

Prospettive dell' impiantistica nell'era della *Transizione Energetica*

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Change of Paradigm

Difficult to forecast in a traditional way



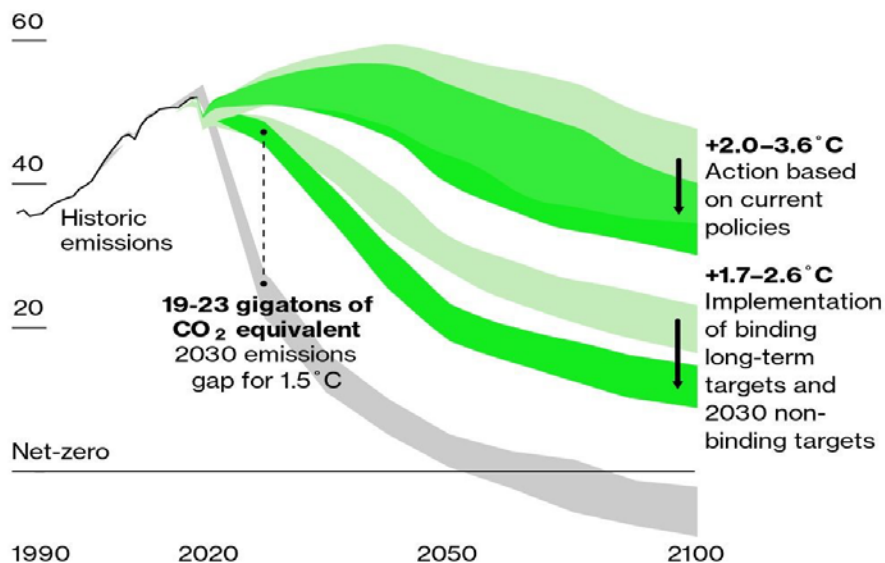
- The process of **energy transition** is a reality, but very **complex**, with major **uncertainties** regarding:
 - Extent – how far?
 - Exact direction
 - Timing
 - Aspirational **pledges** vs. **policies**
 - In which countries?
 - Quantification
 - Public opinion?
 - Political will?
 - Global consensus?
- Now the **war**: embargos, shortages....
- Key dilemma: What **will** happen vs. what **should** happen?

Green-house gas emissions challenge: Lots done, much more ahead of us

Impact of COP26 on Emissions Pathways

New targets could reduce emissions by 2100 in line with 1.7–2.6° C warming

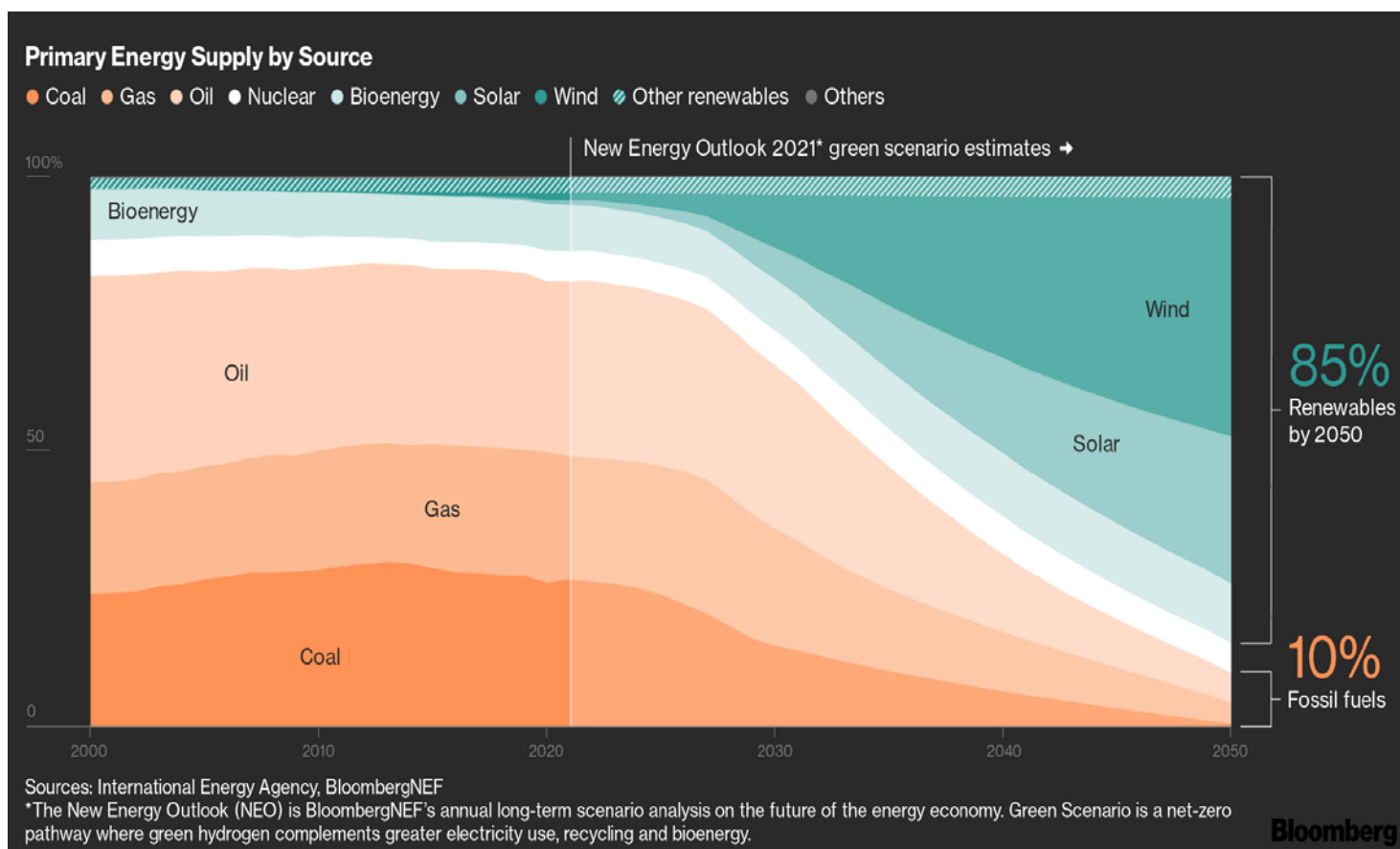
Low and high projections May November Below 1.5° C



