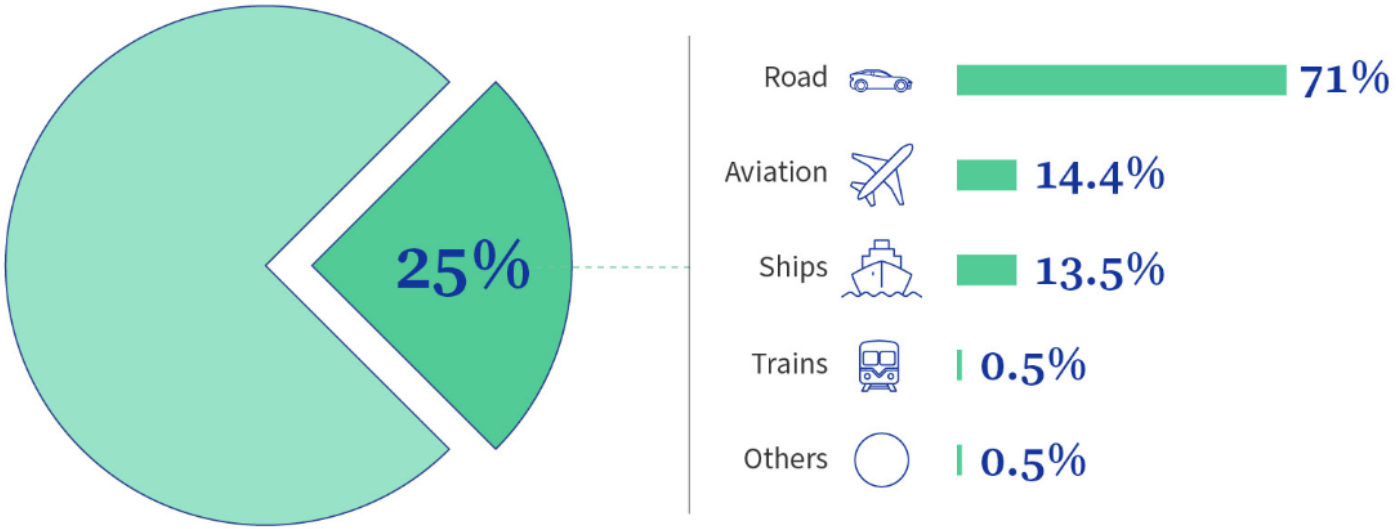
Fit for 55: towards more sustainable transport



Fit for 55: towards more sustainable transport

How does it contribute to the goal of climate neutrality?

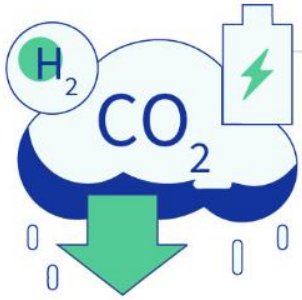
Transport is responsible for almost 25% of greenhouse gas (GHG) emissions in the EU.



HR EXCELLENCE IN RES

LNEG

Fit for 55: towards more sustainable transport



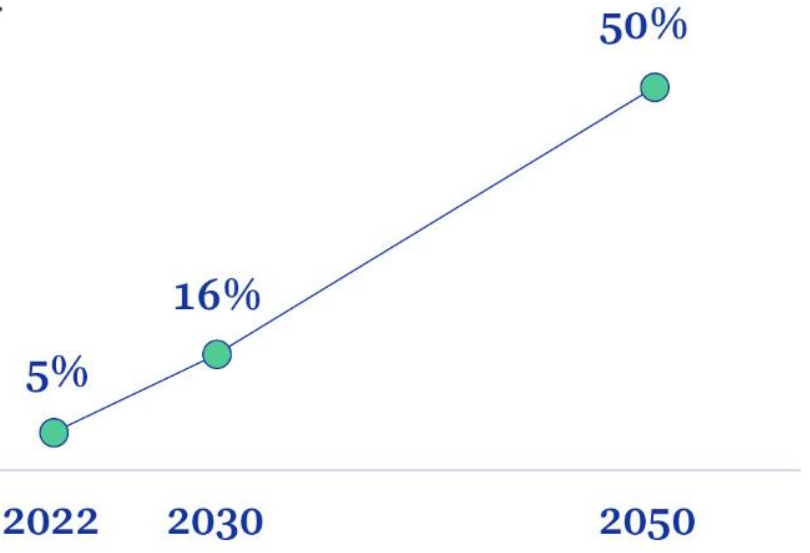
More vehicles powered by electricity and alternative fuels = fewer emissions

There are over

13.4 million

alternative fuel cars and vans in the EU.

