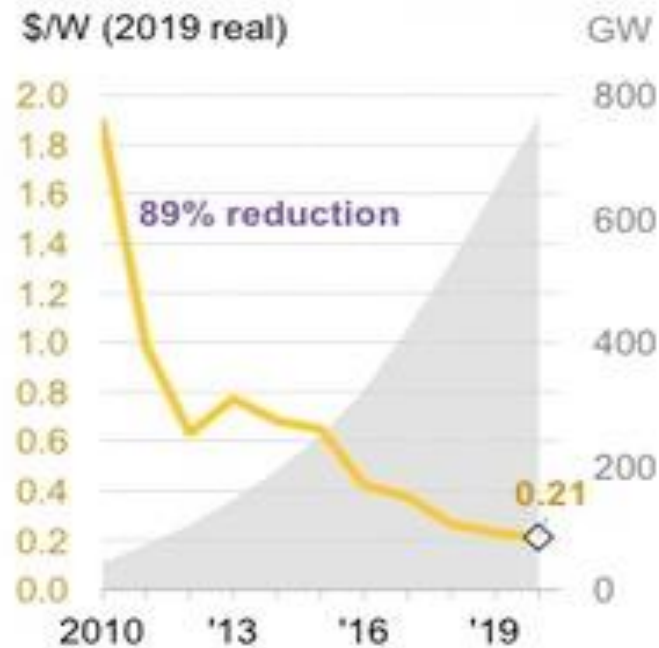


# The impact of the energy transition on financial markets

Kingsmill Bond, February 2021

# The technology revolution

Solar PV module prices and cumulative installed capacity



Onshore wind turbine prices and cumulative installed capacity



Lithium-ion battery prices and demand

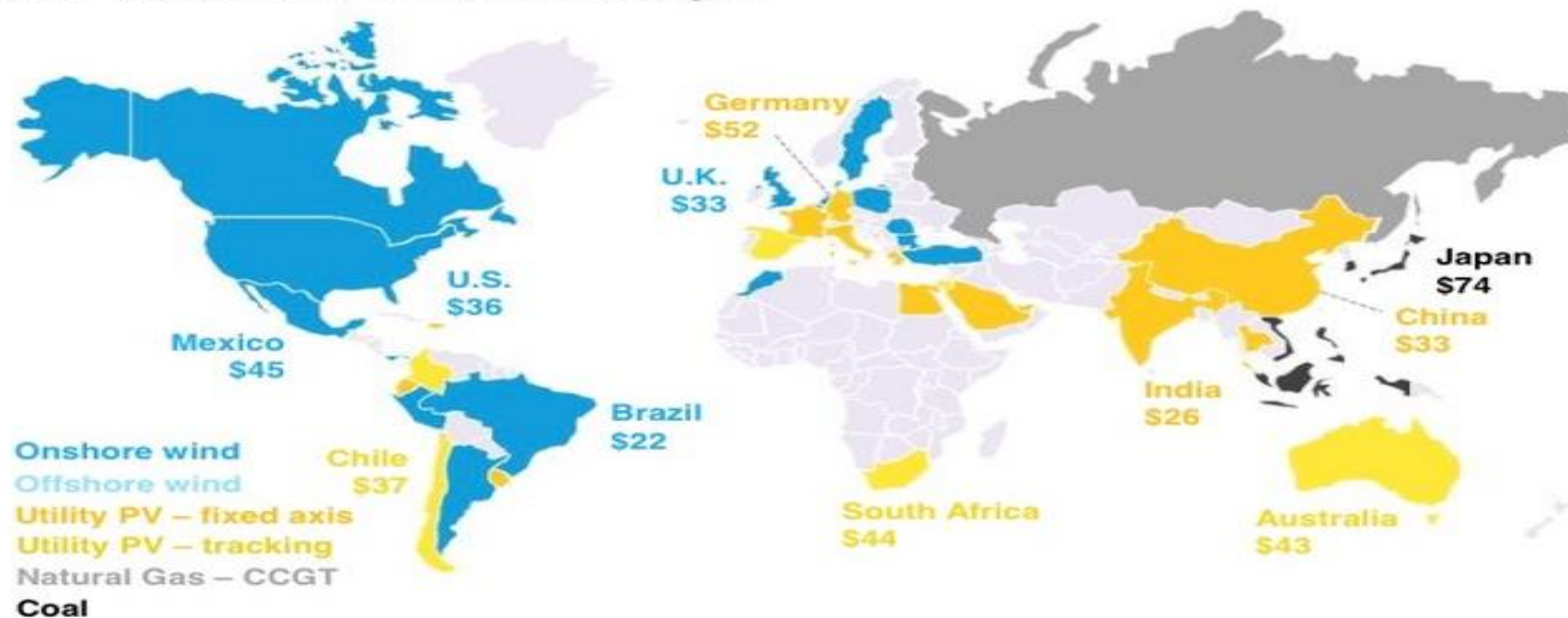


Source: BNEF

# Gives the economic advantage to renewables

Cheapest source of bulk generation (2H 2020)

