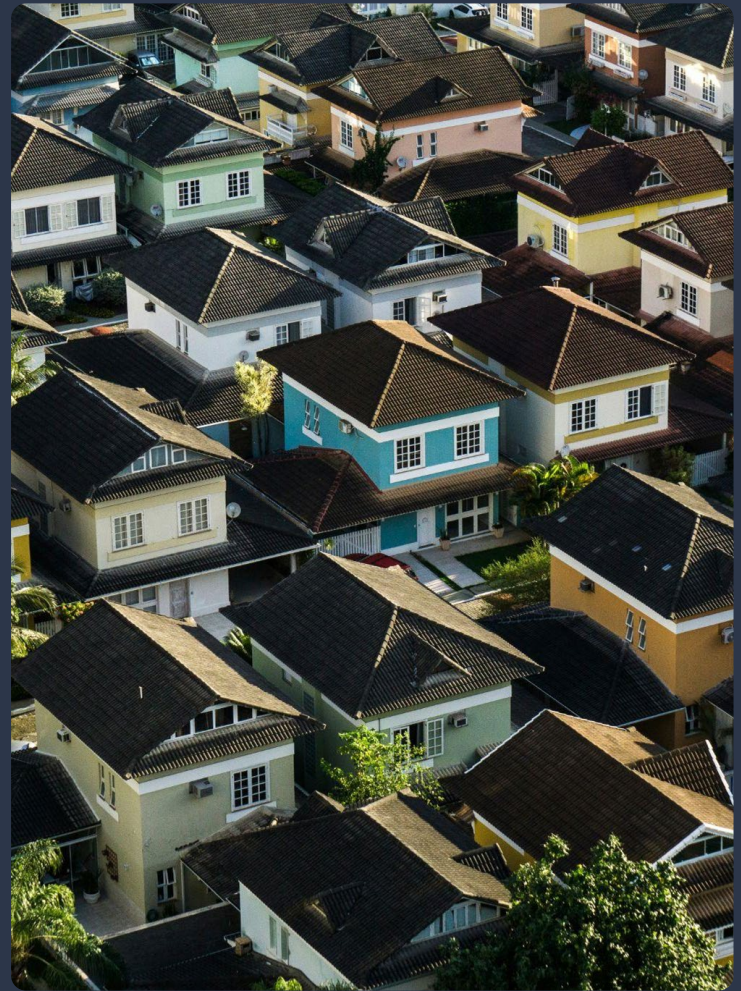


AI for the Energy Transition: Applications for Energy Systems Modelling, Operations, & Policymaking



Centre for Net Zero
Powered by Octopus Energy Group



About Centre for Net Zero

We are a not-for-profit, impact-driven energy research institute, founded by Octopus Energy Group.

We operate autonomously, designing and running research and field trials around the world to collect and democratise data about the future.

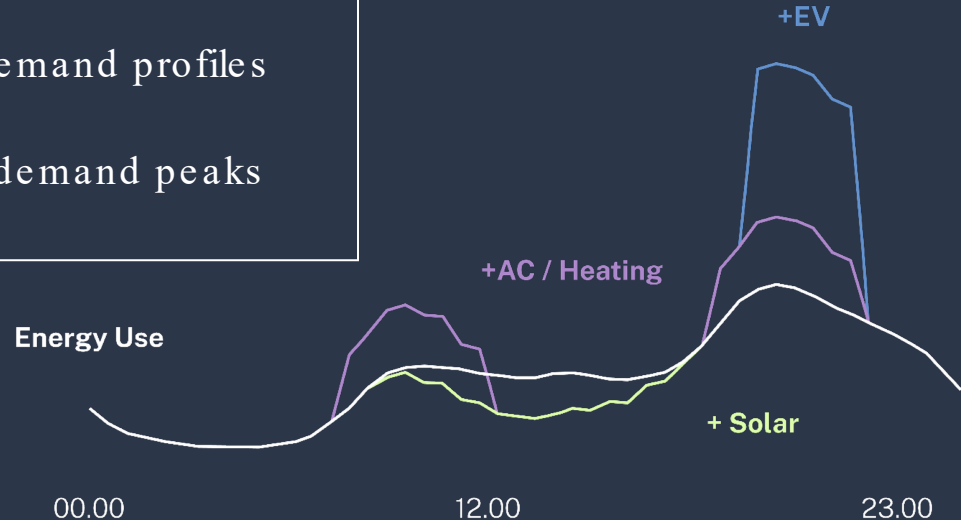
Our goal is to accelerate the journey to a fully sustainable, global energy system.



Energy systems are changing



Accompanying this, data volumes are growing at an exponential rate – global real-time data is set to expand tenfold between 2018 and 2025 – and digitalisation will drive market transformations like we have seen in other sectors, from finance to commerce.



AI can accelerate climate progress

- both in mitigation and adaptation

In systems of variable, decentralised supply and increasing energy demands, AI can help understand, manage and optimise this diversity, integrating more renewables into the grid, to **mitigate** climate change.

At **Centre for Net Zero**, we have created a Generative AI model, [Faraday](#), to generate synthetic daily load “profiles” consisting of half - hourly kWh consumption for a given set of user - specified inputs (such as low carbon technology, property type, season). The model and dataset are openly available to help policy -makers, grid operators and energy service providers form data - driven insights.

There are promising indicators that AI can also support regions to **adapt** to climate change and reduce disaster risks.

[Aurora](#), Microsoft’s AI foundation model for weather -prediction can make accurate operational forecasts, at a greater speed and a fraction of the computational cost of traditional numerical weather -prediction systems. One benefit for models like this, which perform well in regions with scarce data, is a democratisation of access to accurate weather and climate information for low income countries, supporting climate adaptation efforts.



International coordination can create a policy & regulatory environment that maximises opportunities whilst minimising risks

Policy relevance	Policy solution(s)
End user energy demand and environmental impacts	<p>Consider AI data centres in industrial strategies , and align these with decarbonisation plans</p> <p>Use Research & Innovation to explore intelligent and flexible energy use for compute loads in data centres, as well as supporting efficiency gains in hardware and software , from the chips to the data centre design, through to the efficiency of the AI models themselves.</p> <p>Support the role of regulators to ensure that consumer bills are not adversely impacted, whilst supporting the economic growth and vitality data centres offer</p>
Distributional impacts and energy justice	<p>Encourage open source data and modelling to support transparency of decision making, allow for broad access, and enable innovation to flourish, not hindered by access constraints</p> <p>Governments to provide strategic leadership and become “digital first” organisations with increasing AI capabilities, including to address digital skills gap</p>
Data security, privacy and ownership	<p>Encourage use of Privacy Enhancing Technologies (PETs) such as synthetic data, to maintain data owner privacy whilst improving access to rich data and tools, allowing innovation to scale</p>
Compatibility and interoperability	<p>Develop common frameworks for data architecture and to objectively evaluate and quality assure different AI applications through convening expert stakeholders</p>