Note: November 2021 update
Source: Climate Action Tracker

Bloomberg

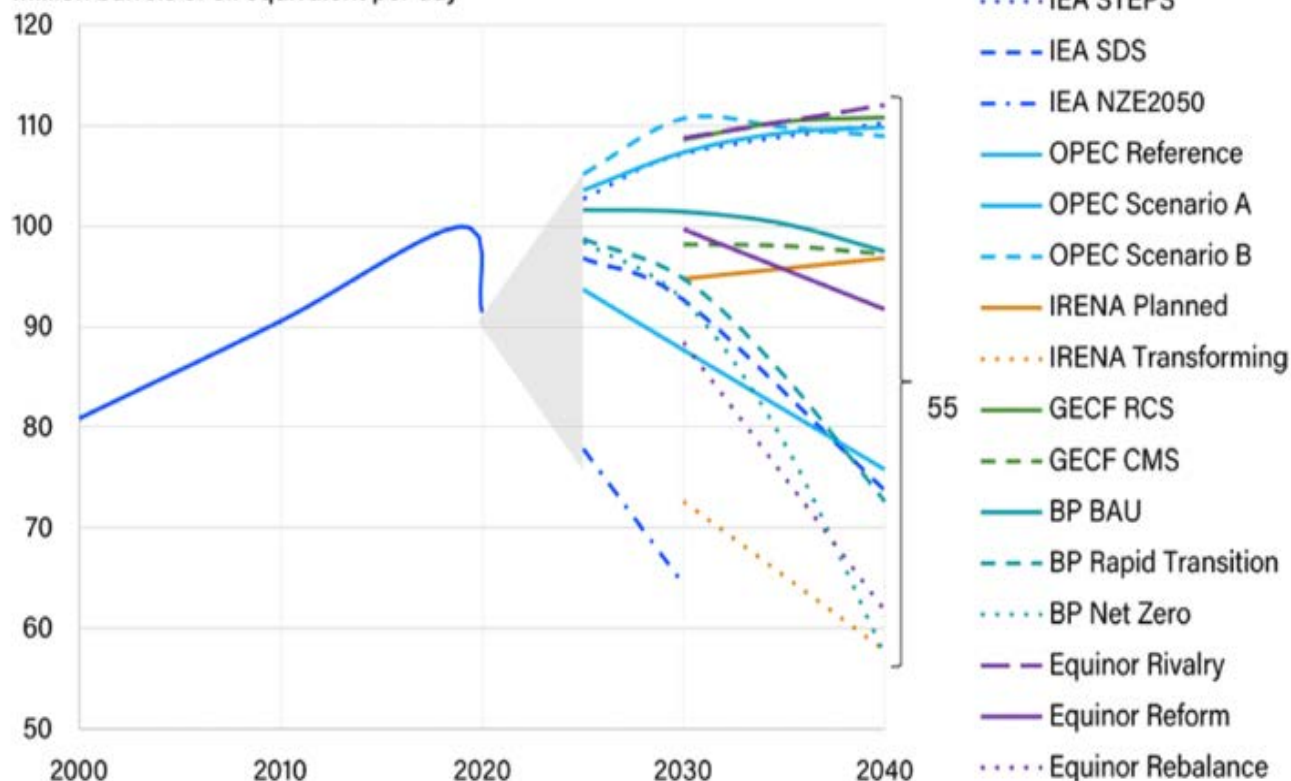
Are we ever going to achieve this scenario?



Oil and liquids demand challenge

Liquids Demand Scenarios Through 2040

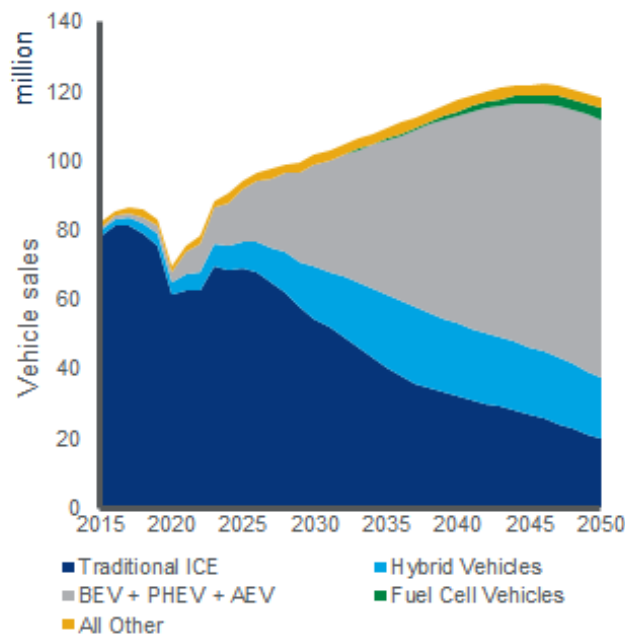
Million barrels of oil equivalent per day



Source: IEF, IEA, OPEC, IRENA, GECF, BP, Equinor

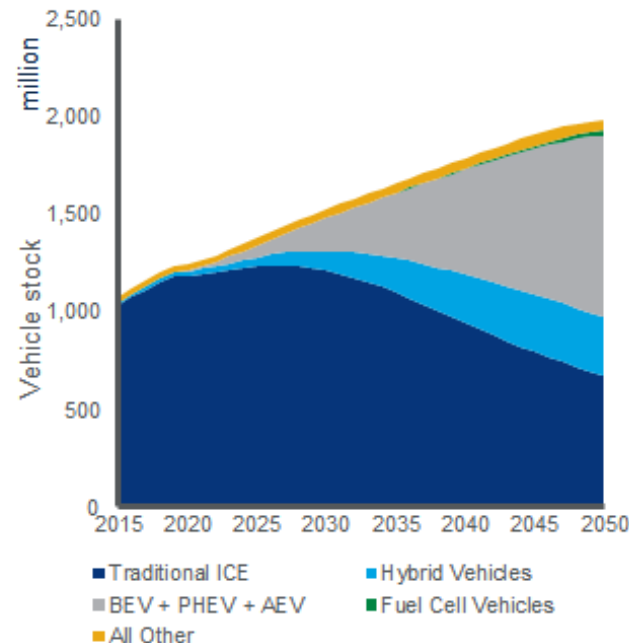
EVs are growing strongly, with inevitable impact on the oil demand