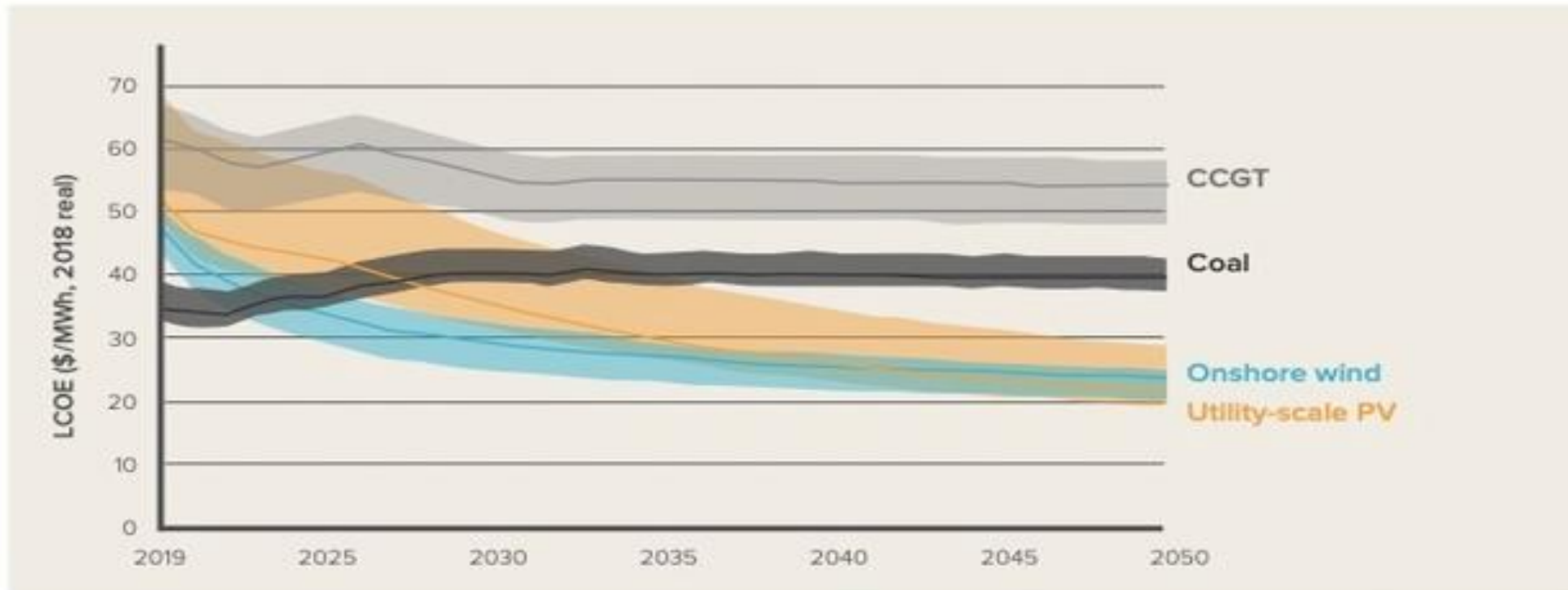
New-build solar, wind, coal and gas



Source: BNEF

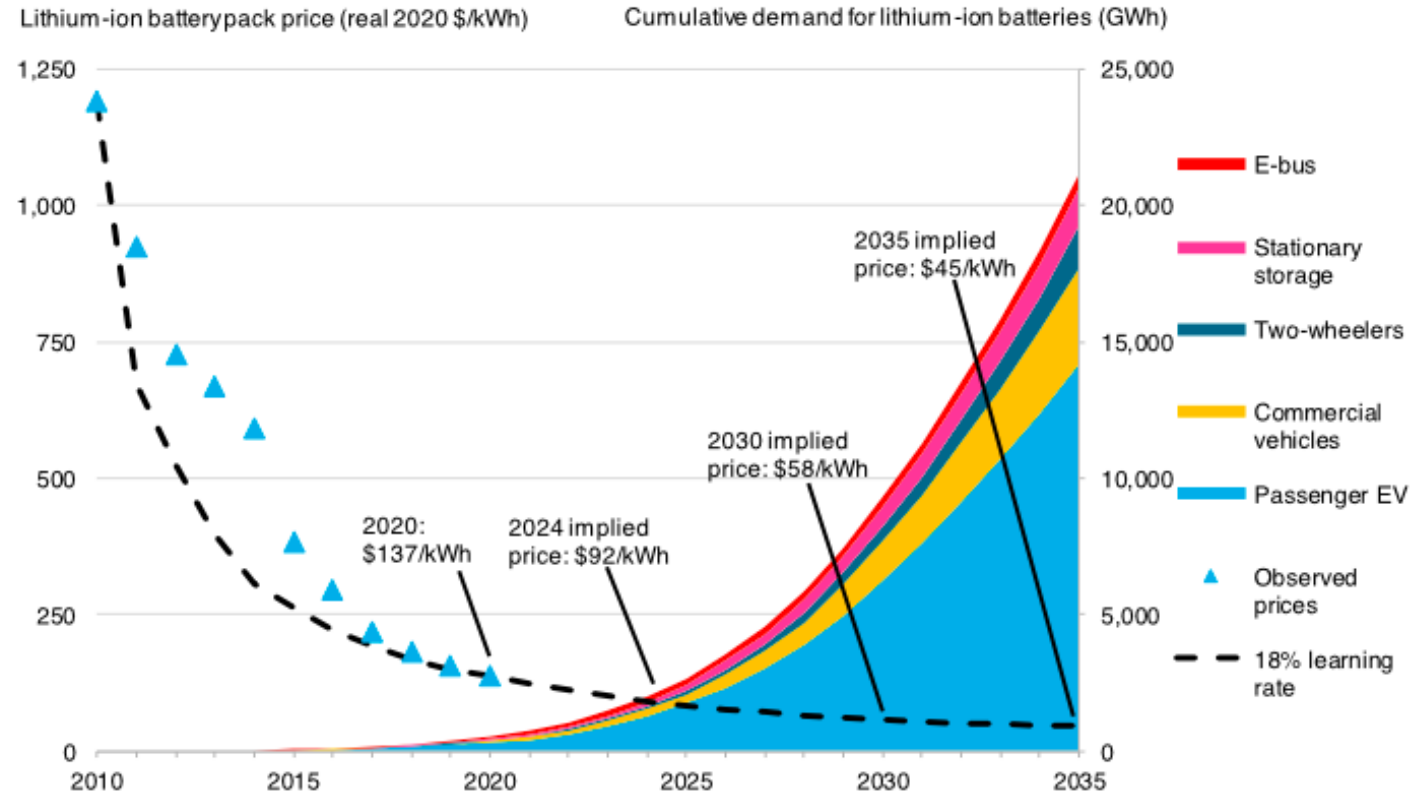
# It just keeps getting better

LCOE of new PV and onshore wind vs running costs of existing coal and gas in China



Source: BNEF

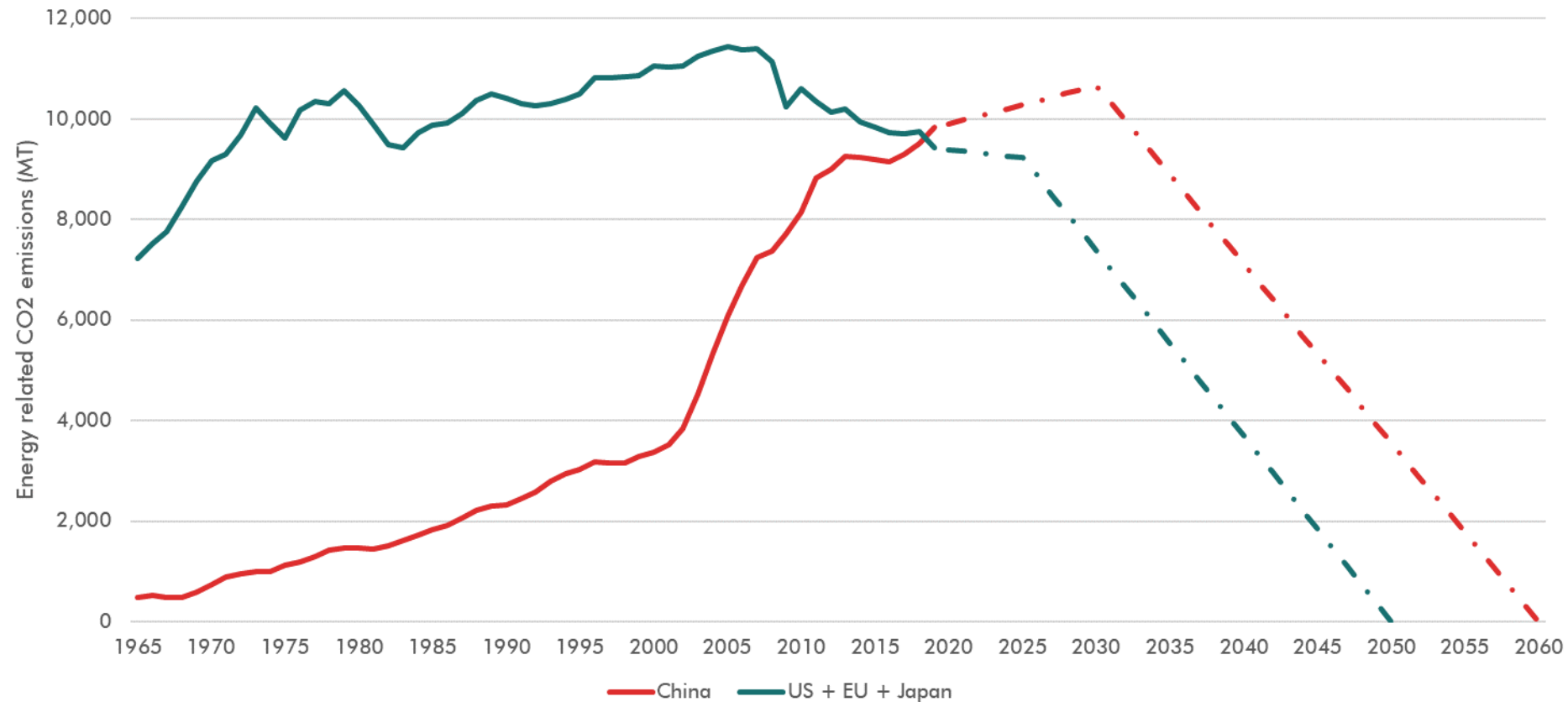
# The revolution is spreading to transport



Source: BNEF

# Supercharged by politics

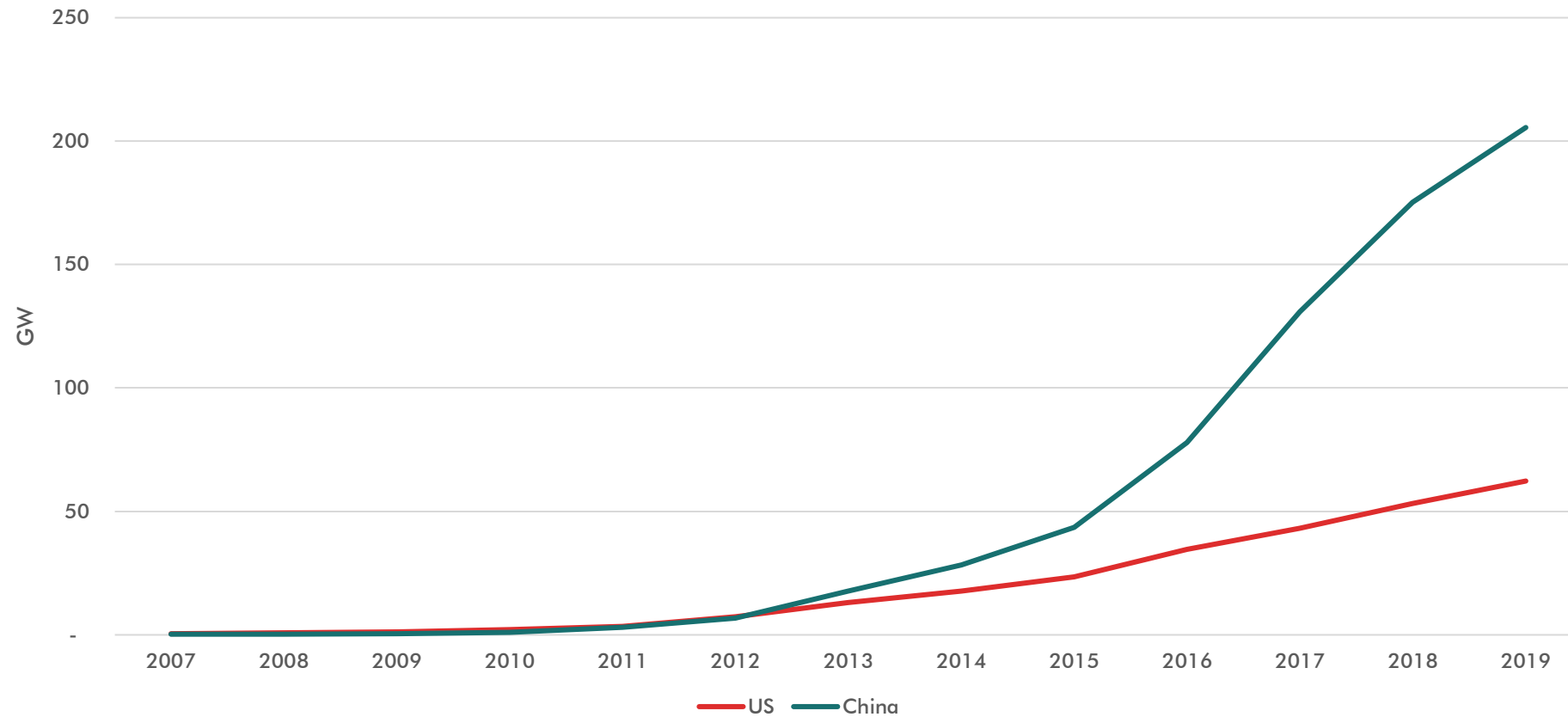
## Carbon emissions and government targets (Mt CO<sub>2</sub>)



