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Impact of COVID-19 on renewables

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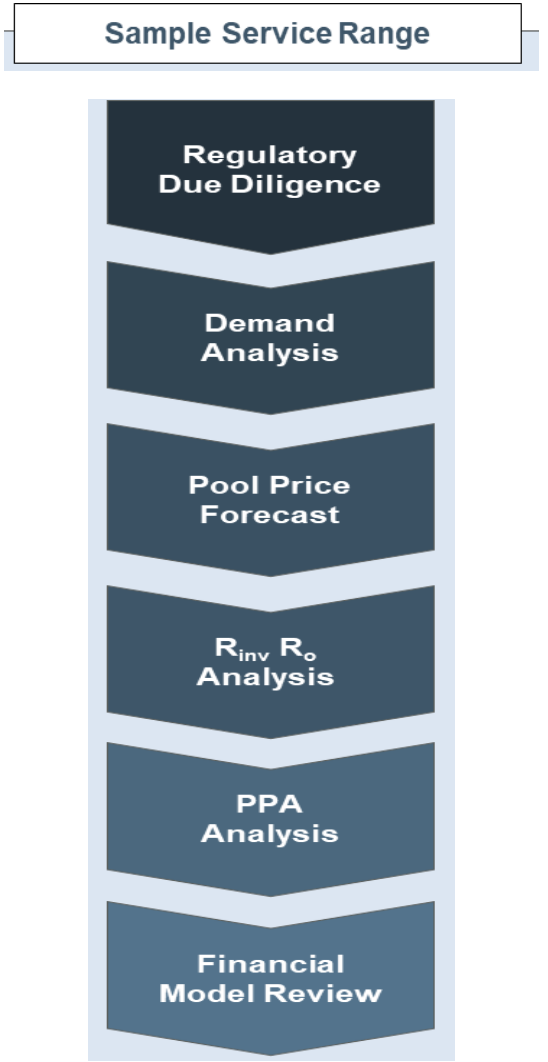
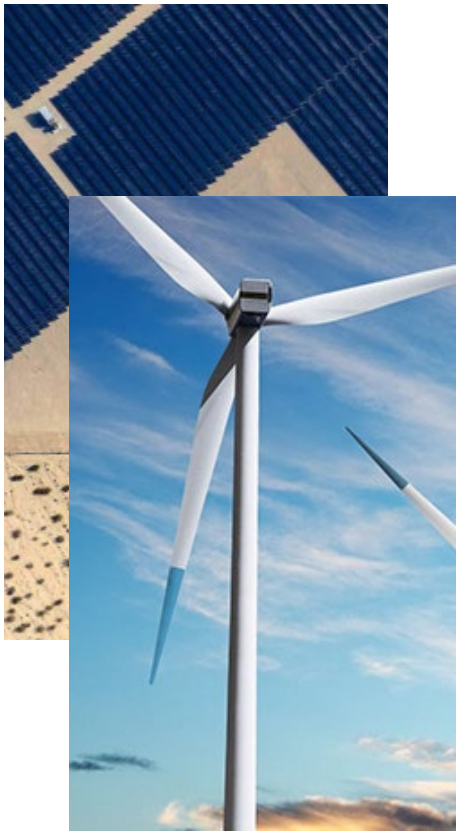
- Broad range of services to financiers, utilities, IPPs and governmental agencies.
- Team background in energy consulting, strategic advisory and project development.
- Expert witness testimony in arbitration hearings of renewable arbitrations and commercial arbitrations between gas buyers and sellers.
- Regulatory and market due diligence reports that are relied upon by lenders.
- Supported successful completion of 52GW with a transaction value of US$35 billion.