Global passenger light vehicle sales



Source: Wood Mackenzie

Global passenger light vehicle stocks

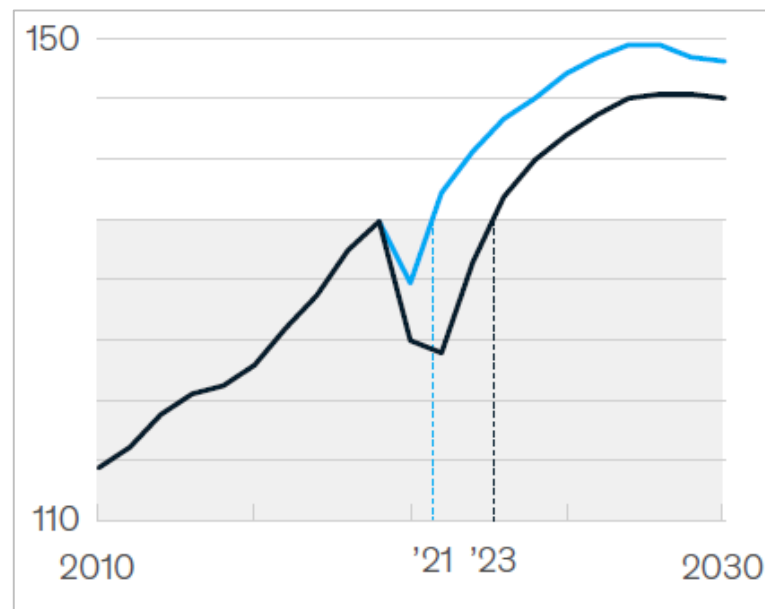


Source: Wood Mackenzie

Gas demand to grow for a long time

Natural gas demand, million TJ

2019 level Recovery to pre-COVID-19 level Virus contained Muted recovery



Source: McKinsey Energy Insights: Global Energy Perspective 2021

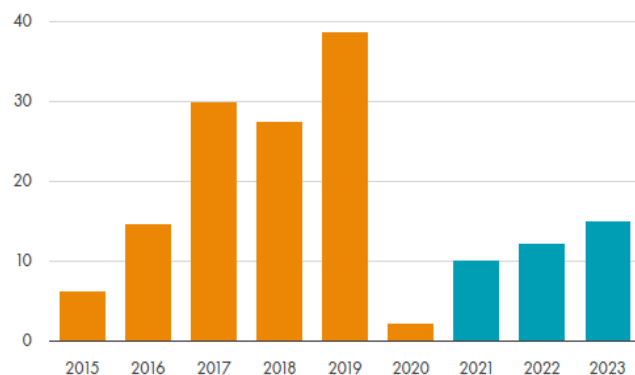
LNG – a key factor in growing gas demand

Supply-demand gap estimated to emerge in the middle of the current decade as demand rebounds

Shell
LNG Outlook 2021

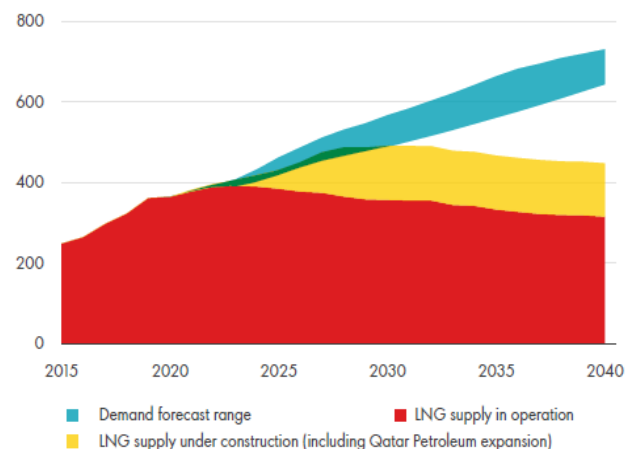
LNG trade volume growth

MTPA



Emerging LNG supply-demand gap

MTPA



Source: Shell interpretation of IHS Markit, Wood Mackenzie, FGE and Poten & Partners 2020 and 2021 data
Qatar Petroleum LNG expansion announced in February 2021

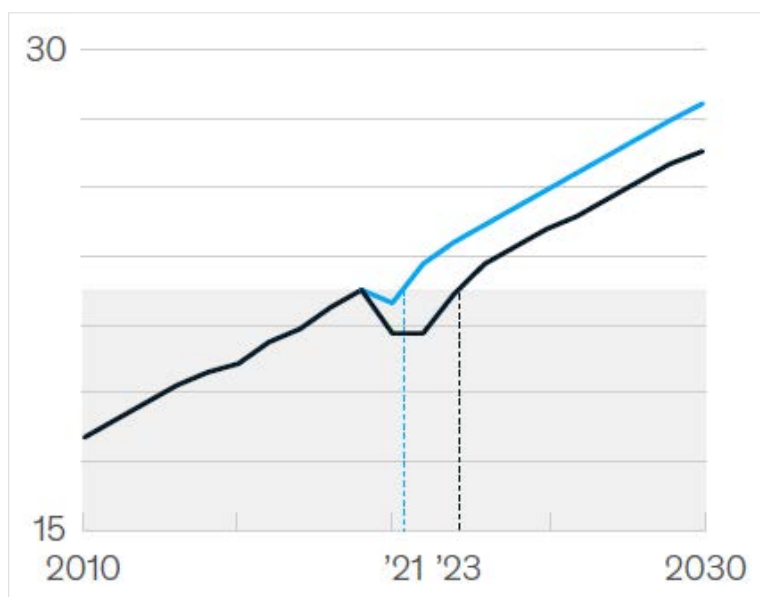
LNG – A cleaner maritime and heavy-transportation fuel



Rapid global electrification

Electricity consumption, thousand terawatthours (TWh)