Source: BP Statistical review, government targets

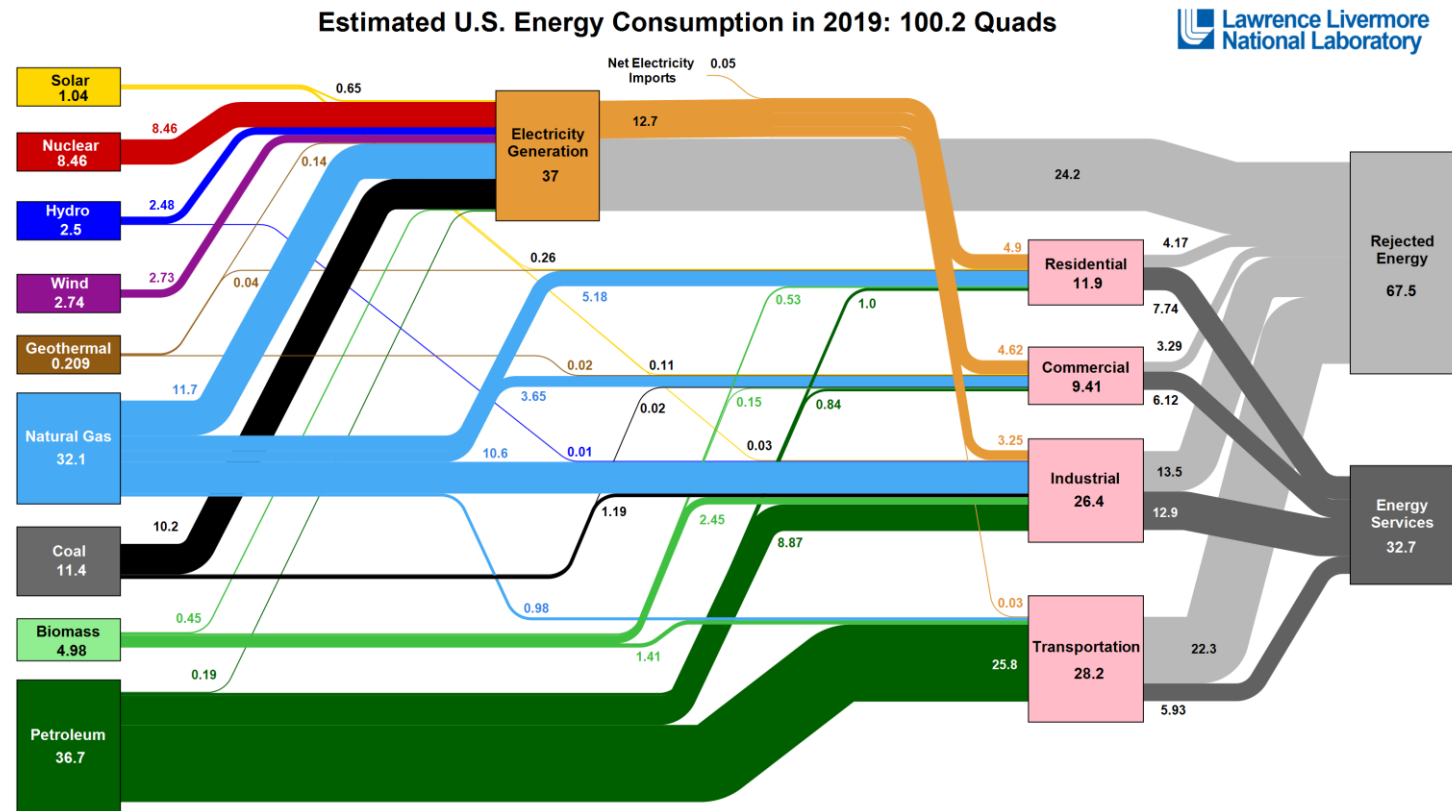
# With an emerging market leapfrog

## Solar capacity (GW)



Source: BP Statistical Review 2020

# Hits a massively inefficient fossil fuel system

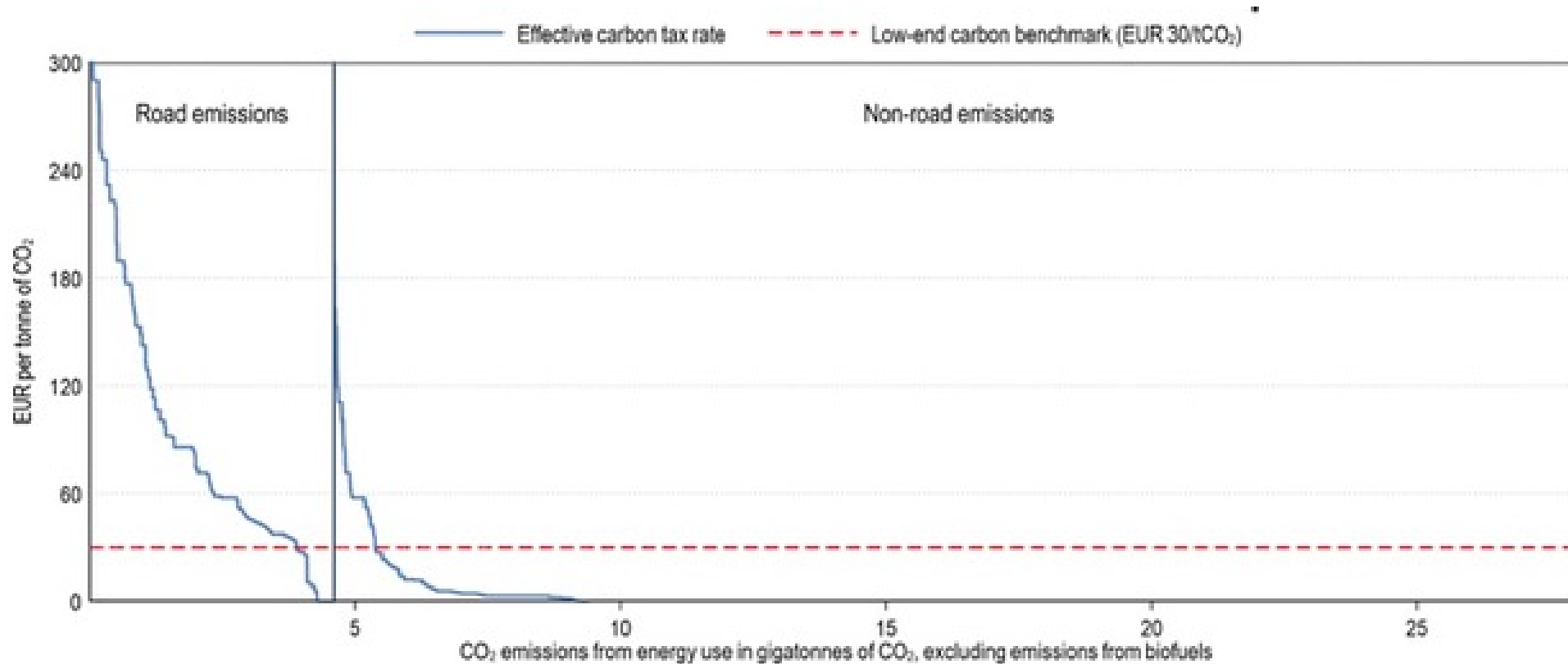


Source: LLNL March, 2020. Data is based on DOE/EIA MER (2019). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 45% for the commercial sector, 21% for the transportation sector and 49% for the industrial sector, which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527