It is estimated that the percentage of all cars and vans in the EU that run on alternative fuels will grow tenfold by 2050.



Fit for 55: towards more sustainable transport

Recharging stations:

→ at least every 60 km on main roads (core TEN-T network)

60 km

by the end of 2025

by the end of 2030

→ every year, the total power output provided through recharging stations grows with the number of registered cars

→ at least two recharging points in each safe and secure parking area (end of 2027) and four by the end of 2030

→ recharging stations also in urban nodes

Derogations for roads with low traffic

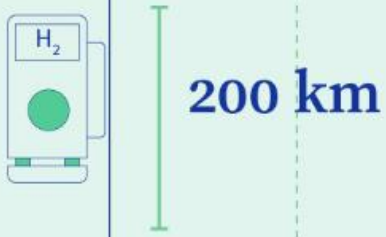
Fit for 55: towards more sustainable transport

Hydrogen refuelling stations:

→ at least every 200 km on main roads (end of 2030)

→ at least one refuelling station in every urban node

→ every refuelling station will have a designed capacity to provide 1 tonne of hydrogen per day, at 700 bar



Liquefied methane refuelling points:

→ at least along main roads to allow vehicles using methane to circulate throughout the EU

New infrastructure will have to:

→ allow ad-hoc charging

→ accept electronic payments

→ clearly inform users about pricing options

Fit for 55: towards more sustainable transport

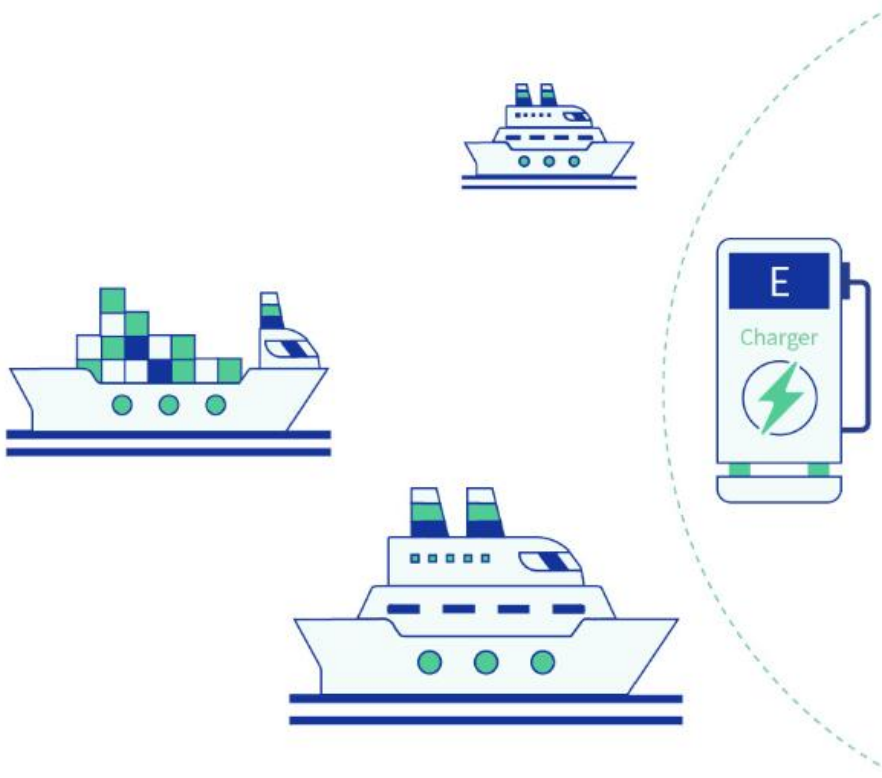
Ports

In the busiest sea ports:

→ at least 90% of container ships and passenger ships to have access to shore-side electricity supply

In most of the inland waterway ports:

→ at least one installation providing shore-side electricity (by 2030)



