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The Energy Transition: A Balancing Act

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We are facing an 'Energy Trilemma'

- We have ambitious carbon reduction goals to safeguard our planet. The EU targets 55% emissions reduction by 2030, 90% by 2040.

  The UK target is 68% by 2030 and 81% by 2035. We are now only about half way to the long-term targets. The path ahead is long and challenging.

- On the other hand, our society wants security of its energy supply. Net, the UK imports 40% of its energy needs and spent c£40bn last year. The EU imports 60% and spends c€400bn annually, c2% of each region's GDP. This is almost the same as they spend on defence.

  Consider this – if we can reduce our energy import bills, allocate the savings to other areas like energy transition, or to higher defence spending or to healthcare, that would be a great outcome.

- As such, there are huge economic and geopolitical incentives to reduce our energy dependency. At the same time, our carbon goals necessitate the push towards clean energy solutions.

- Nuclear is part of the solution but not a dominant one. Hydro is well exploited, but depends on geology.

  Going clean means solar and wind. As we know, the sun is not always shining, the wind not always blowing. We need to manage the intermittency, the daily, seasonal fluctuations.

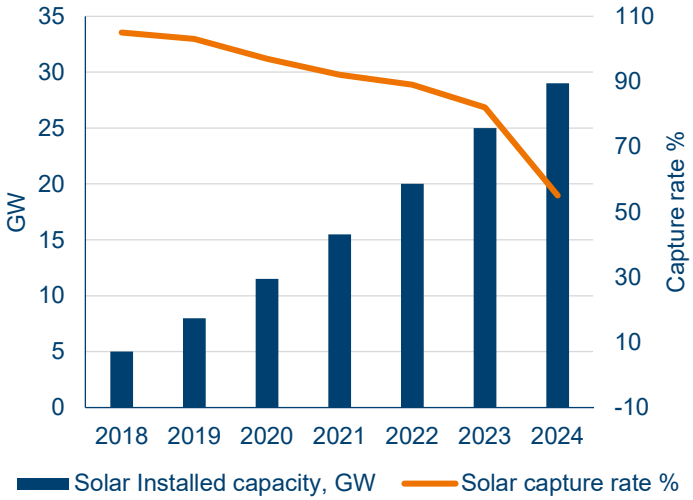
- We are now at a critical point in the energy transition. While we've been rapidly adding variable renewables in recent years, with falling costs simply adding more is no longer enough to drive the transition forward. The low-hanging fruits have been harvested and we need to make the energy transition affordable.

- At certain times, solar and wind production exceed demand, leading to periods of negative pricing in the wholesale market.

  These are getting more prevalent in some countries, the higher the mix of solar and wind.

- For example, in Spain, increasing solar is causing a 'self-price cannibalisation' effect for the power producers. The solar capture rate fell to 55% of the average power price last year.

Annual solar installed capacity and capture rate



Source: Polar Capital, 30 June 2024, Aurora Energy Research.

- What does this capture rate mean? This means that the solar producers are capturing/getting only 55% of the average price in the wholesale market.

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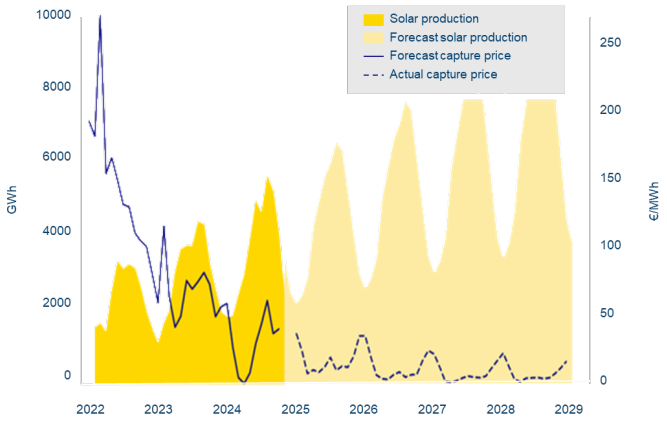
- The chart shows the monthly solar production and absolute capture price of the past few years which was distorted by the Russia/Ukraine war. In April last year, the price dropped to its lowest level, touching zero. Going forward, prices are expected to fall even further, notably in the summer months.

Monthly solar product and capture price



Source: UNEF Spanish Solar Photovoltaic Association, Volue Insight, 28 October 2024.

So what does this mean for investors? This will be not good for utilities but will be good for consumers and investors in the electrification of end markets enabled by cheap, abundant electricity but not from the mainstream, power producers.

- To balance the Trilemma, different solutions are needed. Lithium batteries offer daily short-duration storage and have seen their annual cost decline by more than 20%. It is paired with renewable energy, can store any excess generated and resell them when demand is at its peak.

  In the future, storage through hydrogen will be for seasonal, long-duration use. For example, in Spain, we can use the excess electricity, convert it to hydrogen in the summer and use the power in winter.

- In the UK, when there are dunkleflaute, a German word for periods of low wind and no sun for electricity generation, balancing engines powered by natural gas today can ramp up and down efficiently and step in for renewables. The newly equipped balancing plants are already hydrogen compatible.

  Grid investments are also needed to reduce wind curtailments – which is the deliberate reduction of surplus output during windy days, as you have seen in the UK recently – and to reduce grid congestion.

- Importantly, what is also needed is a liberalised energy market that allows consumers to participate by adjusting their power use to price signals – having 'time of use' rates – to take advantage of real-time, low power prices.

  In some places, it is already happening. Norway. Consumers have access to dynamic pricing on their phones, receive notifications of cheap prices and they are able to charge their EVs (electric vehicles) during these times.

  With charged-up EVs, consumers can also sell the unused electricity back to the grid during peak demand thereby participating in energy trading.

  Smart grids, data analytics powered by AI help manage, stimulate and respond to demand intelligently.

- In conclusion, we are always moving within the Trilemma at different periods. When the Paris Climate Agreement was adopted in 2015, decarbonisation was in focus. During the Russia/Ukraine war, security was the focus. Now we are more focused on affordability.

  For us as clean energy investors, it is important to identify the swings of the pendulum towards the three objectives and position for the underlying trends. In the long run, we are convinced that we can optimise the trilemma.

  The future of energy will be affordable, secure and clean, offering exciting investment opportunities.

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