# Which fails to pay for its pollution

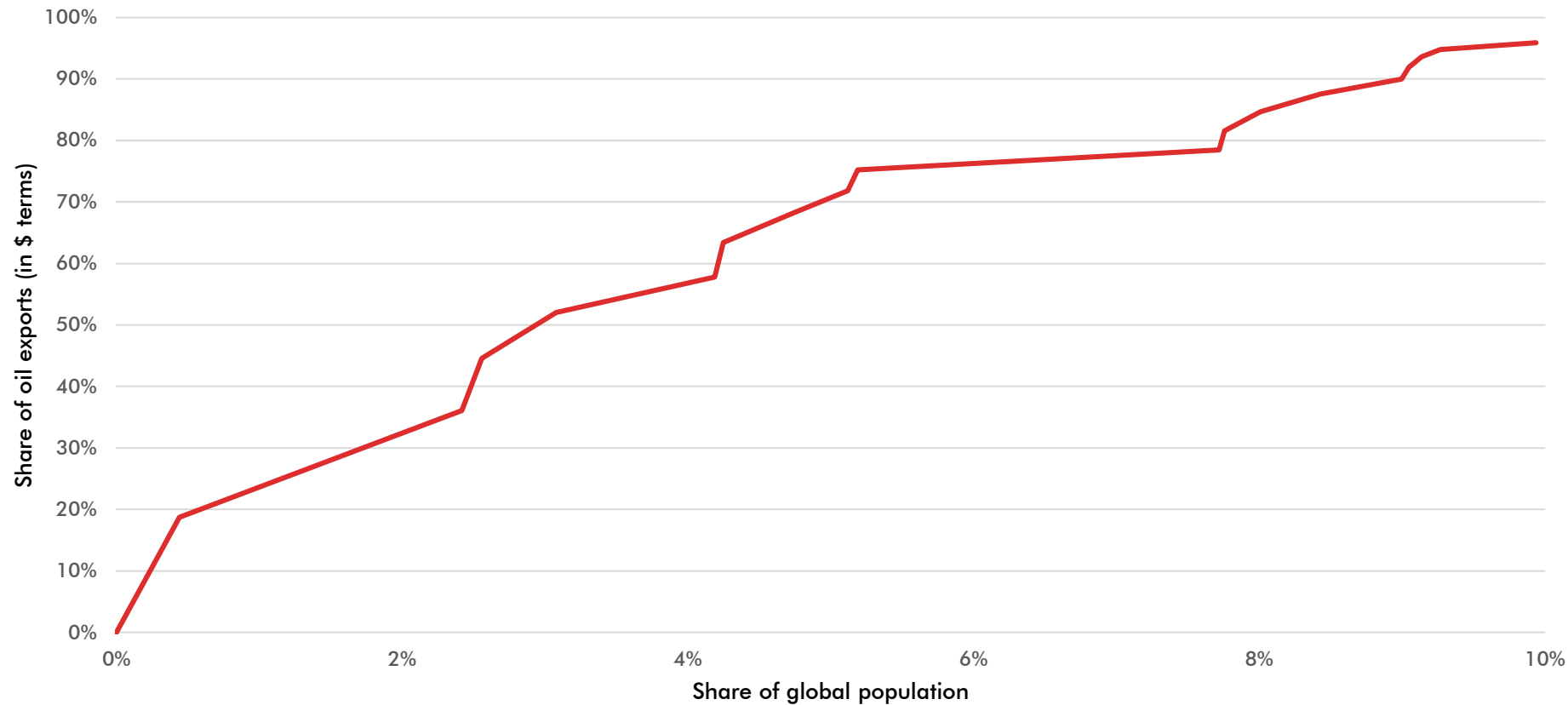
## CO2 tax rates and usage



Source: OECD

# Most countries import fossil fuels

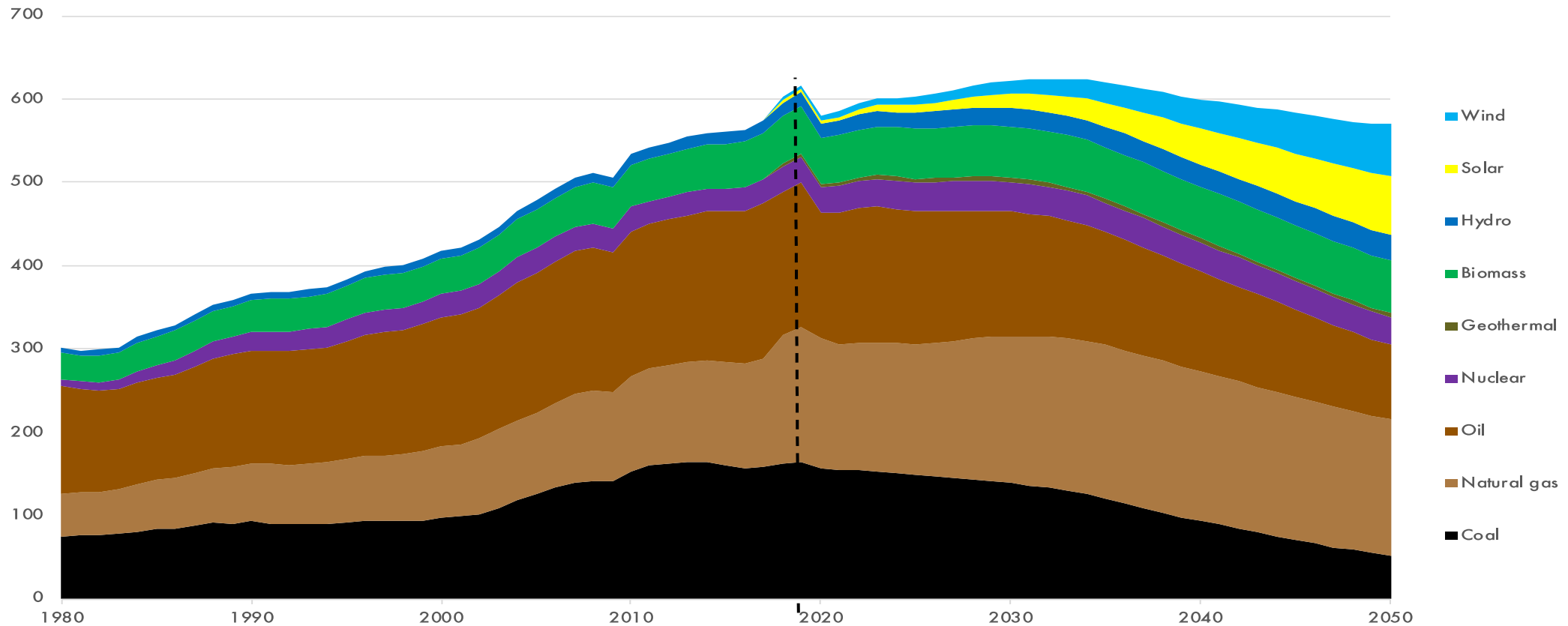
## Share of population and share of oil exports (2017)