2019 level Recovery to pre-COVID-19 level Virus contained Muted recovery



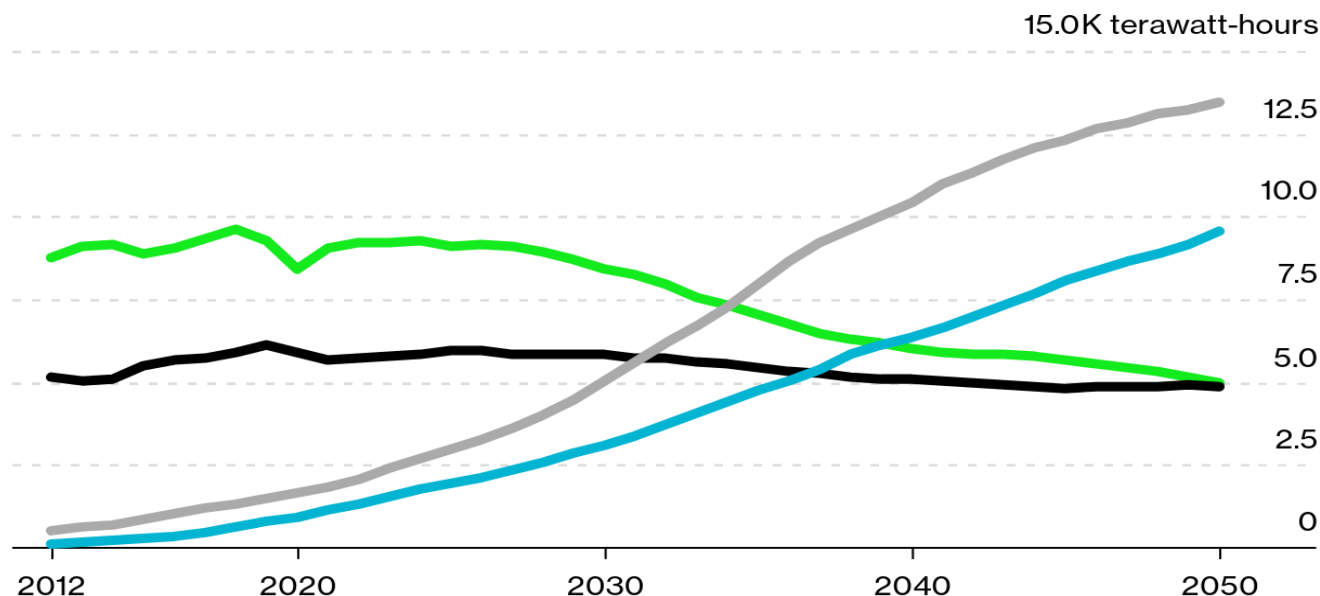
Source: McKinsey Energy Insights - Global Energy Perspective 2021

Electrification - All growth and some coal replacement coming from renewables

Converging and Diverging

Global coal- and gas-fired power generation*

Coal Gas Wind Solar



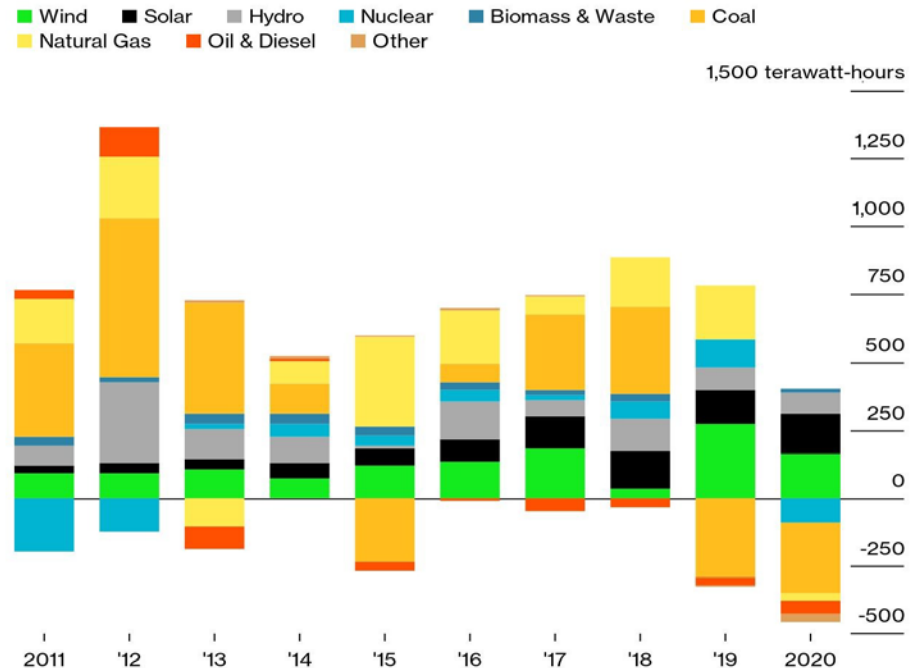
*Data after 2018 represent projections
Source: BloombergNEF New Energy Outlook 2020

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Renewables are substituting some fossil fuel power plants