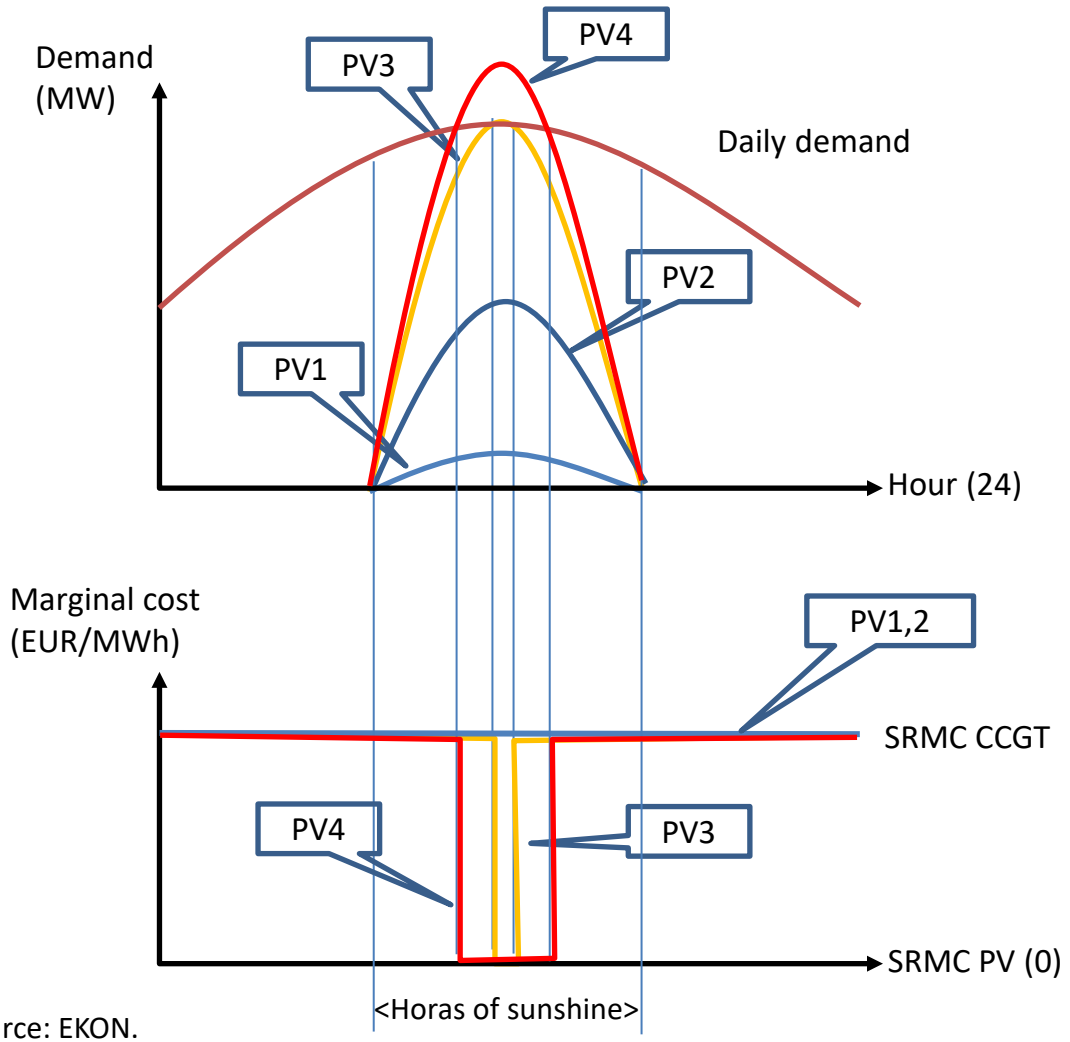
COVID-19 and renewables



- Simple model to keep in mind
- Most important parameters
  - Demand for electricity
  - Thermal generation cost
  - Impact on the supply chain
- Final comment

As an economist my focus will be here

PV SATURATION REACHED WHEN REALISED PRICE OF PV = LCOE



Source: EKON.

- Consider simple 24-hour set-up with gas-fired CCGT. As you add PV capacity (PV1, PV2) prices will still be set by CCGT. After a point, the prices drop.
- After market reaches saturation point (PV4), there is no commercial incentive to build more PV.
- Note that this point has no "missing money" problem, which happens when deployment is pushed beyond this limit.

Recap: https://www.youtube.com/watch?v=pHrUIGTlqt4&feature=youtu.be.