Source: World Bank

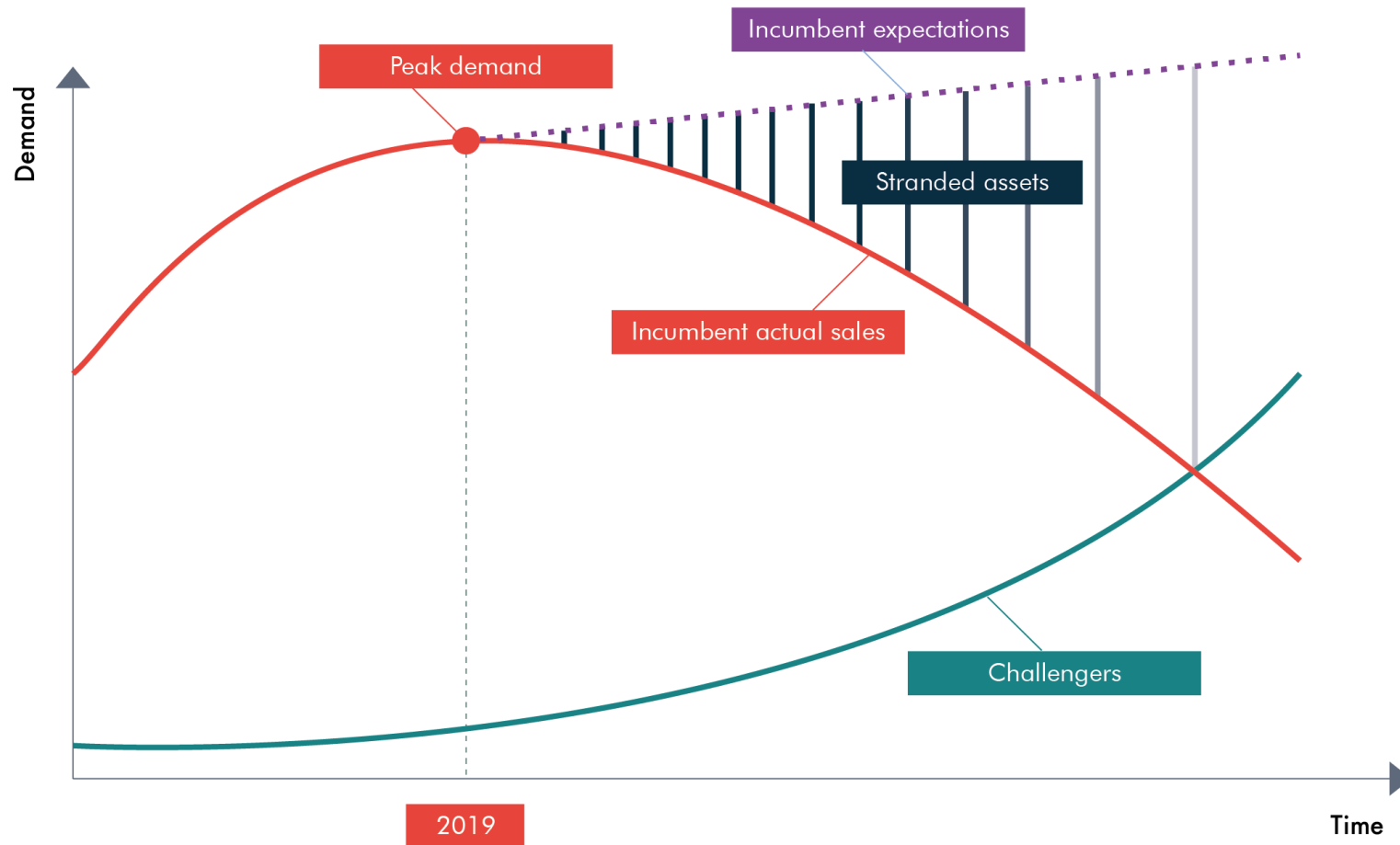
# Means peak fossil fuel demand

## Primary energy supply (EJ)



Source: DNV GL 2020

# Which leads to stranded assets

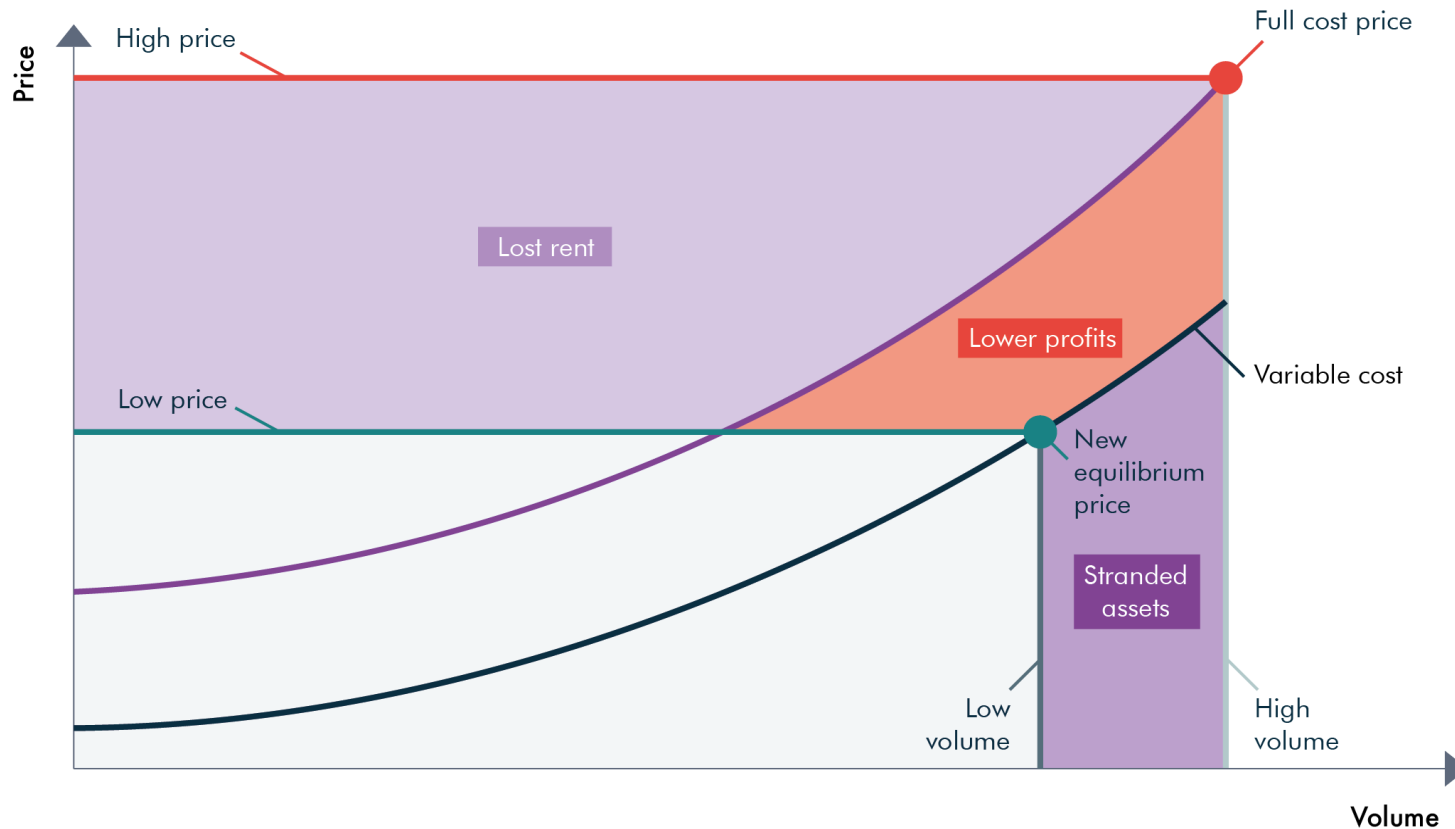


- Incumbents expect growth and they build for growth
- But as challenging technologies take that growth, so incumbent demand starts to fall.
- Therefore, you get a gap opening up between capacity and demand. That is **overcapacity** and hence **stranded assets**.

Source: Carbon Tracker

# Lower rents and profits

## THE IMPACT OF DISRUPTION ON RENT, PROFITS AND STRANDED ASSETS

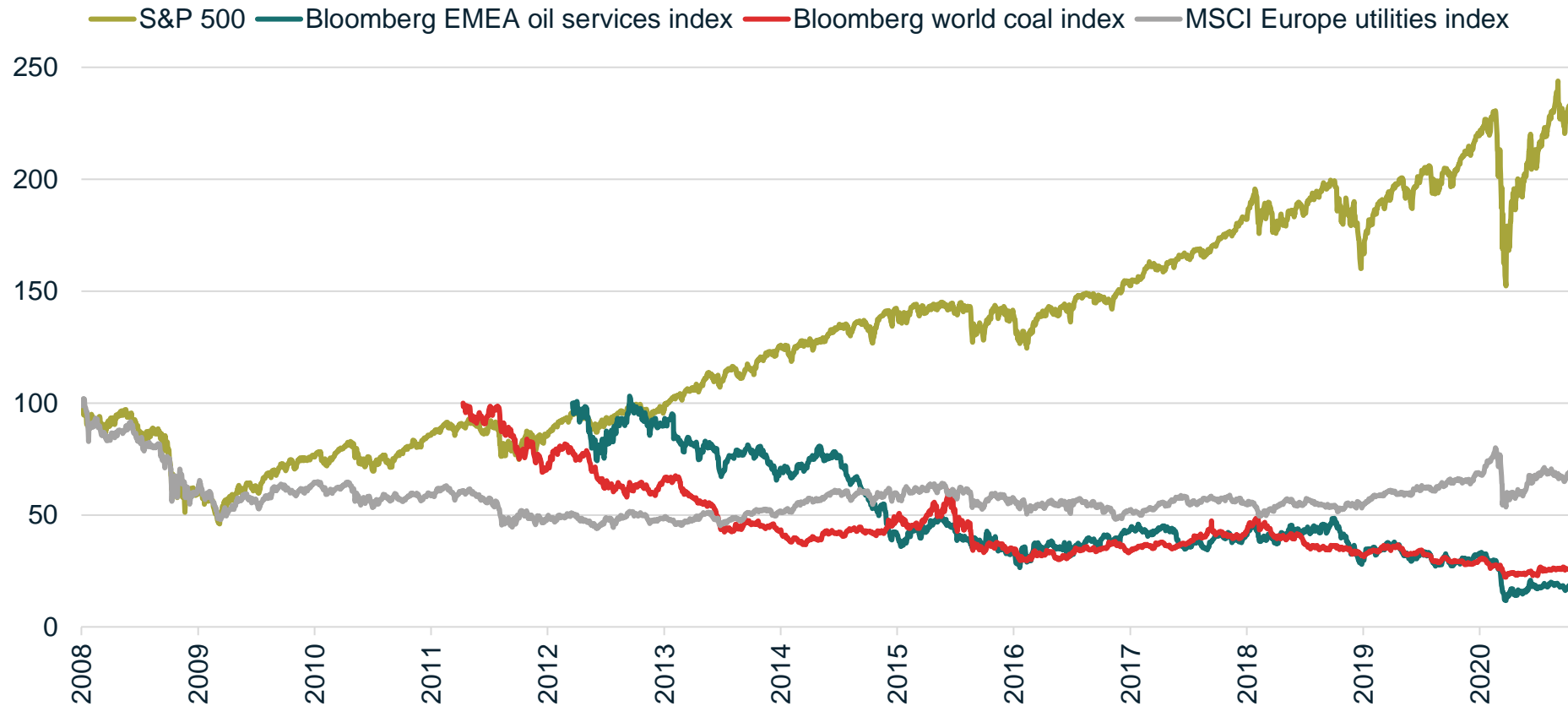


Source: Carbon Tracker

- Overcapacity means lower prices for everyone. So the entire industry faces lower volume and lower prices.
- In this chart you shift from the full cost price equilibrium point to the variable cost equilibrium point with lower volumes.
- And that means, **lower profits for incumbent fossil fuel companies** as well as **lower rents for the petrostates**.

# And equity market underperformance

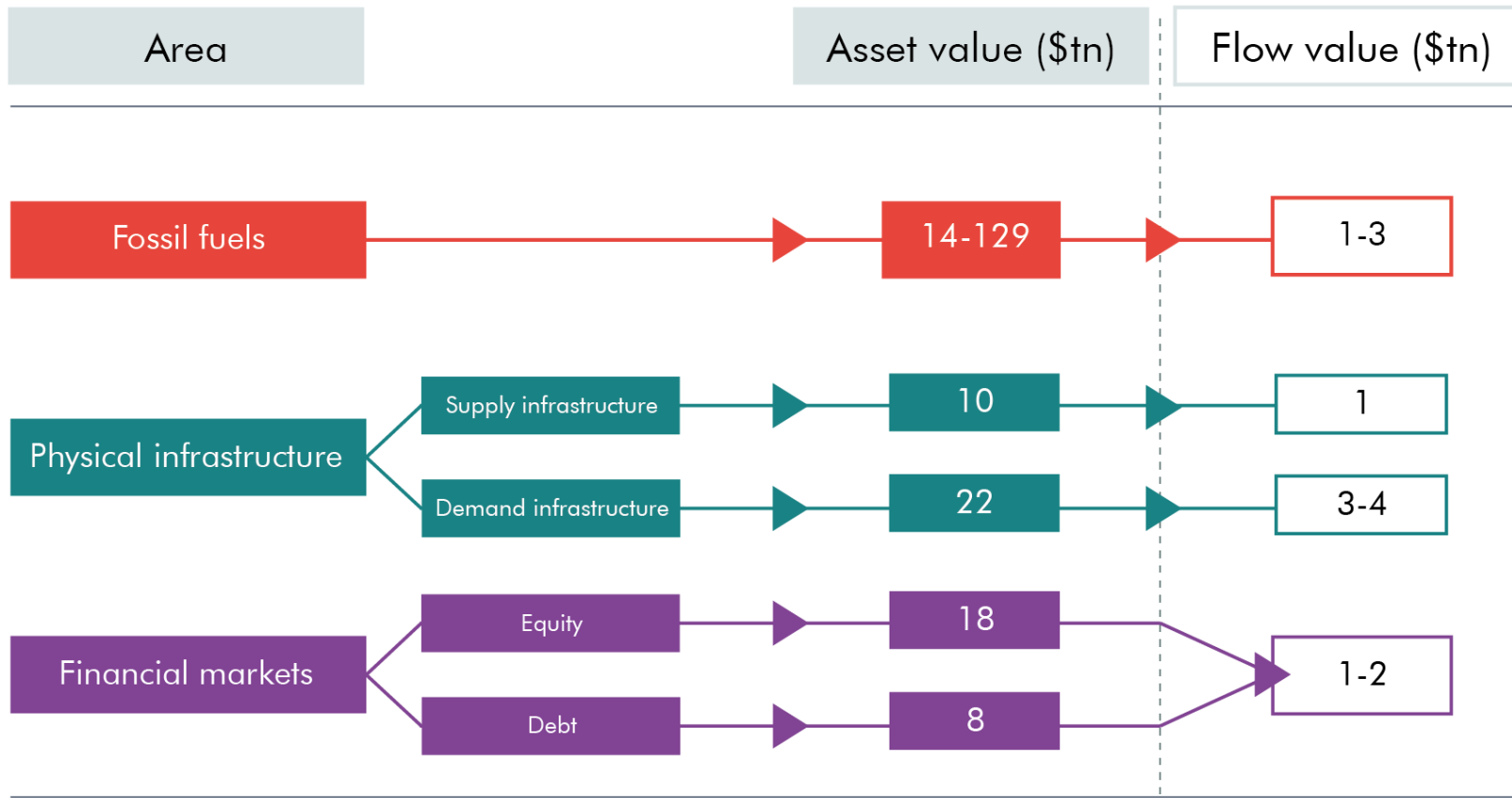
One sector after another...