As Fuels Swoon, Renewables Soar

Global annual growth in power generation by fuel or technology

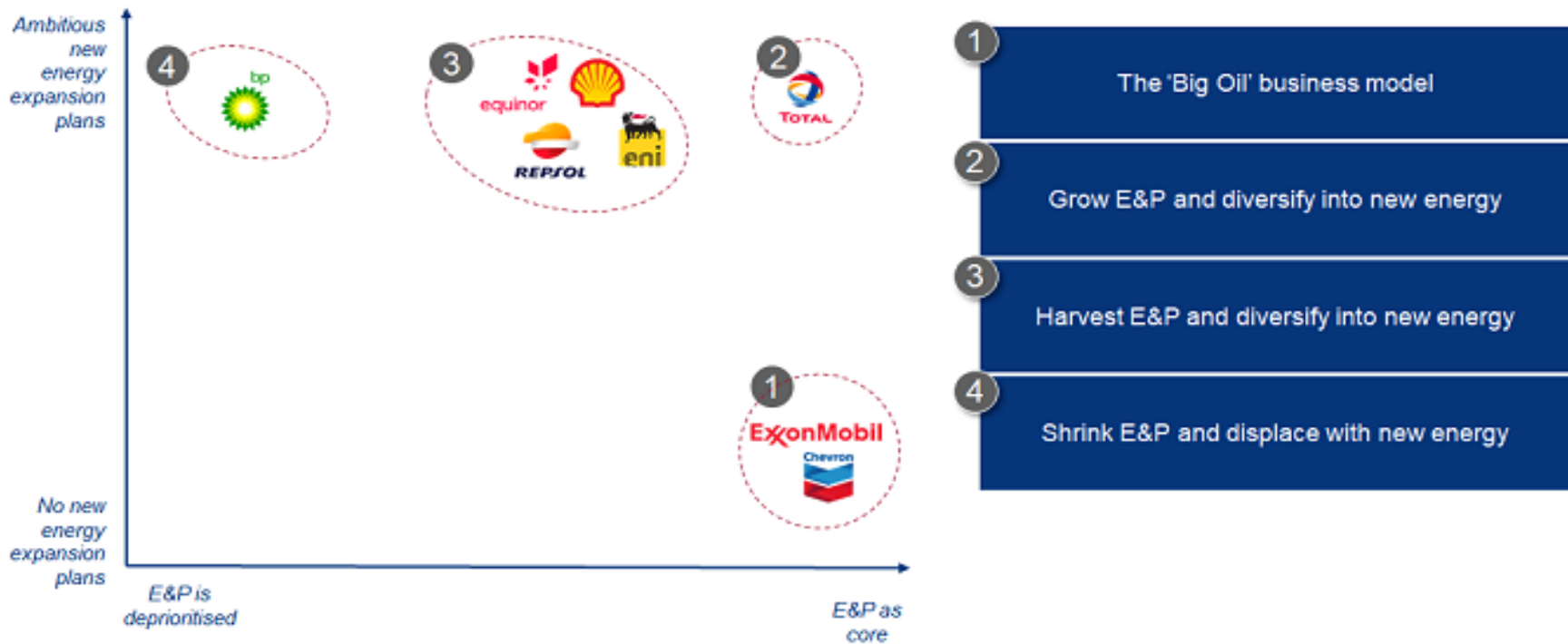


Source: BloombergNEF

January 2022

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The energy majors are realigning their strategies...

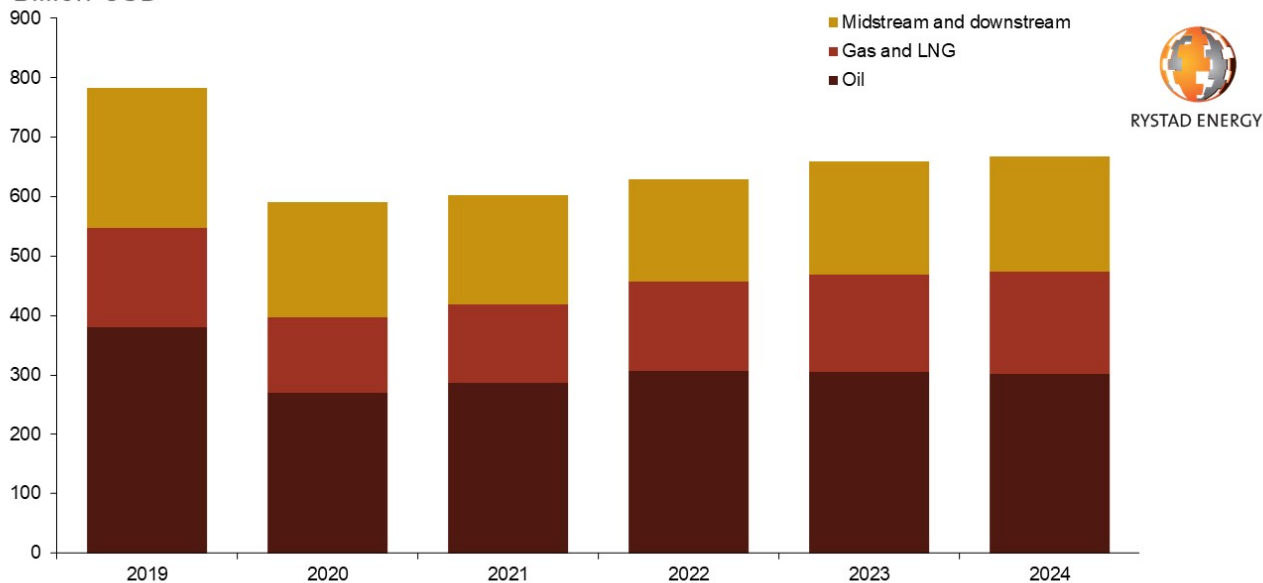


Source: Wood Mackenzie. Based on Wood Mackenzie's qualitative assessment of the Majors' strategies and vision

Traditional **investments in upstream oil&gas** will recover, then plateau

Global oil and gas investments by market

Billion USD

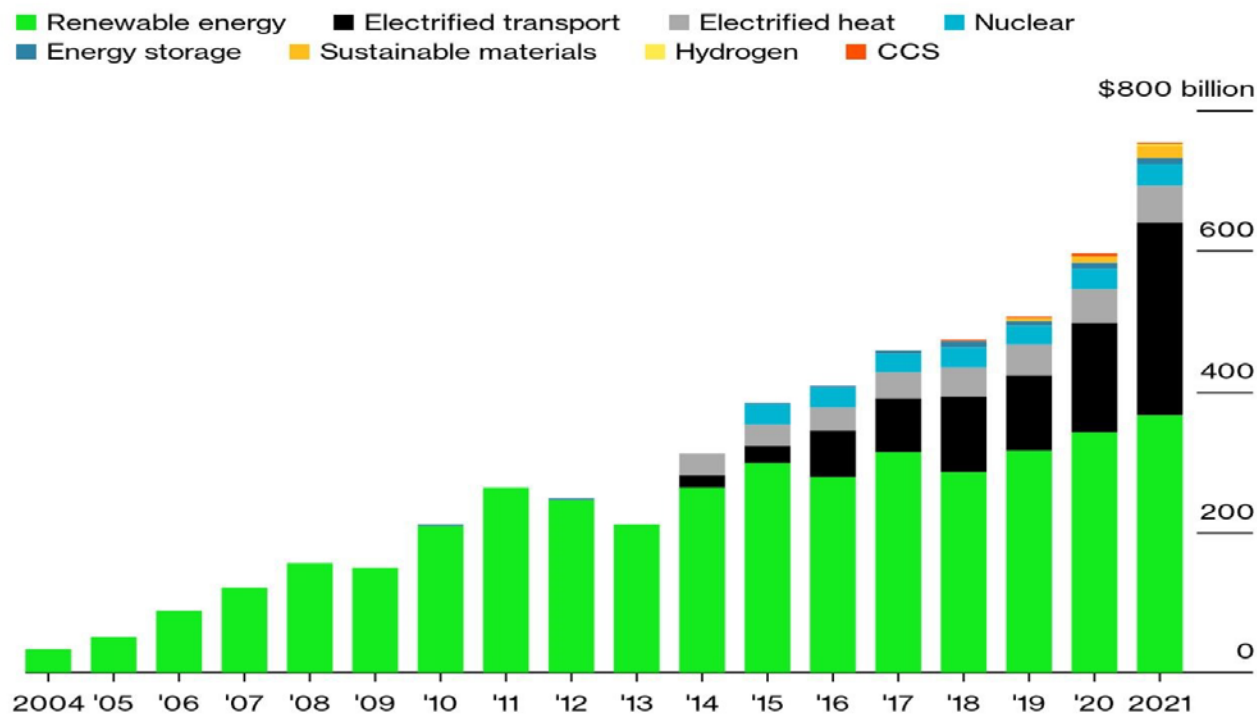


Source: Rystad Energy ServiceCube, Rystad Energy research and analysis
January 2022