COVID-19 and renewables

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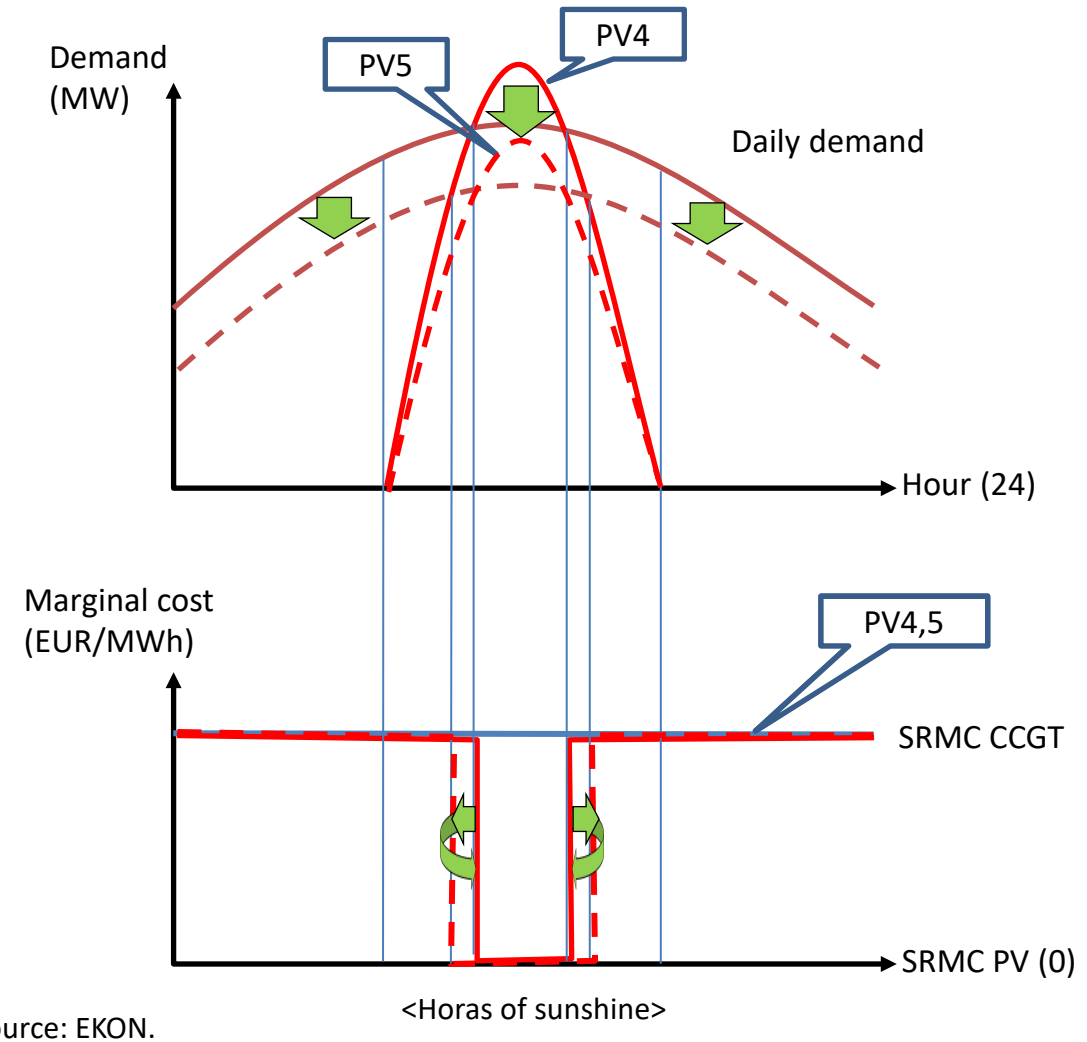
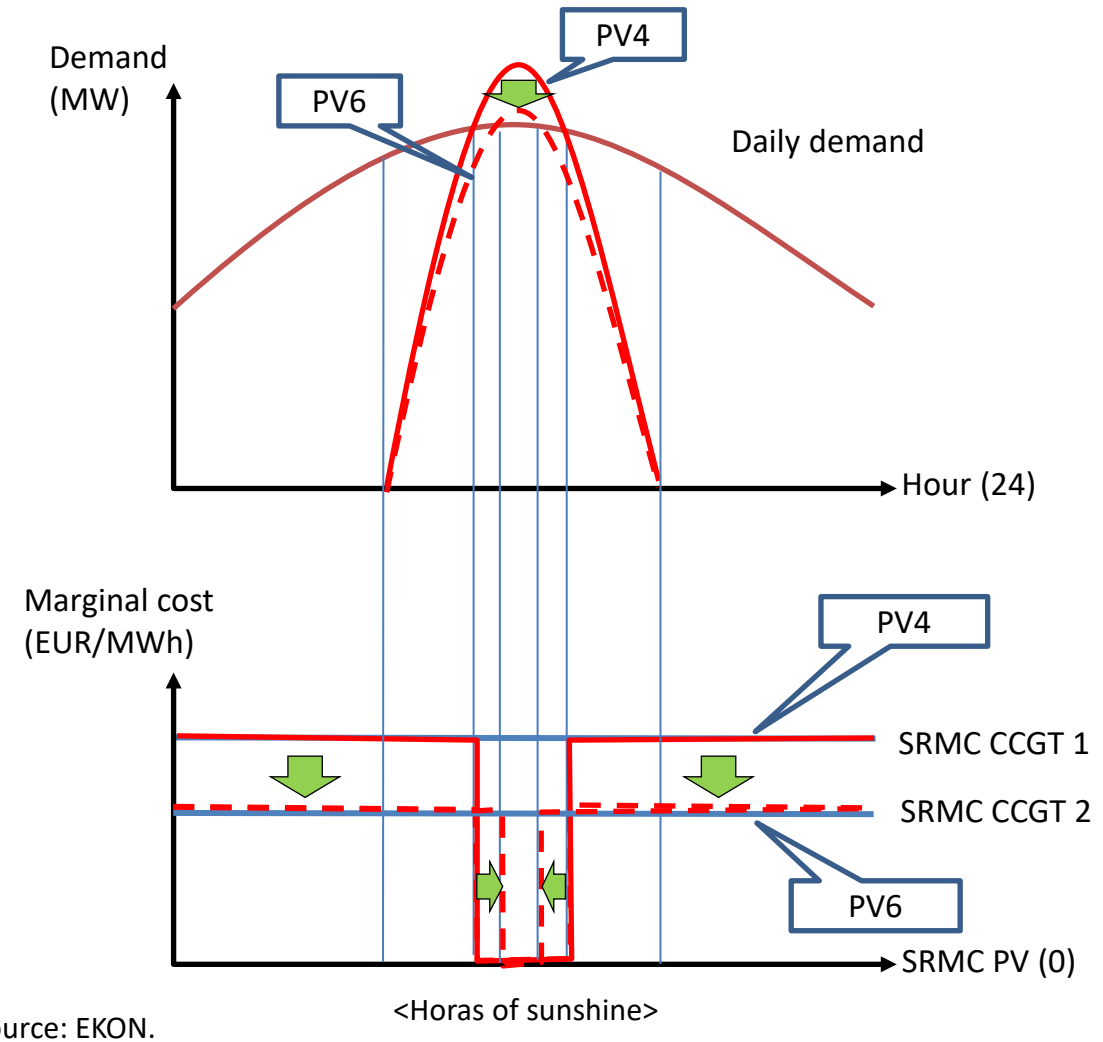
WHAT HAPPENS WHEN DEMAND FALLS?