Fit for 55: towards more sustainable transport

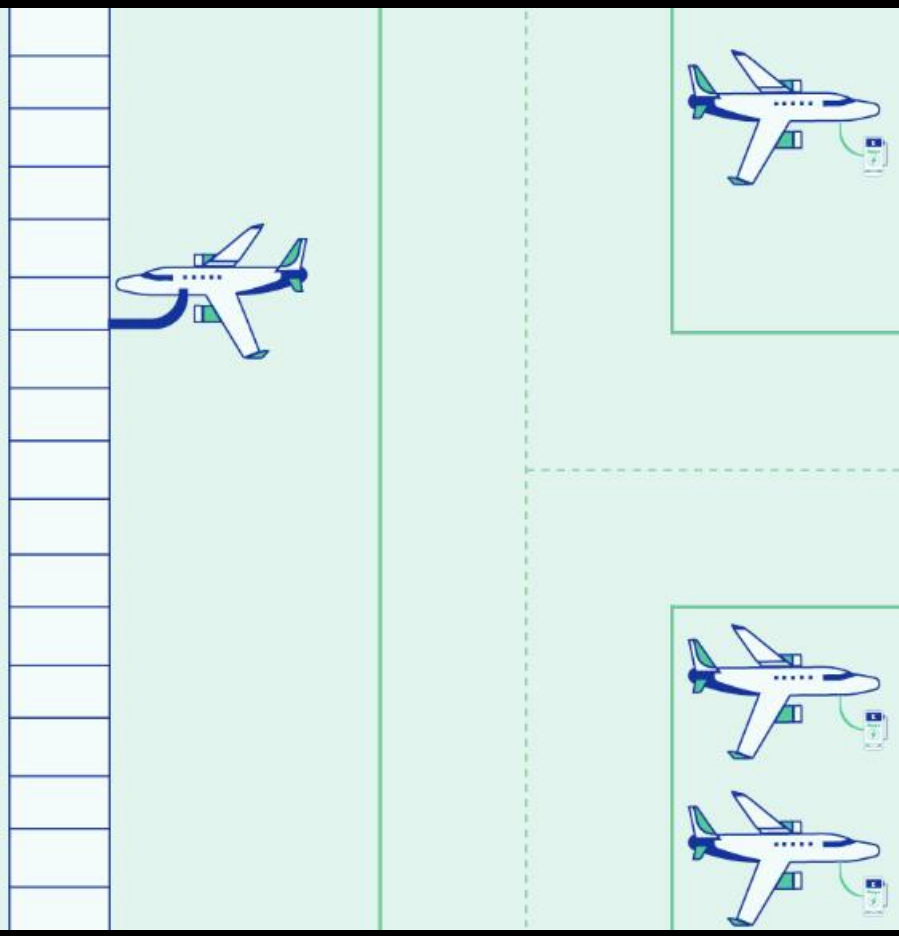
Airports

Electricity supply for :

→ all aircraft stands next to the terminal by 2025

→ all remote stands by 2030

Airports with fewer than 10 000 flights per year may use a derogation for remote stands.

