

The flexibility challenge facing energy transition investors.

The energy transition needs capital deployment to increase in both pace and scale to ensure nations across the globe can meet their decarbonisation targets, however investors in this space face a number of challenges.

Whilst investment in 'core' renewables continues to grow, and these markets have positively recovered following the period of high inflation and supply-chain disruption caused by COVID-19, at the same time hype around new technologies has faded. For example, according to Rystad Energy, less than 3% of announced hydrogen projects over the last 3 years have reached Final Investment Decision.

In fact, it is flexible assets which are the key to accelerating the buildout of renewables and therefore delivering the energy transition. Below, I set out the challenges faced by investors in this sector and three key solutions to help overcome them.

What is flexibility?

The well-recognised pathway to net zero is to first decarbonise the power sector; secondly to electrify as much of the economy (mainly transport and heating) as possible; and thirdly to tackle hard-to-abate sectors alongside carbon offsets to eventually reach carbon neutrality. Solving the first two problems creates the requirement not only for new technologies, but for the constituent parts of the entire energy system to work together in a new way.

This is known as creating 'flexibility' in the network.

Flexible assets involve a wide variety of technologies including forms of energy storage, distribution, and supply & demand management tools.

Many investors have now recognised the colossal amount of investment required in grid infrastructure to support our aging networks (BNEF have recently estimated this at over \$800bn per year by 2030). However, fixing these problems also requires networks to function more intelligently with flexible assets and therefore energy transition investors must understand this dynamic as well.

Emerging tech, such as Hydrogen, does have a role to play in decarbonising the hard-to-abate sectors. However, the real key to unlocking energy transition progress in the near-term remains continued scalable investment in 'core' renewables (wind and solar), alongside a rapidly accelerated deployment of flexible assets.

The role of flexibility in delivering the energy transition at pace

Flexible assets serve three key functions within the energy transition. Firstly, they materially reduce the amount of physical infrastructure – and therefore the amount of land, capital, materials, and labour – required to decarbonise.



Given the intermittency of renewable technologies, building an energy system entirely comprised of renewable generators would require an enormous amount of capacity to ensure power demand is met during periods of low yield, and would be grossly inefficient.

Research shared by the Carbon Trust in the Flexibility in GB Report (2020) suggests that the timely deployment of such flexibility technology in Great Britain could reduce the cost of meeting Net Zero by up to £16.7bn per year in 2050.

Additionally, with equipment in short supply – Hitachi Energy has recently warned that the transformer industry is “overwhelmed” and is unable to meet exploding demand for grid equipment – it is important that we build as efficiently as possible.



Secondly, by reducing the amount of infrastructure we need to build – particularly large and complex generators – flexible assets improve the speed at which we can deliver the energy transition. Although the amount of grid investment required remains considerable, using energy more intelligently can help pare the need for new grid infrastructure so that investment can be focused on reinforcement and upgrade works.

Flexibility also allows consumers to engage directly in their energy consumption by using home appliances more efficiently, which will prove crucial as EV and heat pump adoption grows.

The ability to influence demand is one of the most powerful tools available to system operators. Alongside supporting the energy system, this demand-side technology also raises awareness around energy consumption and energy security among

the public which can, in turn, lower overall demand and further aid decarbonisation efforts.

Finally, flexibility improves resilience within the energy system and reduces vulnerability to external shocks, the cost of which was brought to the fore following the Russian invasion of Ukraine. Storage helps manage periods of low renewables generation, whilst other flexibility assets such as interconnectors enable system operators to move energy around both within and between markets more intelligently to respond to idiosyncratic events.

Why are flexible technologies difficult to invest in?

The main barrier to investment into flexible technologies is the less proven, more volatile revenue profile of these assets. Whilst this can offer better returns due to the risk premium, investors still require the ability to predict cashflows over a long-term investment horizon with some degree of certainty in order to make investment decisions.

Secondly, the complexity of the flexibility business model, combined with the use of novel technology, has understandably presented a challenge for investors. Flexible assets both respond to and shape the energy system they reside within, meaning that price signals can be hard to detect and the ‘needs case’ can change somewhat dramatically as the system evolves.

These factors are amplified by the scale of capital required for flexibility assets. Whilst not on the same level as today’s largest offshore wind farms, these projects still require investment that typically puts them out of reach of venture capital-style investors. Flexible assets instead often demand the sort of ‘scale-up’ infrastructure capital that is now being sought from energy transition investors.

Added to this, due to the cost of capital benefits that leverage typically provides, investors also require the support of senior lenders to deliver financing of this scale.

Revenue stream volatility presents an even greater challenge for lenders, requiring time as well as innovative structuring to engender appetite to underwrite these asset classes.

The recipe for tackling this challenge

Commendable progress has been made towards investing in flexibility as investor sophistication continues to grow. However, apprehension remains and the breadth of capital providers in this space must mature beyond that of bespoke infrastructure funds into the wider institutional market. Three key factors can help to unlock this for the industry:

- 1. Evolving market price signals and regulatory frameworks:** Delivering the right revenue and market regime is critical. This does not automatically mean subsidies are the solution, but governments can support the creation of an attractive revenue and market environment to investors. For example, the Cap & Floor regime which provides a collar on returns has been very successful at attracting both equity and senior debt into the interconnector sector across Europe and is now being rolled out for long duration energy storage projects in Great Britain.
- 2. Standardisation, scalability, and diversification of portfolios:** Currently, flexibility projects are often bespoke and therefore standardising technological and commercial flexibility solutions will unlock the pace of their deployment. Given it can take as much time to invest in small energy transition projects as it can large projects, capital tends to flow towards larger opportunities and so it is important that the industry drives scalability in its

propositions. Such scale is also critical as it can provide diversification of revenue and technology risk (which can help sponsors and lenders manage their downside as well).

- 3. Building from 'core' infrastructure:** Finally, energy transition investors can accelerate the deployment of flexibility assets by developing these within or alongside lower-risk real asset investments. Having a large and more predictable cashflow source to offset new development, or investment into higher risk technology, is an attractive way for infrastructure investors to do this. For example, the 'non-regulated' arms of network utilities are able to expand into flexible grid technologies and services; smart metering companies are actively building out wider home decarbonisation product suites to provide demand-side flexibility; and core onshore renewables businesses are growing portfolios of battery storage to complement their generation portfolios.

In conclusion, deploying flexibility across our energy systems is vital to achieve net zero. Whilst this presents many challenges for investors, the market continues to develop. Through evolving market price signals and regulatory frameworks, portfolio scalability, and a build from 'core' approach, energy transition investors can overcome these.



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