Source: Bloomberg

# The fossil fuel system is huge

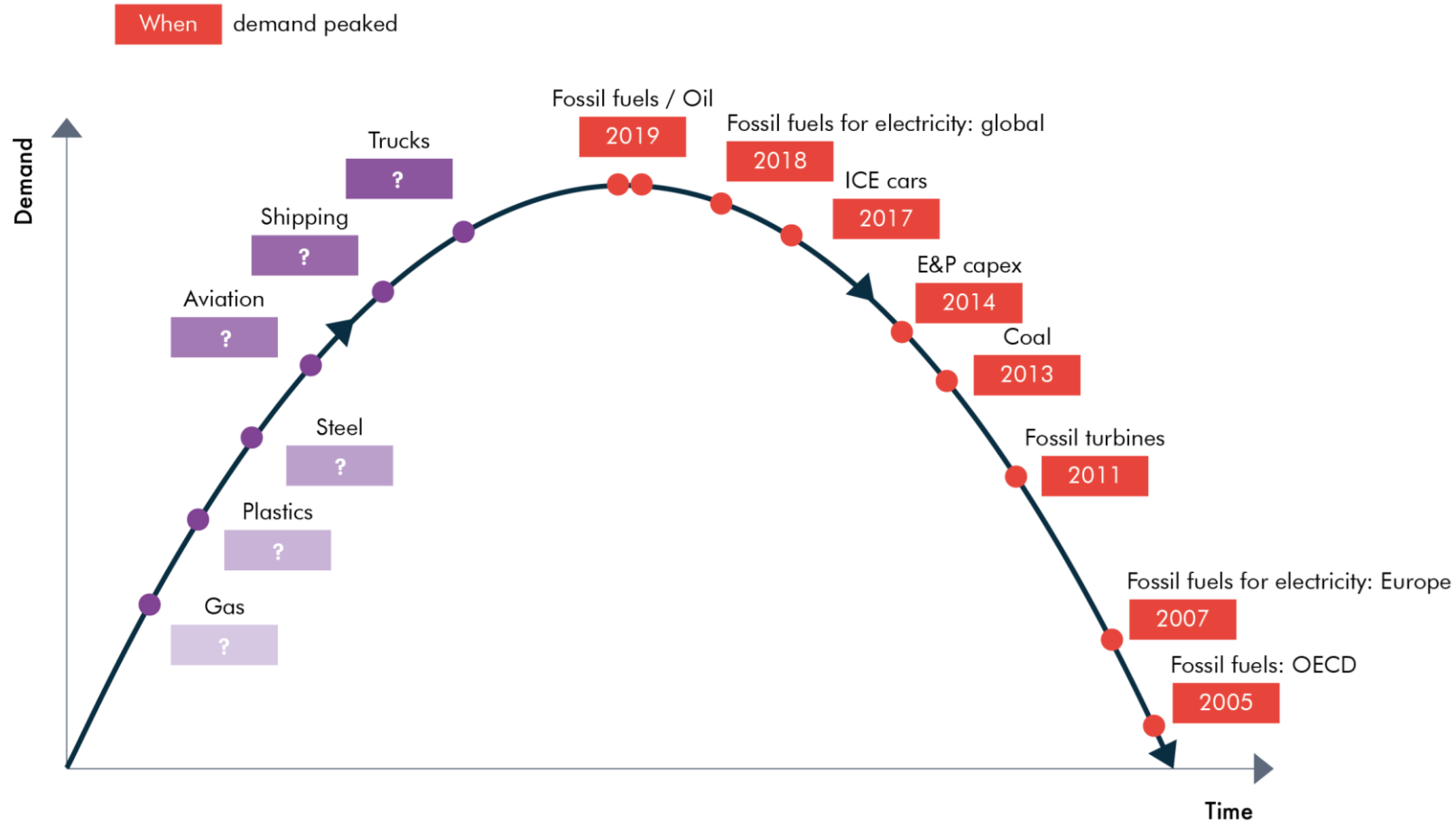
## THE FOSSIL FUEL SYSTEM IN NUMBERS



Source: Carbon Tracker

# There is a lot more disruption to come

## PEAK DEMAND DETAIL

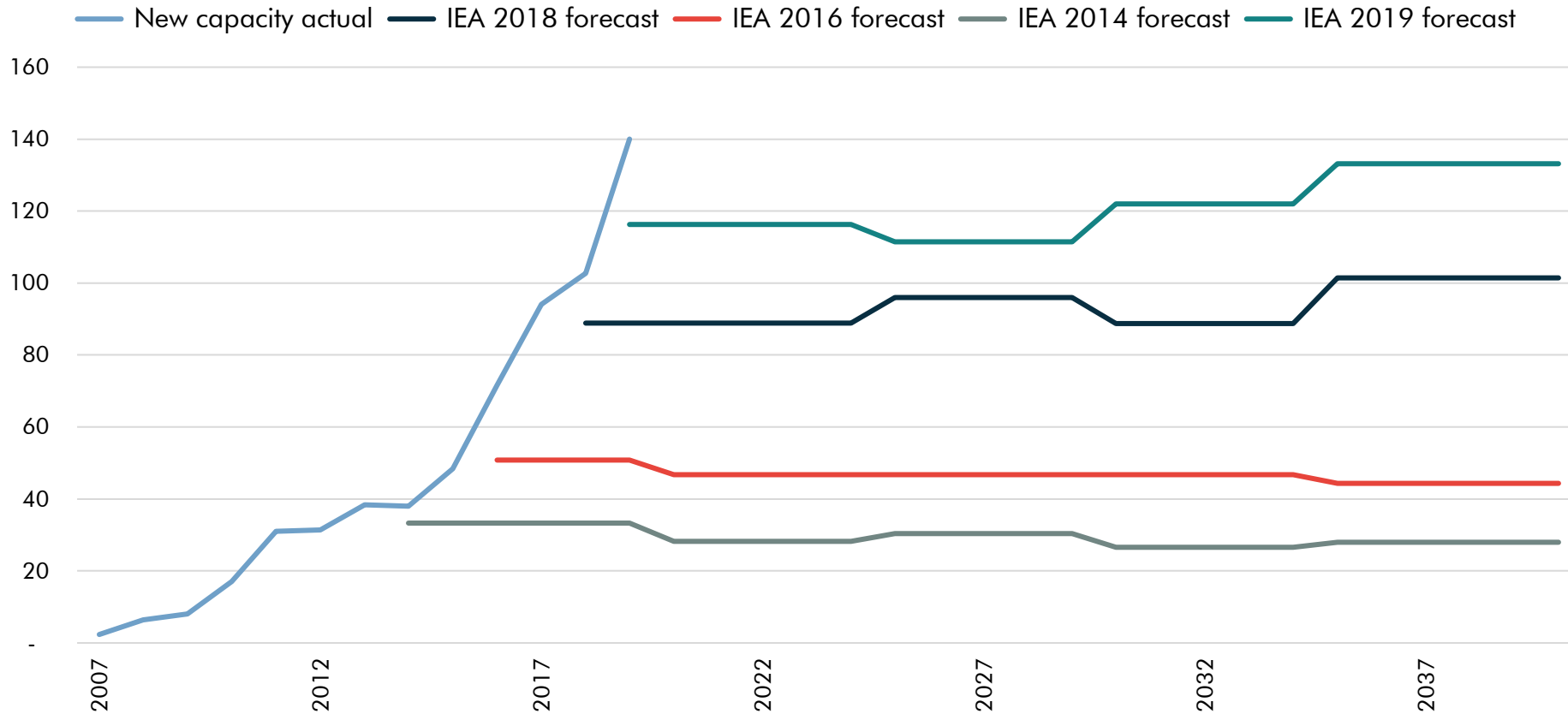


Source: Carbon Tracker



# Incumbents are in denial

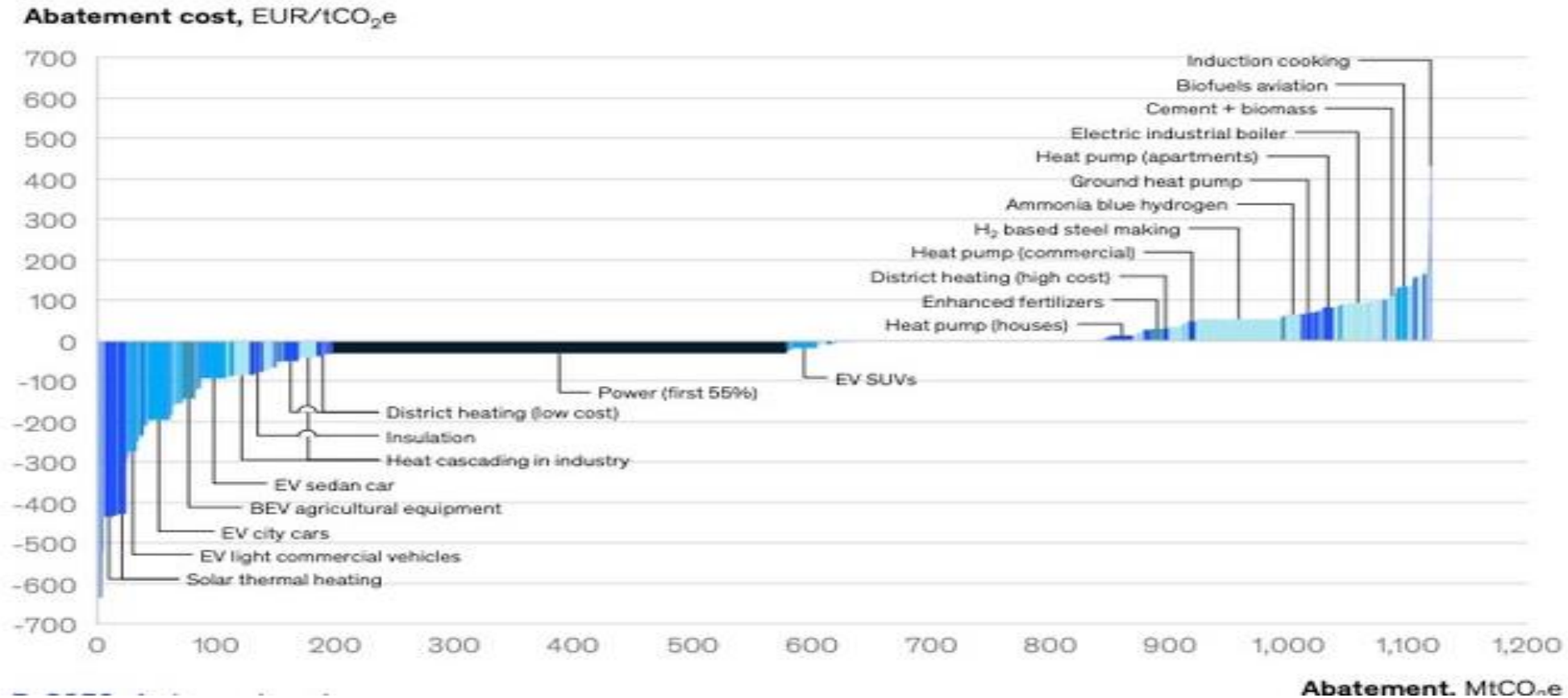
## Annual solar additions (GW)