- If the demand falls and the capacity is equal to that of the starting point, there will be more hours with a low price
- The solution is to decrease the penetration of PV so that the PV realised price does not fall below the LCOE
- Notice that the distribution of prices (positive vs zero prices) is the same as before!

Source: EKON.

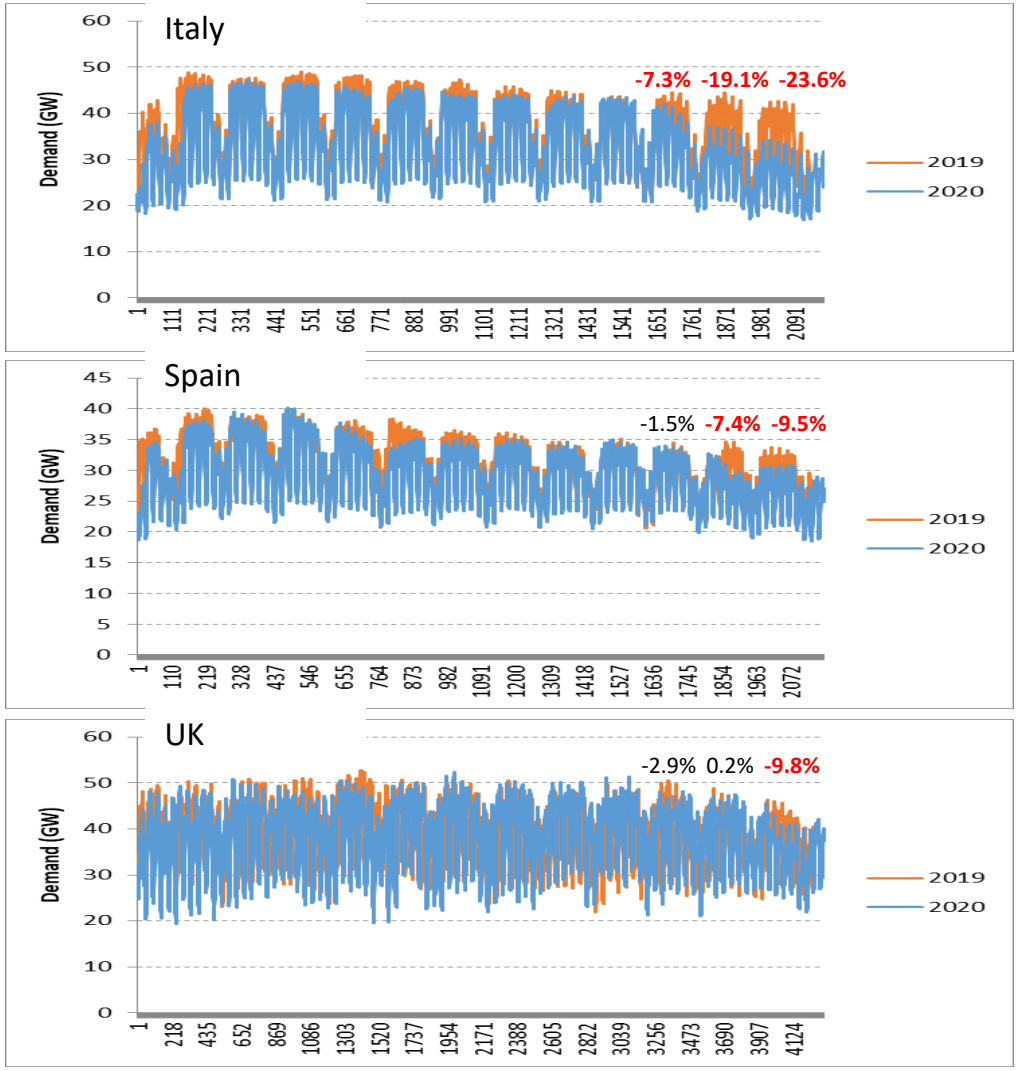
WHAT HAPPENS WHEN COST OF CONVENTIONAL GENERATION FALLS?



Source: EKON.

- If the cost of generating with a CCGT falls - caused by a decrease in the price of natural gas or the cost of CO2 - prices in all hours of PV operation will fall
- The New PV cannot survive with the same number of very low priced hours, so the penetration of PV must be reduced so that the PV realised price does not fall below the LCOE
- You have to "close the curtain": the percentage of low prices has to drop enough for the realised price to stabilise at the LCOE