..whereas the investments in the energy transition will continue to grow

Taking Off

Global energy transition investment by sector



Source: BloombergNEF December 2021

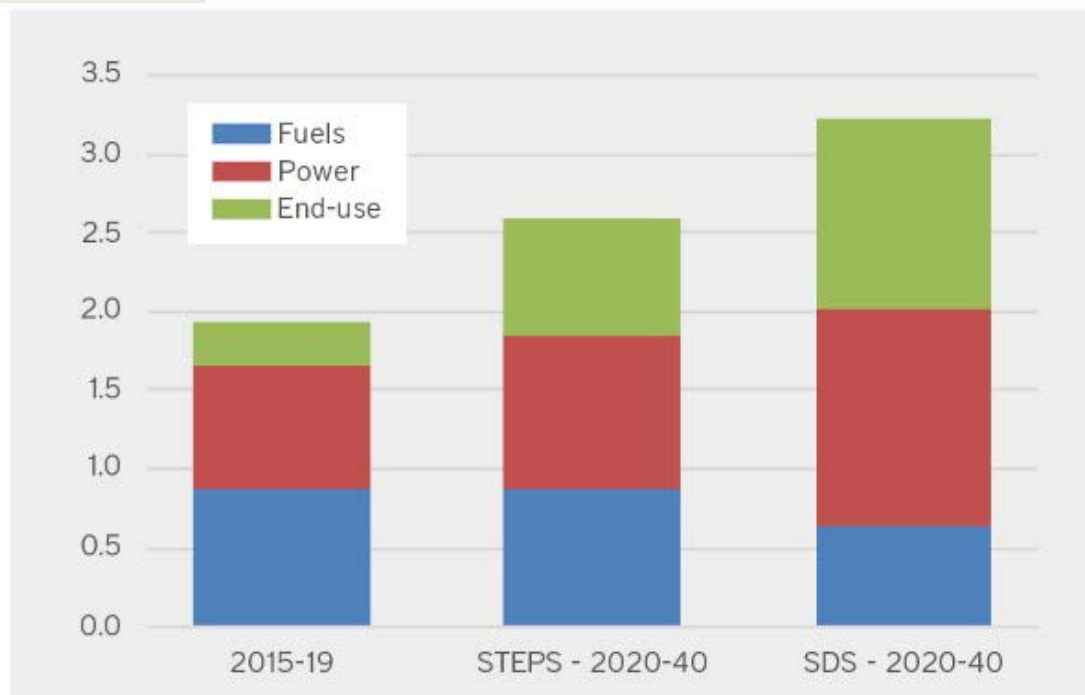
Note: nominal dollars

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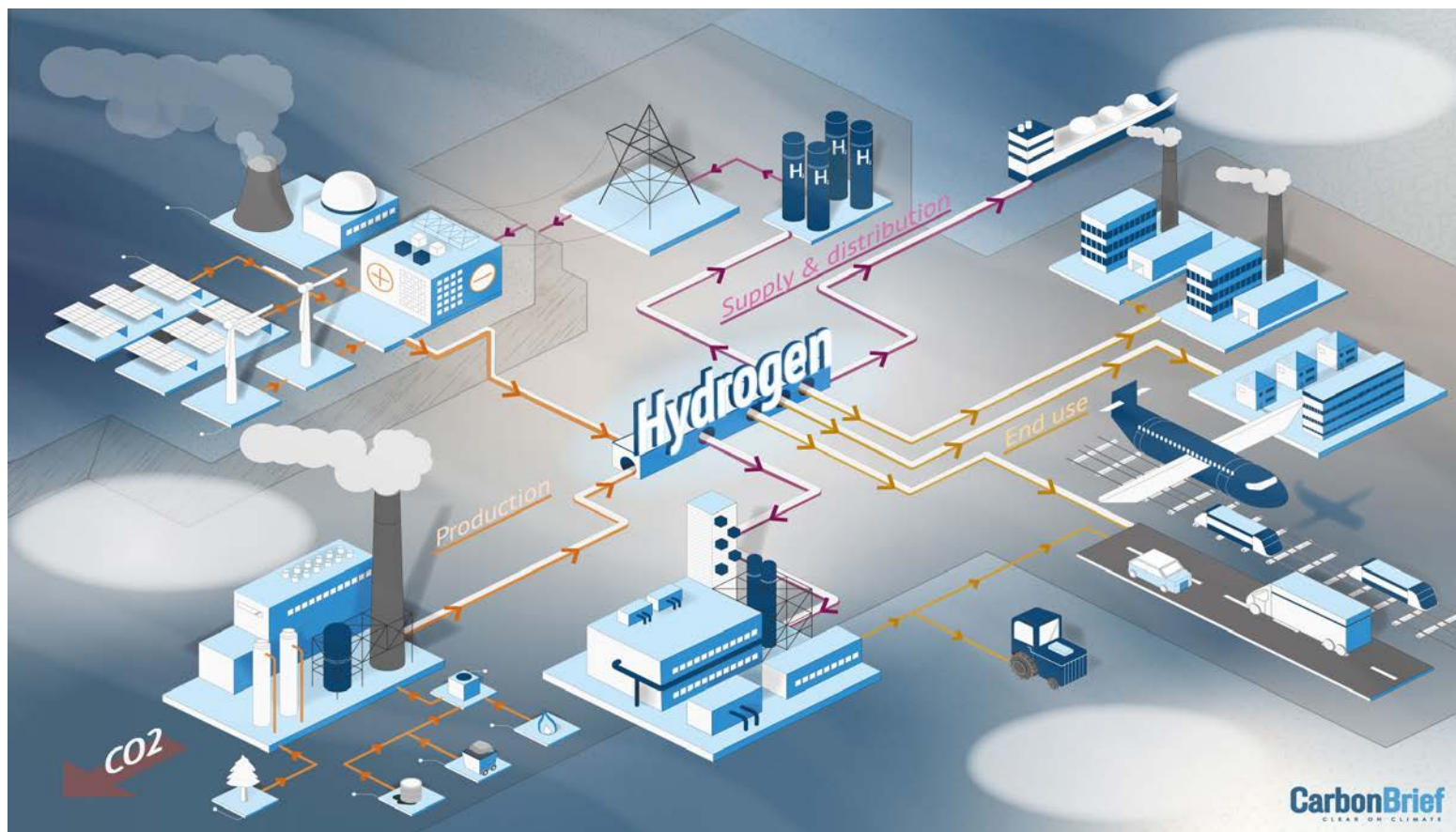
Overall global energy investments should increase under any scenario