Source: BP, IHS, IEA, based on methodology of Auke Hoekstra

# CCS is a false solution

## 2030 abatement cost curve



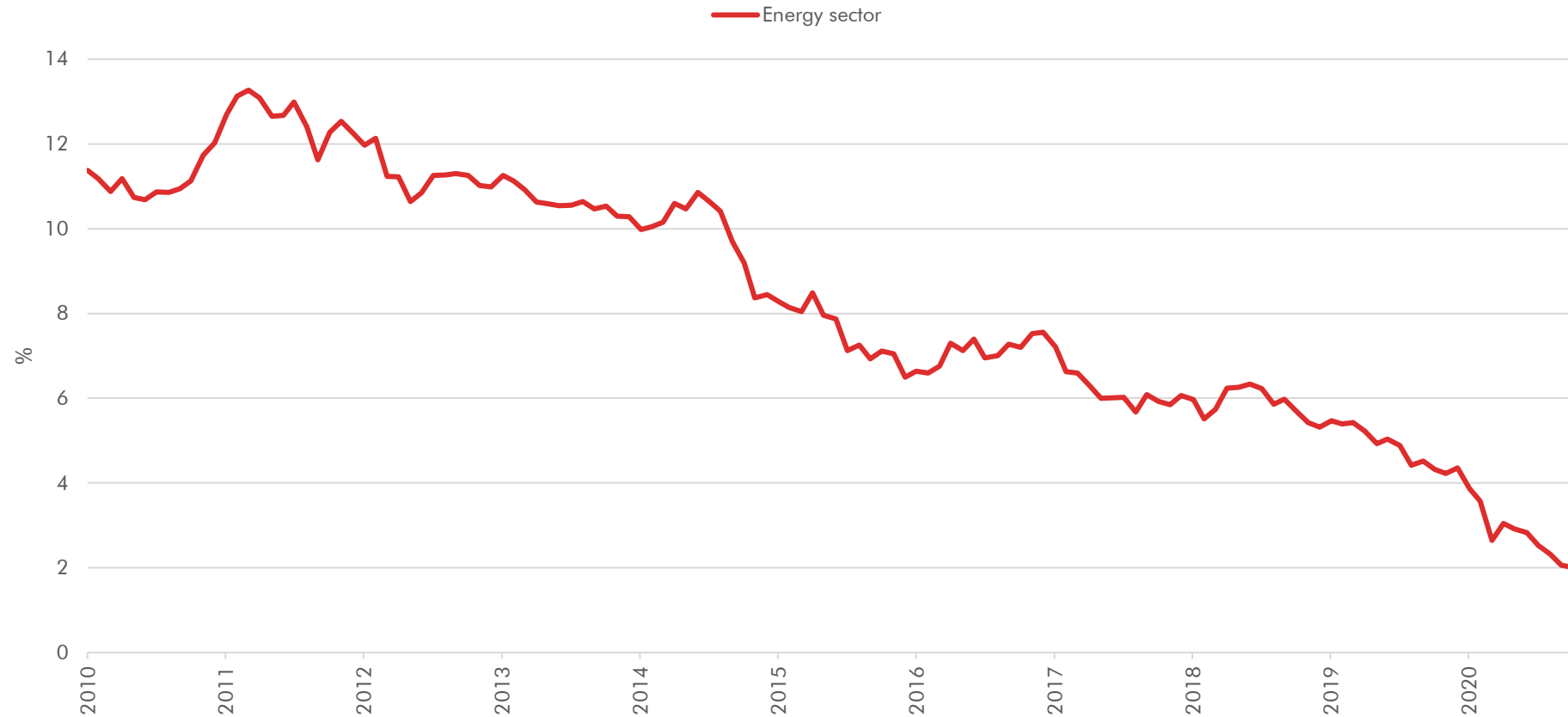
Source: McKinsey

# What can you do

- Ignore the incumbent forecasts for the future of energy
- This is a risk issue not an ESG issue
- Plan for structural change not cyclical
- Assume a structural decline in fossil fuel prices with cyclically around that.
- Assume rising costs of carbon
- Increase discount rates
- Short the losers. There are many more to come.
- Find the winners. Whole new sectors need to be built.

# Appendix 1: The long derate of the fossil fuel sector

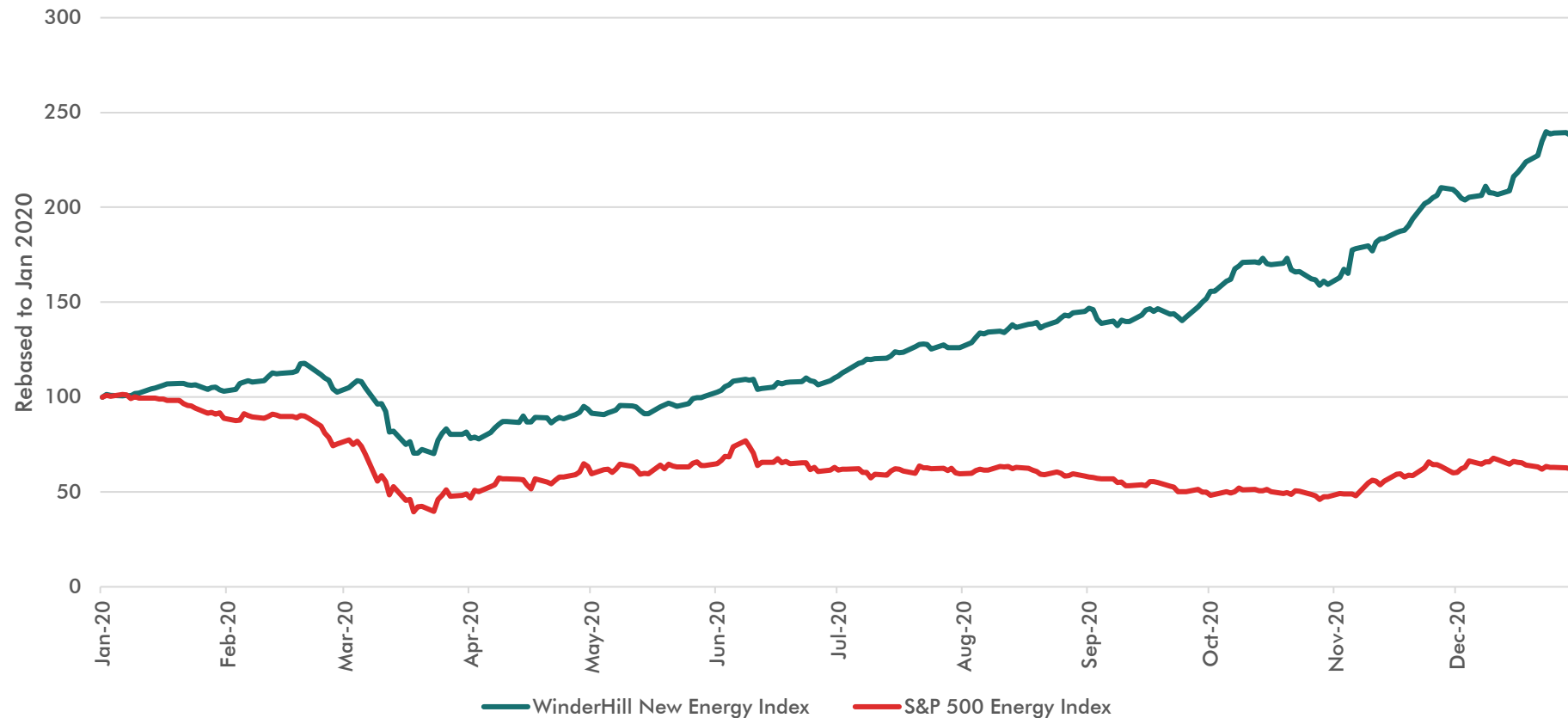
## Share of the energy sector in the S&P 500