EVOLUTION OF DEMAND IN 2020



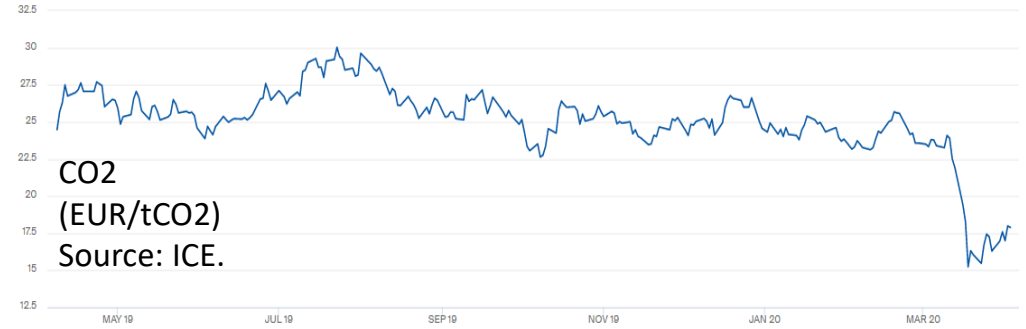
Source: ENTSO-E.

- Three hourly demand profiles from three European countries at different stages of COVID-19 infection
- If you see orange this indicates a drop in demand relative to the same period in 2019
- But note that demand is affected by other things too: February had good weather and demand was much lower than last year
- So watch out for silly comparisons. You can check these yourself!

CONVENTIONAL GENERATION COST: BRENT, NATURAL GAS AND CO2

Brent
(USD/bbl)

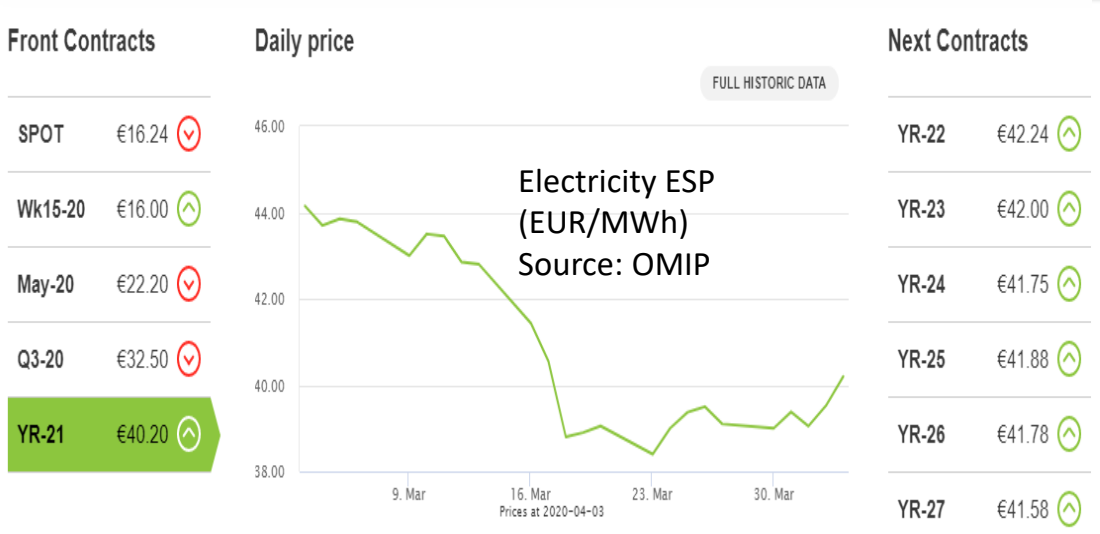
Natural gas, TTF
(EUR/MWh(f))