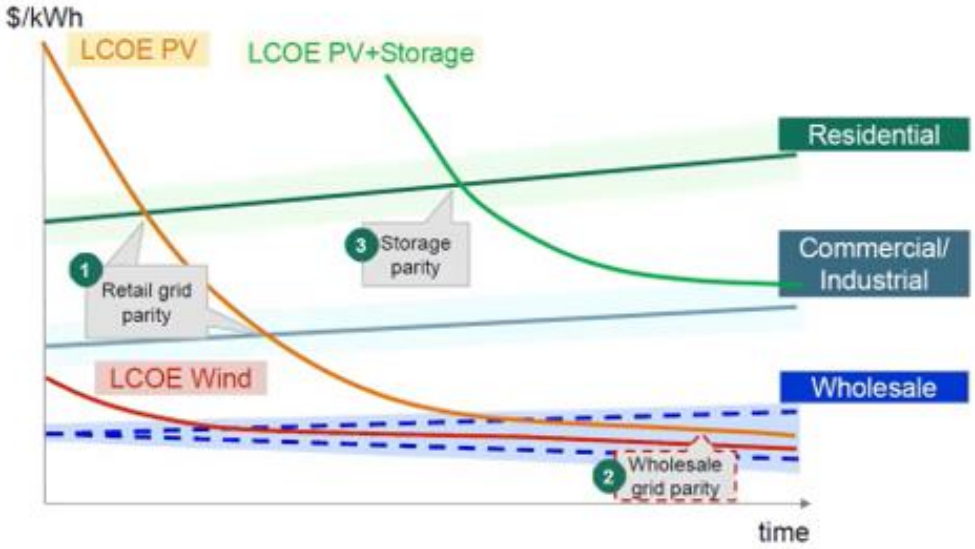


HR EXCELLENCE IN RESEARCH

LNEG

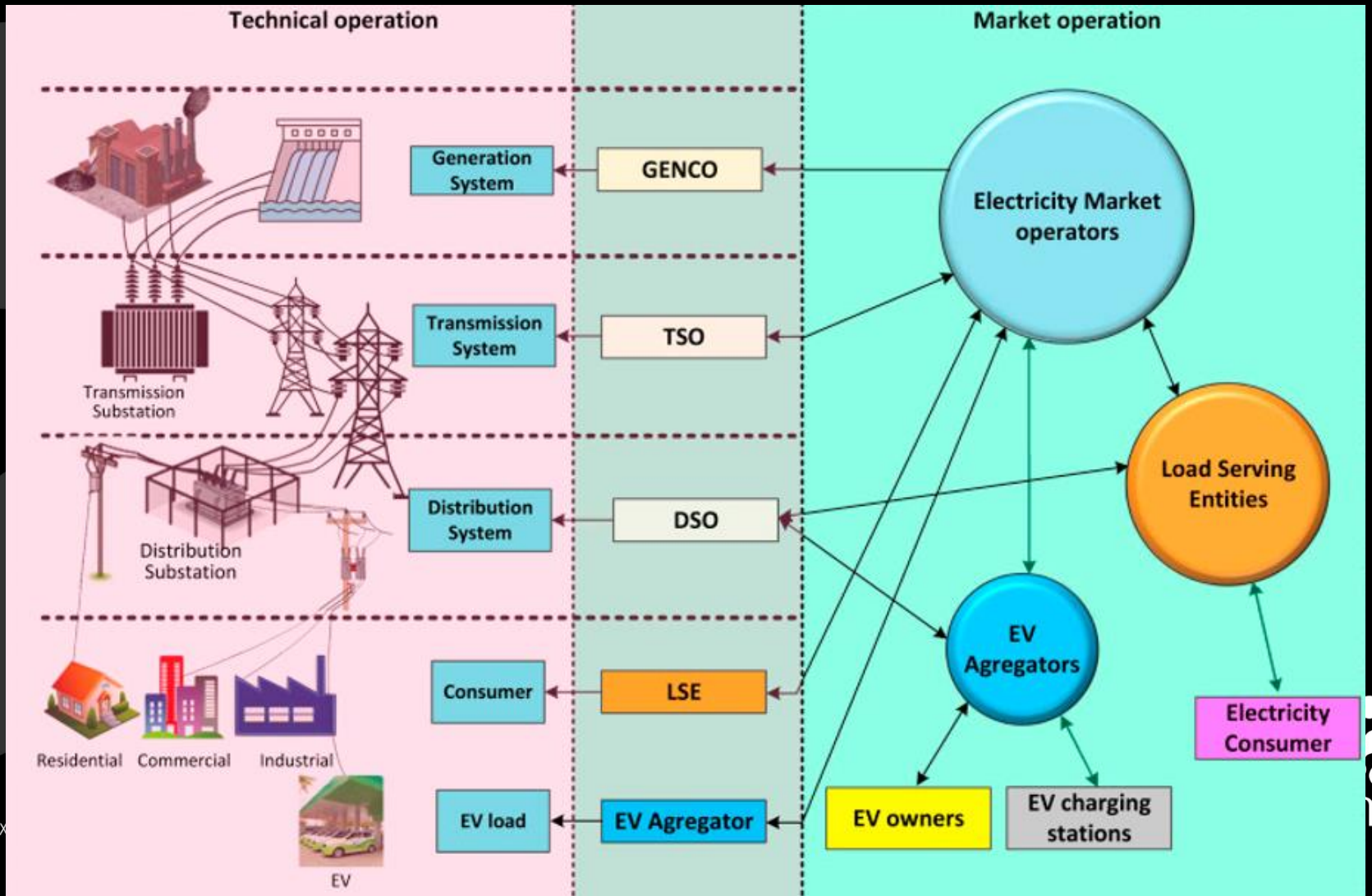
What does this mean for the energy grids? Opportunity?