- Big danger of underinvestment
- Huge changes in the supply chains

Global energy investment (\$tn)

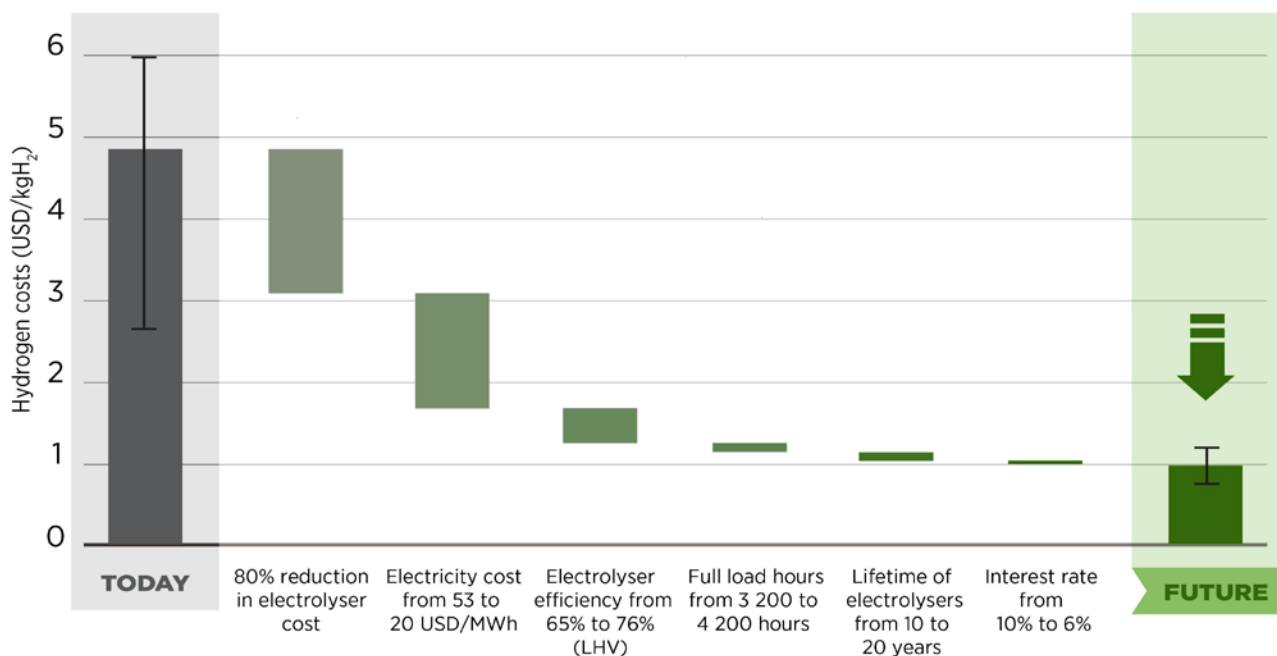


Are we ready for the 'Hydrogen Economy'?



Reducing the hydrogen production cost could be possible in a decade ...

The journey to a competitive green hydrogen

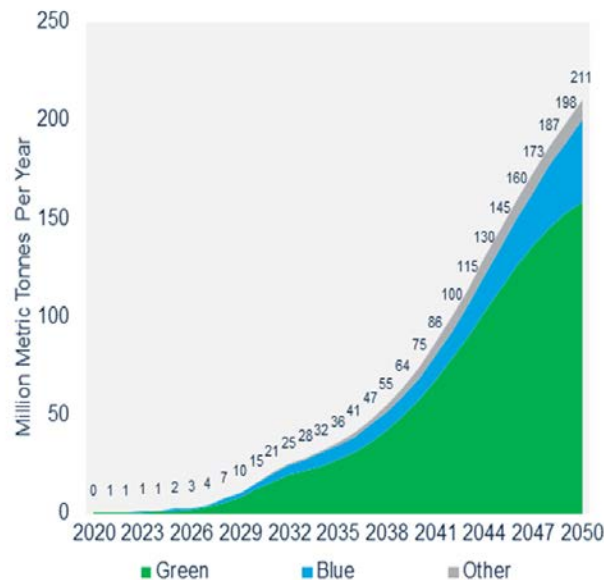


Source: IRENA (2021)

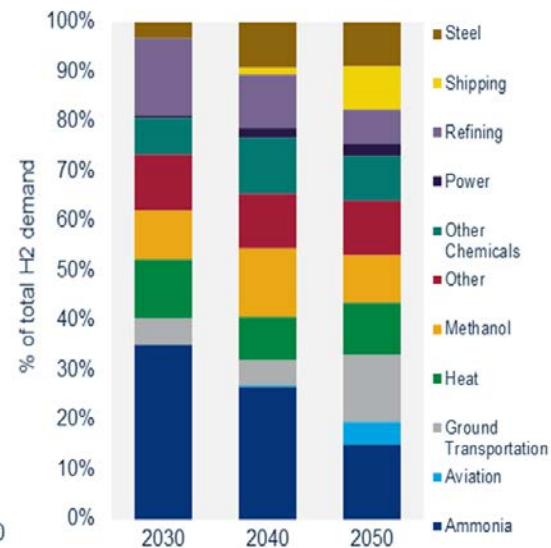
...which would allow the hydrogen market to take off

Green hydrogen capacity takes off post-2030 (LHS) and starts to penetrate hard-to-abate sectors