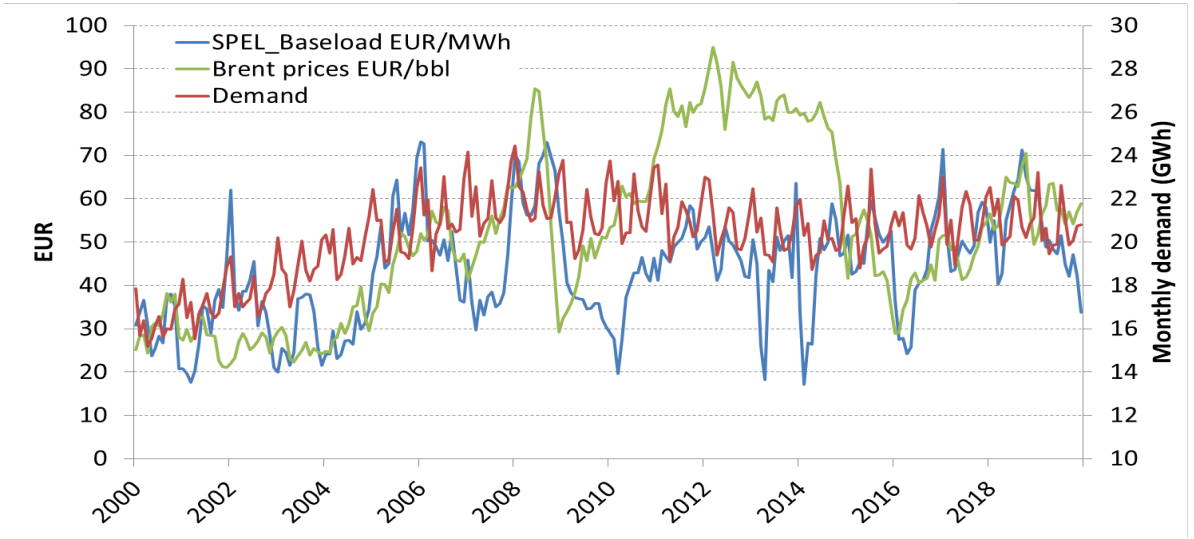


CO2
(EUR/tCO2)
Source: ICE.

- All commodity prices are low by historical standards
- But some, like crude oil and natural gas, were falling BEFORE COVID-19 (conflict Saudi Arabia and Russia in OPEC +, excess of Liquefied Natural Gas ("LNG"), warm winter in the northern hemisphere)
- CO2 price drop can be said to be more timely, but to hard to make sense of it...

AND WHAT ABOUT THE ELECTRICITY PRICES?





Source: CNMC, OMIP, REE.

- The wholesale market is a place of <u>real</u> buyers and sellers. A drop in electricity prices is expected but not a huge slump
- The market thinks that the fall in demand has less impact than the cost of fuels...
- And that makes sense if you examine historical data (e.g. Spain)

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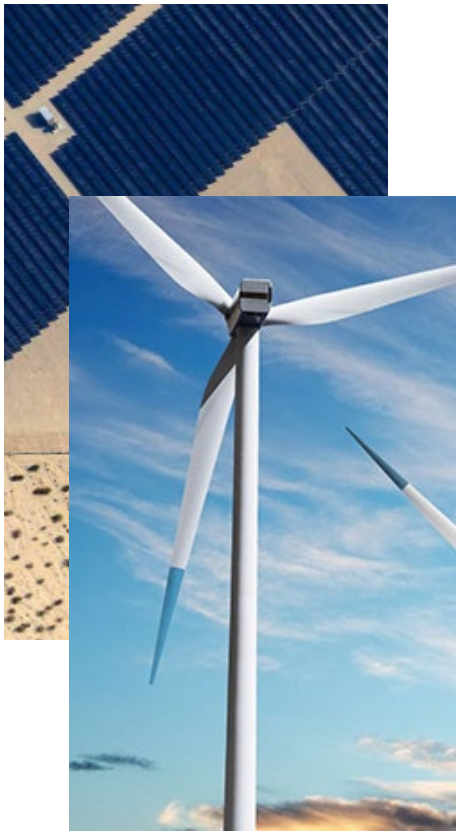

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FINAL COMMENT

- Prospects for renewables are much worse today than they were a few months ago. With the fall in demand and fuel costs, renewables are less attractive. Things may revert to trend but it will take a while ...

- Questions to bear in mind:
  - How long will the crisis last?
  - Will there be a rebound in the national / world economy?
  - Will fuel prices / CO2 rise?
  - When and how will electricity prices recover?
  - How will buyers and sellers feel about PPAs?
  - What strategies for operators, developers, and / or banks?
  - What about government decarbonisation plans (NECP)? Will the numbers have to be redone?
  - What kind of aid will governments be able to afford if they are super-indebted? Will priorities change?
  - Etc..