In the future PV with storage may become the most competitive solution. The grid will be a back-up to which we will pay kW instead of kWh ?



Origem do gráfico e do desenho: Boston Consulting Group

What does this mean for the energy grids?



Aggregators are a key the electric mobility ecosystem to maximize the value of EVs to the electricity grid

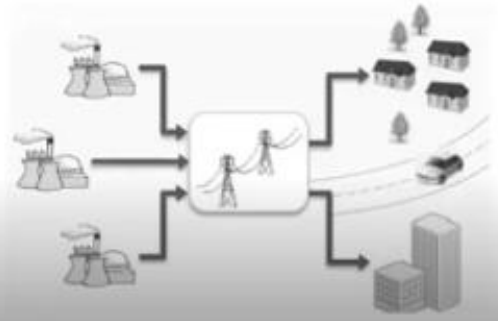
Smartgrids is a part of the solution. It should be possible to leapfrog present paradigm
Power systems are facing three trends: decarbonisation, decentralization, digitalisaton

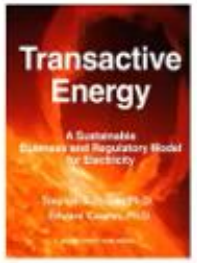
Old Grid

- Central generation
- One-way flows
- Central control
- Dummy loads

Energy 4.0 Grid, or the Energy Web

- Transactive enegy model
- Distributed generation
- Two-way flows
- Distributed generation
- Distributed storage
- Distributed Control
- Responsive loads
- Loads/ Local Generation IoT enabled





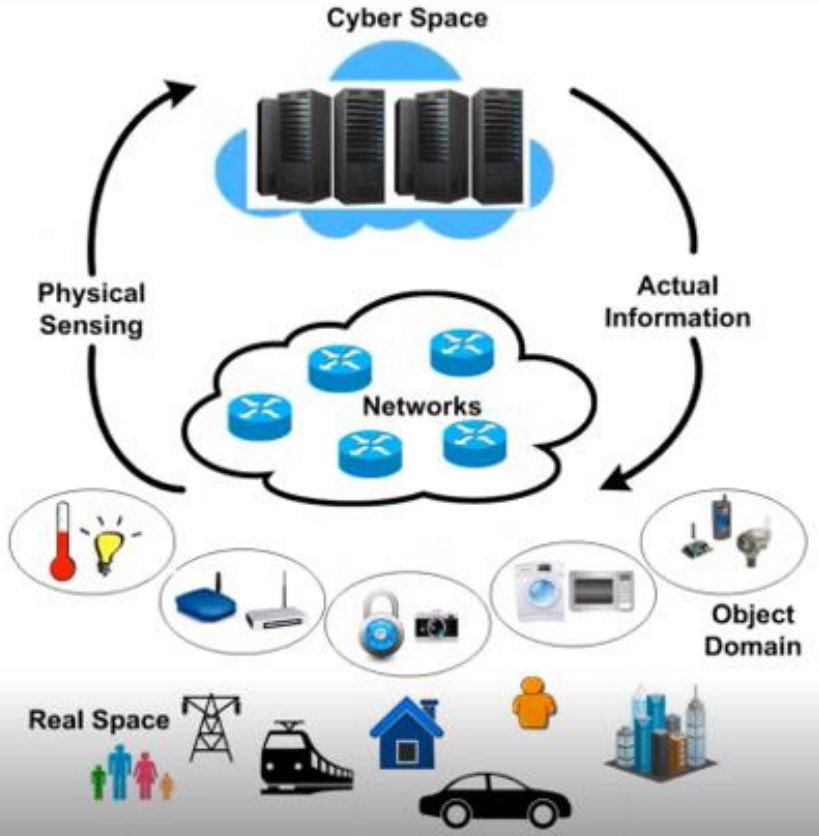
Source: Apresentação António Vidigal no LNEG

Electric Vehicle Aggregator

An EV aggregator can, for instance, shift the charging process of a group of EVs in time, in order to avoid potential load peaks at critical hours, or to profit from lower energy prices at specific hours.

