Climate tech is about much more than carbon

Despite increasingly challenging market conditions, climate tech remains one of the most popular areas of startup investment. The ongoing commitment to this vital area of innovation reflects the accelerating urgency of climate action, following a global rise in extreme weather events and fresh scrutiny on Net Zero ambitions. The complexity and diversity of the climate challenges that need to be addressed is vast, as are the range of solutions being built to help do this. But too often, the true scale and diversity of "climate tech" is overlooked and underestimated.

With the global push for Net Zero continuing to dominate conversation on climate action, focus most frequently falls on tech that can help reduce carbon emissions and advance the clean energy transition. Whether it's _capture_, _removal_ or _offsetting_, carbon is largely the unofficial 'face' of climate tech and innovation. However, while reducing carbon emissions is of course vital for the fight against climate change, it's merely the tip of the iceberg when it comes to technology's role in securing a cleaner, safer, more reliable energy future.

In reality, _climate tech is about much more than carbon_. One area in particular that's helping turn the tide on the climate crisis is technology aimed at climate-proofing existing infrastructure and optimising renewable energy transmission. From AI-enabled network optimisation software to grid flexibility and energy storage solutions; these technologies represent a fast-growing area of climate tech that is revolutionising our approach to climate action – protecting and enhancing key resources to bolster our defences in the face of evolving change.

Protecting against the impact of extreme weather

From the wildfires that raged across large areas of the globe this summer, to the severe flooding now hitting parts of Europe, extreme weather events are increasingly becoming a norm. These climate events pose a grave risk to vital infrastructure, with damage to power lines, pylons and poles cutting off homes and businesses from access to essential energy supply.

Resilience against extreme weather is therefore a growing concern and something we must actively be working to strengthen. Technologies such as digital modelling, AI and machine learning are providing the tools to enable us to do this more accurately, and efficiently in a secure, risk-free environment.

At Neara, for example, we're seeing utilities use 'digital twin' modelling to safely and effectively simulate extreme weather conditions, like flooding or wildfire, across their entire networks. These hyperreal virtual environments allow them to stress test individual assets and analyse any potential impact from extreme weather before it occurs. This allows them to take highly targeted action to protect these assets, facilitating a more proactive approach, and boosting the resilience of infrastructure ahead of future climate events.

Increasing the grid's flexibility

Meanwhile, as we move towards a larger reliance on renewable energy sources, supply is becoming increasingly variable and demand from consumers is on the rise. To maintain balance and avoid ongoing reliance on fossil fuels to bridge the gap during peak demand, we urgently need greater grid flexibility.

A wealth of innovation is helping to answer this need, by building solutions that allow utilities and consumers alike to flex their respective energy transmission and usage. These include long-duration energy storage solutions, such as thermal storage batteries and hydrogen storage, which have received significant government backing in the UK; and initiatives from companies

like Electron, whose flexibility marketplace is supporting operators, suppliers and consumers to optimise their renewable energy use, facilitating easier routes to effective and sustainable grid flexibility on a nationwide scale.

Supporting a faster transition to clean energy

While demand for, and generation of, renewable energy is high, difficulty connecting these energy projects to the grid remains a significant roadblock on the path to Net Zero. In England and Wales alone, there are already over 600 renewable energy projects in a backlog, facing wait times of up to 20 years to be connected.

Building new infrastructure will certainly have a role to play in helping fix this; but this costly and lengthy process is not our quickest, or only, answer. A large amount of latent capacity is hiding in plain sight within our existing infrastructure which, if unlocked, could significantly speed up the transition to more renewable energy.

Traditional line rating methods – which are still largely manual – make finding this latent capacity a slow, costly and labour-intensive process. But technology is helping change this. Digital line rating can combine multiple data sources using AI and digital modelling to provide a highly-detailed network model that gives engineers faster, more accurate full-network visibility. Latent capacity can be identified in a safer, more efficient and reliable way, enabling more renewable energy to be safely run through existing networks. For example, a partnership between New South Wales utility Essential Energy and Neara discovered that double the capacity could be harnessed within their existing infrastructure.

As the fight against climate change continues, the imminent challenges and crises we face will only grow. We must realise the full and diverse potential of climate tech and the tools it can give us to effectively tackle these on a global scale. Carbon is only one piece of the puzzle – we must stand back and acknowledge the whole picture; it offers a promising vision of a brighter, more sustainable future.

Taco Engelaar, Senior Vice President at Neara

Article by TACO ENGELAAR