Source: Bloomberg

# 2020: the year the market woke up

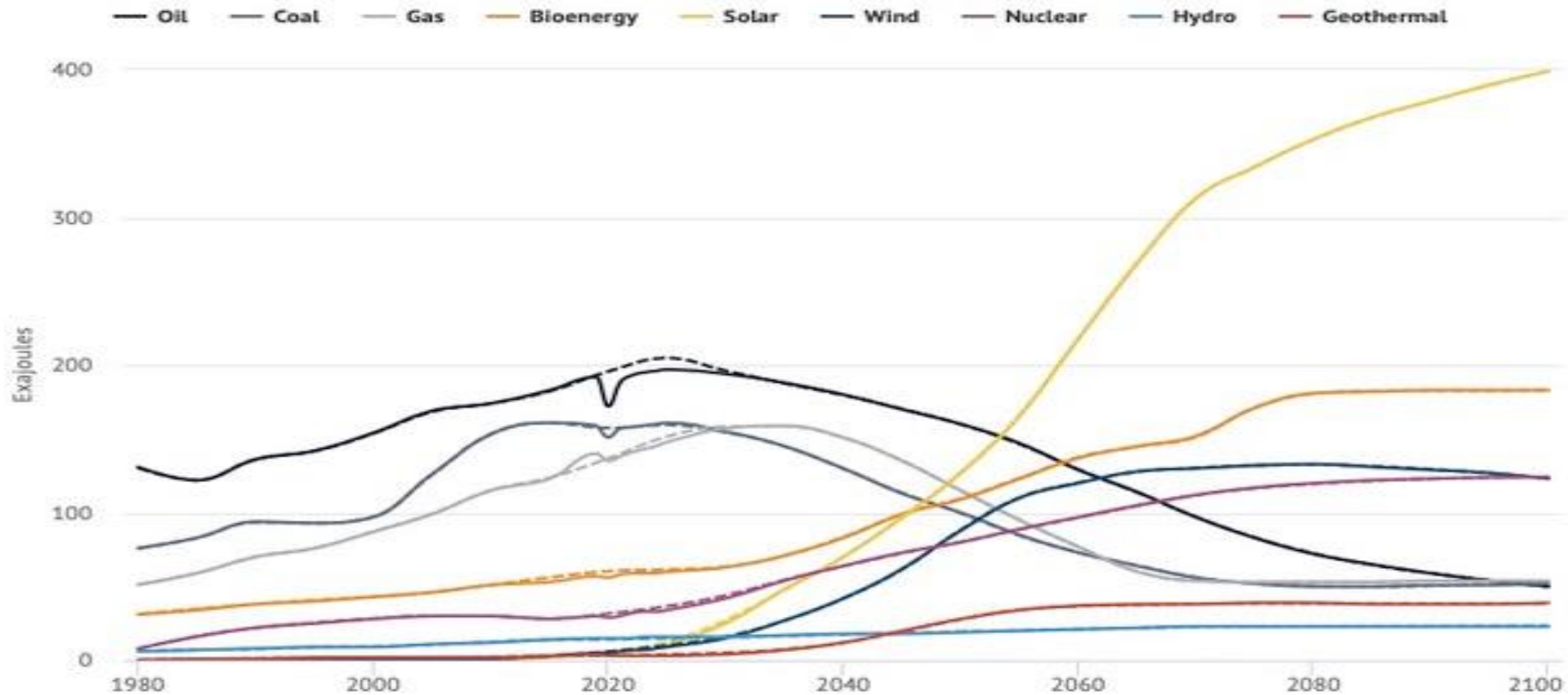
Fossil fuels sector performance vs renewables from Jan 2020



Source: Bloomberg

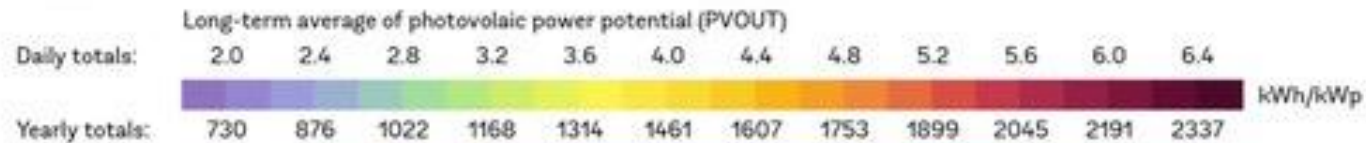
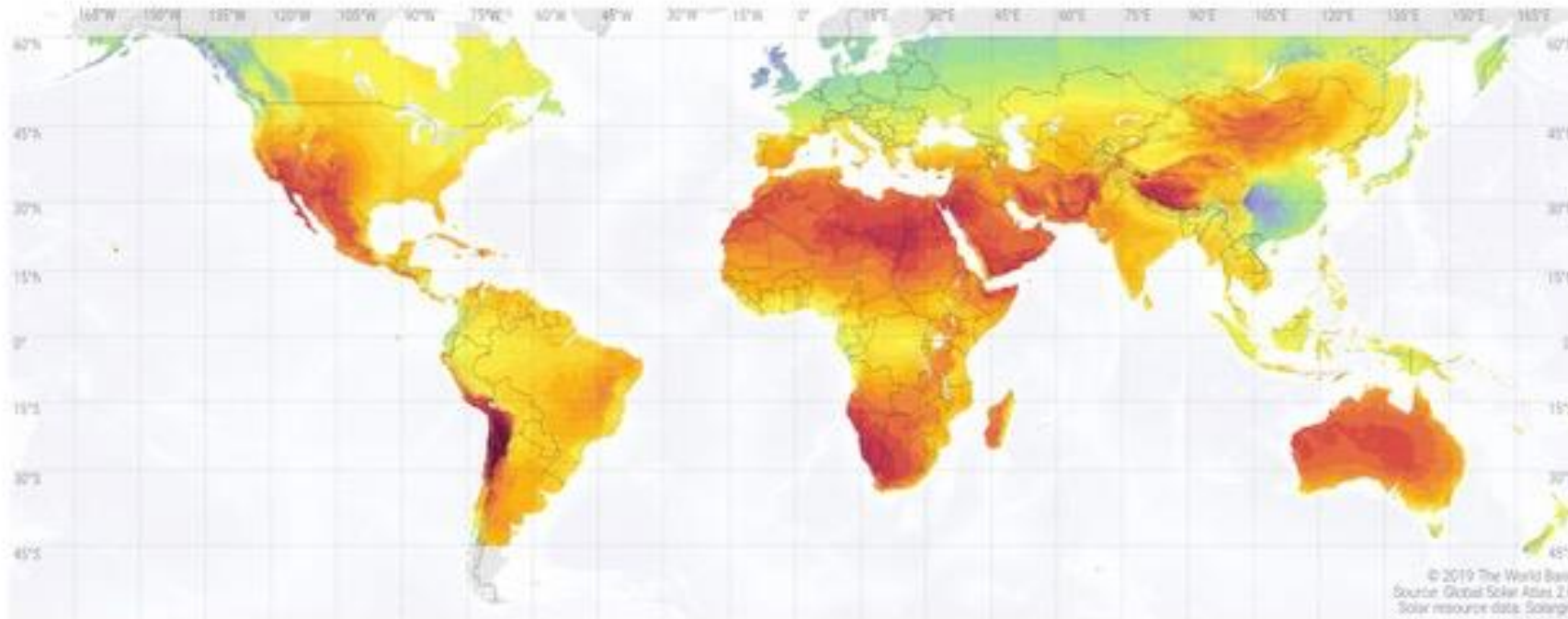
# How COVID brought forward peak demand

Energy demand by sector: Shell Sky Scenario 2021



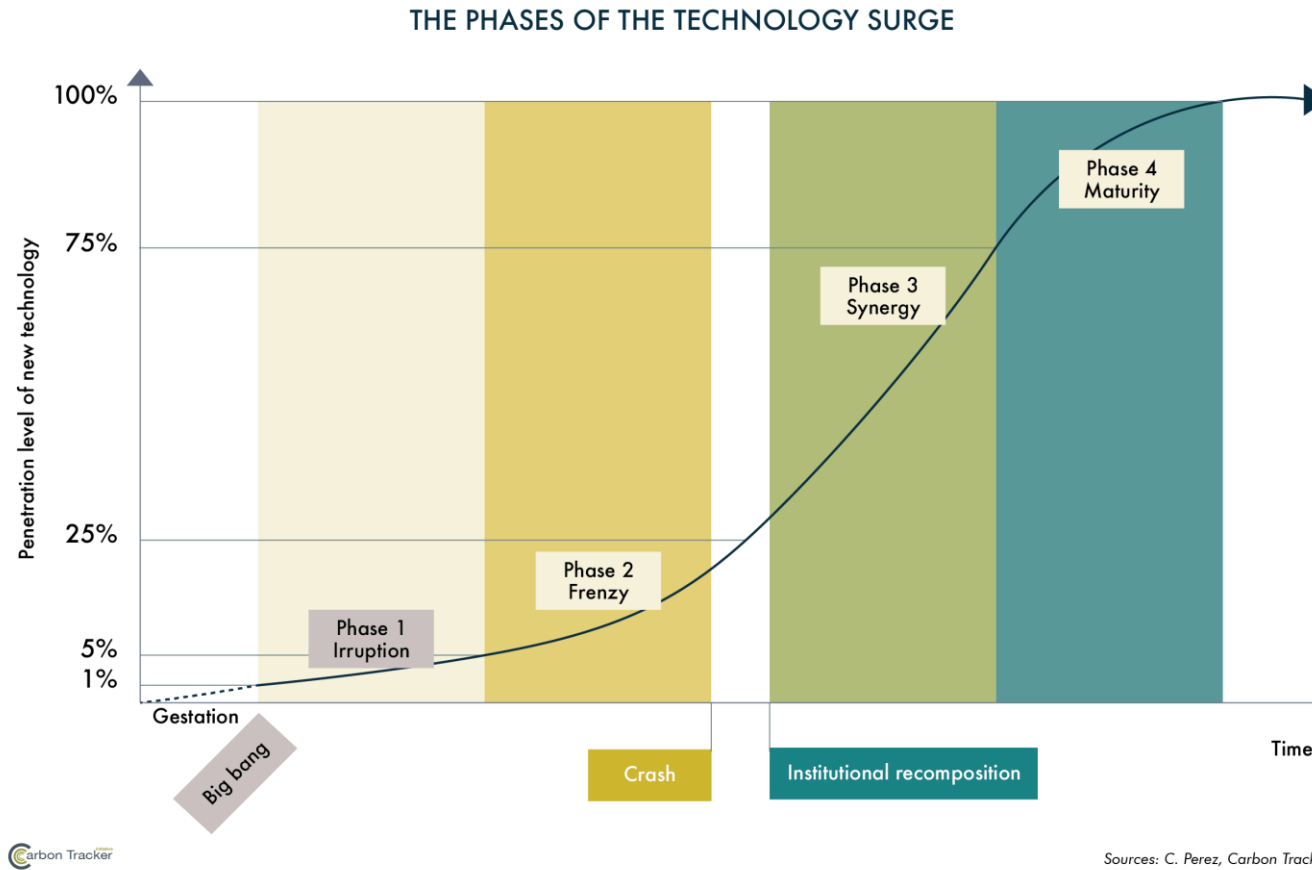
Source: Carbon Brief from Shell Sky Scenario

# Where are the new energy resources



Source: Solargis

# How technology transitions work



Source: Perez, Carbon Tracker annotation



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