Energy transition

A reality check towards green electrification

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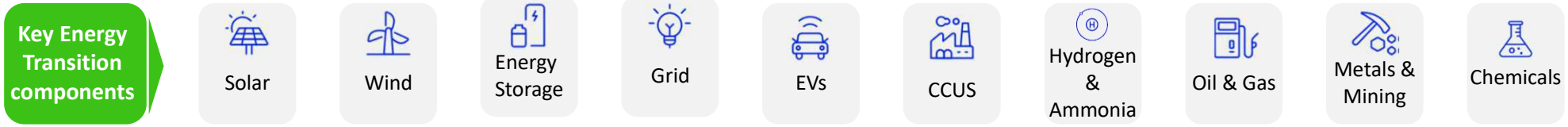
Energy transition – key messages

- The Paris Agreement's central aim is to limit the global temperature rise well below 2 °C
- Recent years have seen a flurry of net zero commitments and ever-growing enthusiasm for climate action from all parts of society
- Energy drives a large portion of Green House Gas emissions, both directly, as well as indirectly as input to several industries
- Translating into action the ambitious climate targets that have been put in place by governments and companies depend on accelerating the deployment and adoption of several interrelated technologies.



- Charting a course toward a net-zero future requires a fundamental chance in how energy markets operate. It is estimated that Europe will have to undertake investments in the tune of €5trillion from now until 2030 to meet green targets.
- **Almost 9 years later** and nearly halfway through what has been called a "decisive decade" for climate change, the world stands at a critical juncture in their transition away from fossil fuels.
- Deployment targets have not adequately accounted for the impacts of macroeconomic shocks, geopolitics, the enablement of technology ecosystems and most importantly (a) affordability to the consumer and (b) security of power supply

Key themes that drove the overall Green Transition euphoria

1

Low interest rates

Era of almost zero policy rates, aimed to drive investments, in the post Financial crisis world

2

Ample capital liquidity

Energy transition scored high in investors' agendas, as the market started buying into the theme, providing ample funding sources

3

Market stability

Market conditions were broadly stable, with no exogenous shocks expected to change the equilibrium

4

Perception of market risk

Relaxed view of power merchant risk (price volatility & cannibalisation)

5

Technological euphoria

Rapid maturing of key technologies, like solar and wind, increased roll out expectations for other zero or low emission technologies like hydrogen and carbon capture

6

Supply chain

Availability of critical components required for the deployment of aspired RES and grid pipelines