Advanced Analytics and Big Data and AI are an importante part of Industry 4.0

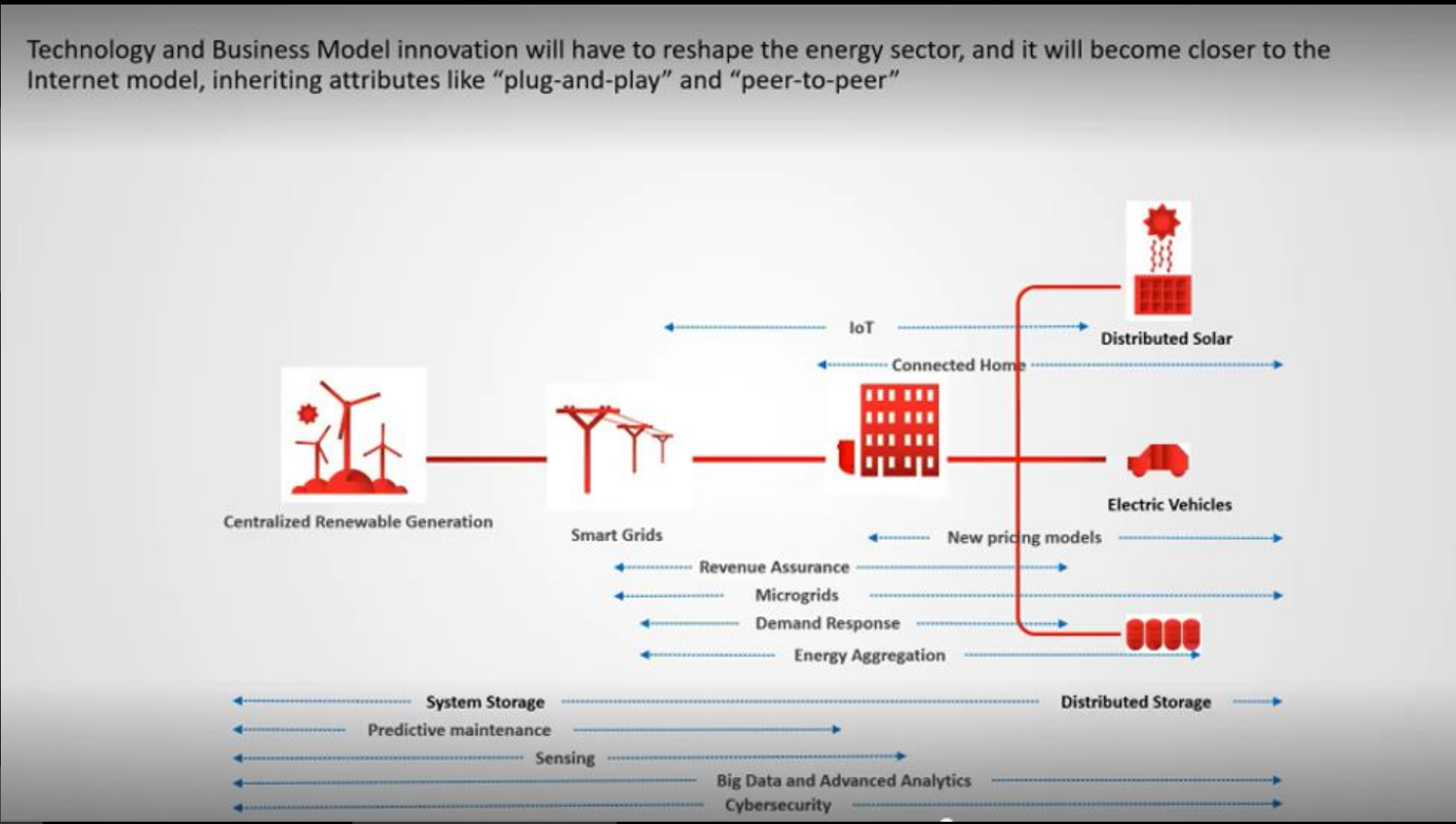
Cyber-physical systems* (CPS)** are engineered *systems* that are built from, and depend upon, the seamless integration of computational algorithms and ***physical components.



Origin: Network Challenges for Cyber Physical Systems with Tiny Wireless Devices: A Case Study on Reliable Pipeline Condition Monitoring: Salman Ali et al.

Source: Apresentação António Vidigal no LNEG

Aggregators are a key part of the electric mobility ecosystem, helping to maximize the value of EVs as a flexible and valuable resource for the electricity grid.



Source: Apresentação António Vidigal no LNEG

Thank you!

HR EXCELLENCE IN RESEARCH

LNEG