Global low carbon hydrogen production by colour, 2020 – 2050



Global hydrogen demand by existing end use, 2030 – 2050

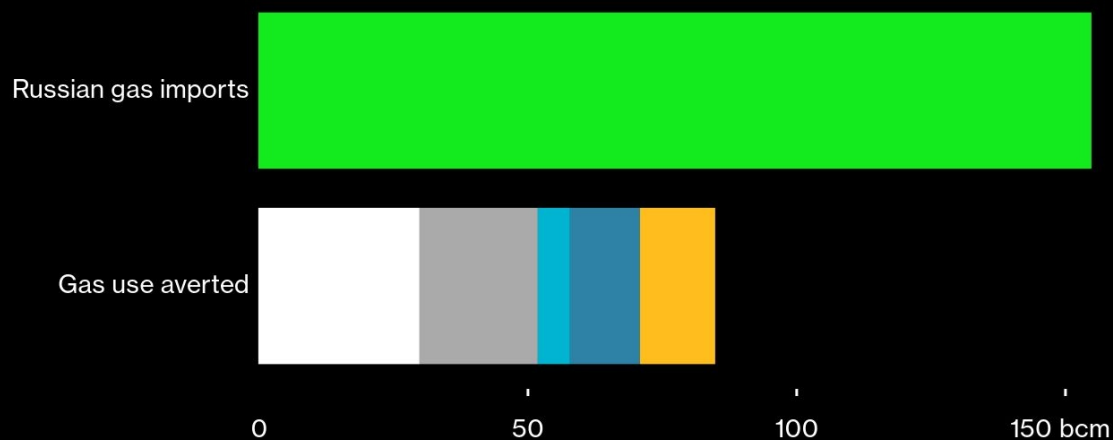


And in the current **war** situation?

Everything on the Table

The International Energy Agency says Europe can replace more than half its Russian gas this year

- Russian imports 2021
- Other piped gas and LNG
- Coal
- New renewables
- Nuclear and biomass
- Heat pumps, energy efficiency and turning down the thermostat by 1°C



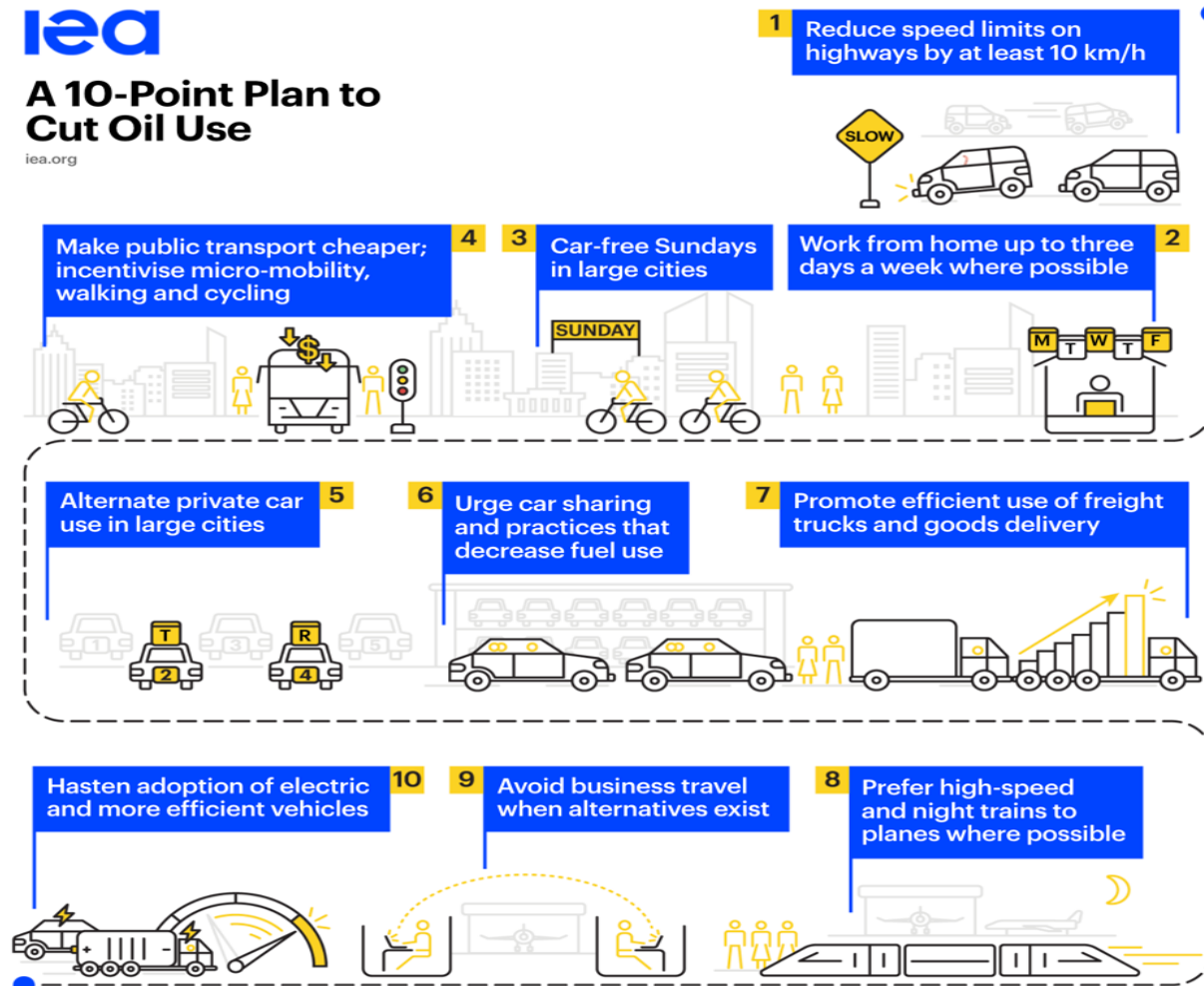
Source: International Energy Agency

Bloomberg Green



A 10-Point Plan to Cut Oil Use

iea.org



Conclusions



- We are at the start of **the energy transition**, but with huge **uncertainties** regarding:
 - Timing
 - Exact direction
 - Quantification
- **Traditional fuels**, particularly **Natural Gas**, will remain as base-load and later as '**companion**' or '**transition**' fuels for a long(er) time – particularly in today's new **war scenario**
- We could face **shortages** caused by **under-investment** and **uncertainties** in the energy industry
- Multiplicity of choices will be the best way forward to solve the current **supply crunch**:
 - Gas from several sources
 - More Renewables
 - Hydrogen, bio-gas, geothermal, nuclear ...