7

Transmission & Distribution Networks

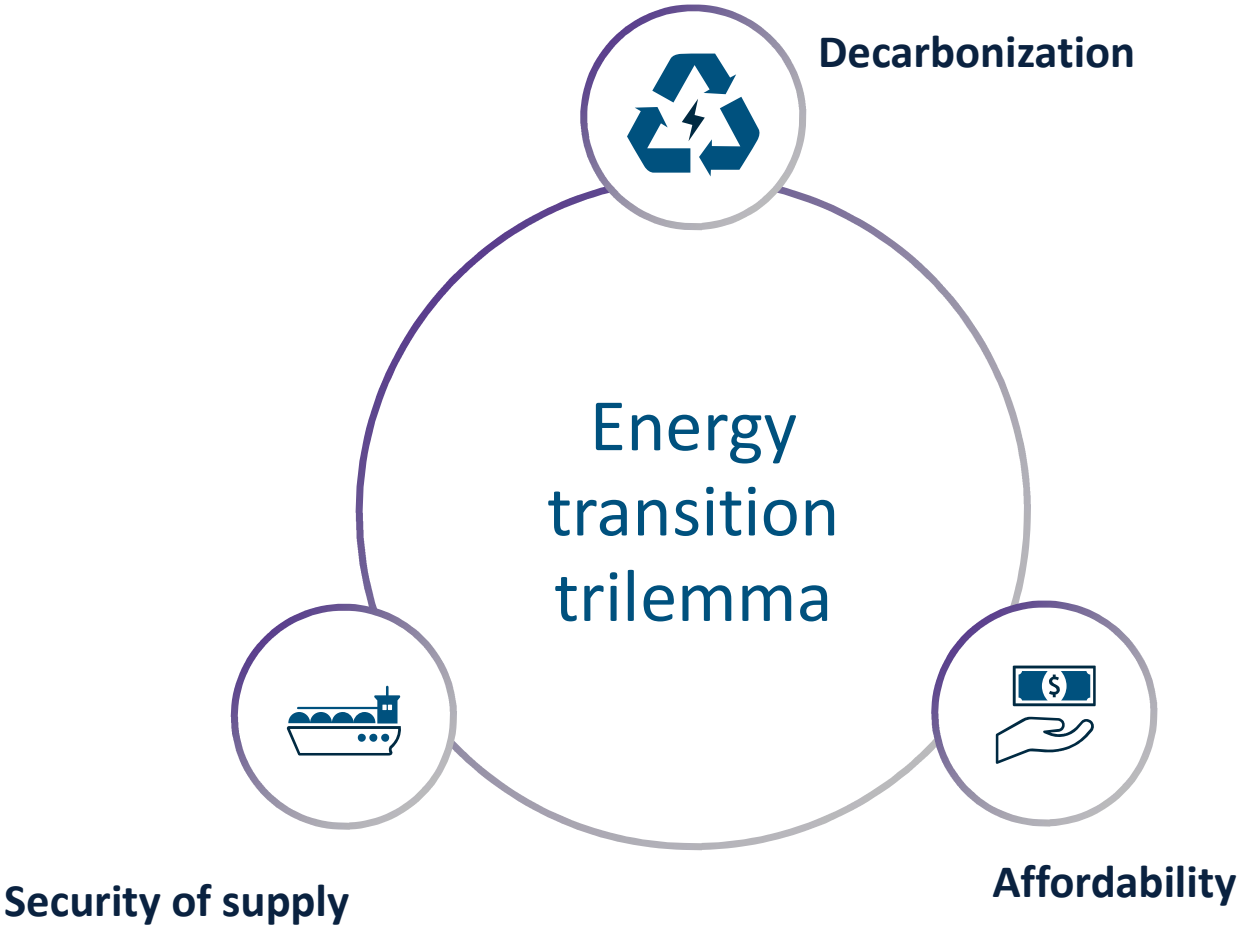
Ability of grid infrastructure to support the targeted roll out of RES and other zero-low emission technologies

8

Low expected investors returns

RES investment was viewed as a safe investment, lowering expected returns and allowing for more projects to proceed

Aligning decarbonization goals with security of supply and affordability proves not be straightforward in today's polarized world



The pace of the energy transition a key question mark; many voices raise concerns over the ambition, in view of today's headwinds across multiple fronts

More and more voices call for a reality check…

JPMorgan warns of need for 'reality check' on phasing out fossil fuels

US bank says higher interest rates, inflation and global conflict have dented outlook for energy transition

Autos & Transportation | ADAS, AV & Safety | EV Battery | Sustainable & EV Supply Chain | Regulatory & Policy

EU car sales at 3-year low in August, EV sales plunge 44%

Europe's negative price trend could continue until summer

AleaSoft and SolarPower Europe inform **pv magazine** that negative energy prices in Europe are related to the pandemic, low demand, insufficient storage solutions, and inadequate energy planning. They say this situation will likely continue into the summer.

Negative electricity prices registered in nearly all European energy markets

Spanish consultancy AleaSoft Energy Forecasting recorded negative hourly electricity prices for all but one European energy market it analyzed during the first week of April, including in the Spanish and Portuguese markets for the first time. It also registered an all time production record for photovoltaic energy in Portugal and the second highest value ever recorded in Italy.

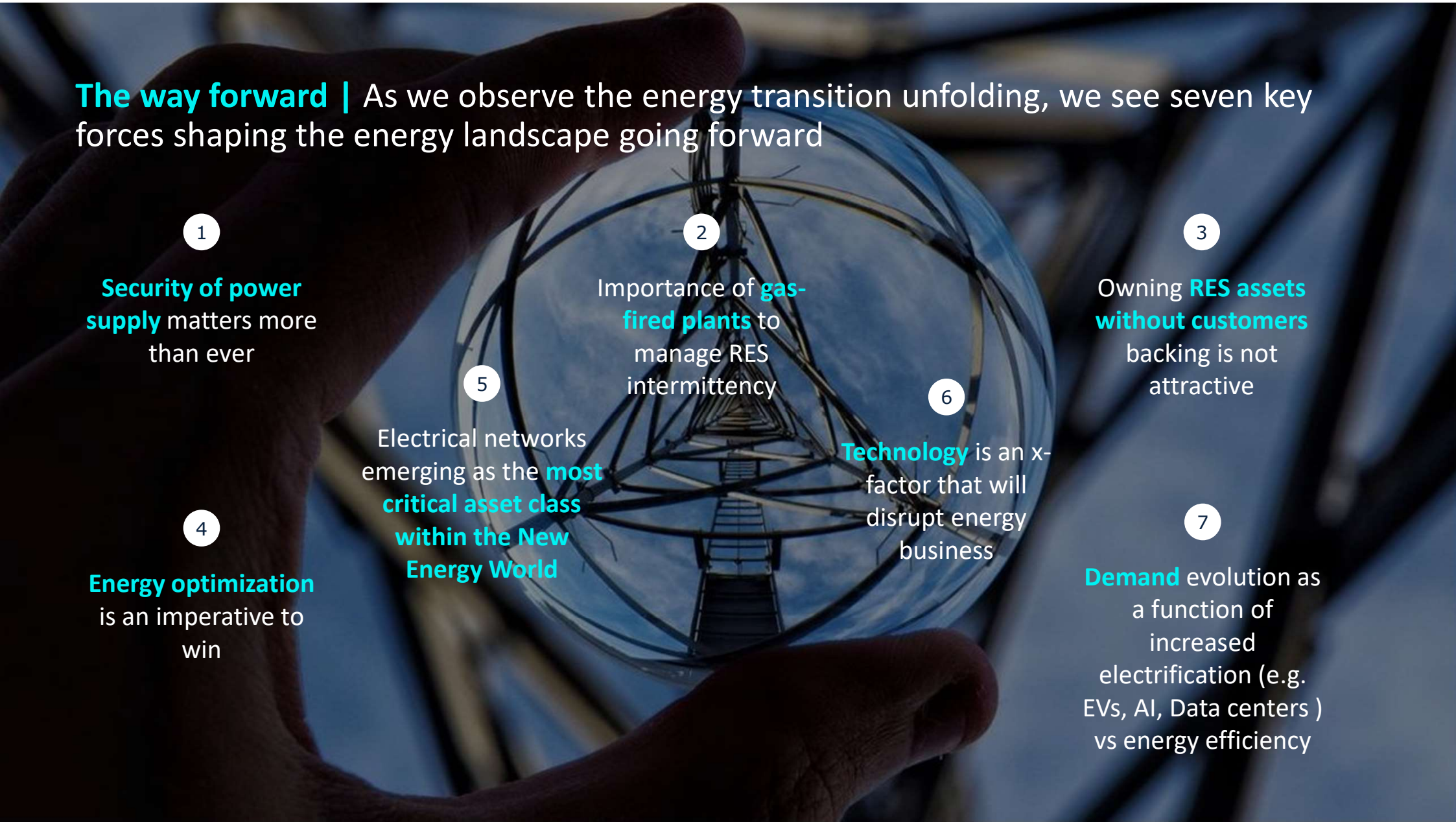
Why realism is key as we balance the energy transition with global growth

Hitting the brakes:

How the energy transition could decelerate in the US

…in view of headwinds in different fronts

- **Ability of Renewables** to ensure base security of supply without large Battery Storage capacity and / or Thermal Generation
- **Low system flexibility** due to insufficient interconnections and storage capacity require prudence in fossils retirement
- **Geopolitical events** further increasing security of supply concerns while introducing power market volatility
- **High and persistent price volatility and cannibalization** of RES, as evident by high curtailment rates
- **Tightened macroeconomics** underpinned by high inflation/high interest rates raising overall cost of investment/financing
- **Stretched supply chains** raising questions over availability of raw materials critical for transition (e.g. metals)
- **Slow electrification** as key use cases (e.g. e-mobility or heat pumps) have failed to reach envisaged penetration rates
- **Affordability – as a result of the above, consumers are paying a cost they had not seen coming**



The way forward | As we observe the energy transition unfolding, we see seven key forces shaping the energy landscape going forward

1

Security of power supply matters more than ever

2

Importance of **gas-fired plants** to manage RES intermittency

3

Owning **RES assets without customers** backing is not attractive

4

Energy optimization is an imperative to win

5

Electrical networks emerging as the **most critical asset class within the New Energy World**

6

Technology is an x-factor that will disrupt energy business

7

Demand evolution as a function of increased electrification (e.g. EVs, AI, Data centers) vs energy efficiency