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Response to 'Progress with the Electric Vehicle Infrastructure Strategy'

06/01/2025

Response authors:

This response is on behalf of the 'Future Electric Vehicle Energy Networks supporting Renewables (FEVER)' project team (www.fever-ev.ac.uk), funded by the Engineering and Physical Sciences Research Council (EPSRC) Programme Grant, grant reference EP/W005883/1. This project is focused on developing a solution to grid-independent, renewable energy-powered, EV charging stations, based around the utilisation of novel hybrid energy storage systems.

Policy Recommendations:

The authors believe the development and utilisation of grid-independent EV charging solutions offer the following benefits:

1. They avoid the grid connection queue (current average of 5.5 years) and hence provide capability and capacity to meet EV infrastructure targets, particularly addressing geographical disparities;
2. Provide a local power solution that does not add to the rapid increase in grid standing charges;
3. Will be delivered where local EV charging demand is (e.g. on the strategic road network in rural areas and provide local charging hubs for smaller communities);
4. Will directly provide improved energy security (via local generation and energy use isolated from geo-political and energy market influence).
5. The Government should therefore: Update the Government narrative in related EV infrastructure policy and funding support e.g. the Local EV Infrastructure (LEVI) funding[1], to include specific mention of and permit, grid-independent EV charging solutions. The current narrative only promotes and supports grid-connected solutions, which is limiting geographical accessibility and restricting the delivery of EV infrastructure solutions for many towns and smaller communities.

[1] https://www.gov.uk/government/publications/local-ev-infrastructure-levi-funding-amounts/local-electric-vehicle-infrastructure-levi-funding-allocation-methodology

6. Enable the Ofgem SIF (Strategic Innovation Fund) funding[2] to directly support grid-independent innovation, which will ultimately support the grid by removing the necessity to increase local grid capacity to allow charger installation from stressed grid regions.

Context:

From DUKES 2024[3], the total UK de-rated electricity generation capacity was 74.8 GW in 2023, with a peak demand of 47.5 GW[4] in 2024. Renewable energy forms of generation, namely on and off-shore wind and solar generation, are now the cheapest forms of electricity generation, typically capable of generation at a price between £38 – 44/MWh (3.8 – 4.4 p/kWh)[5].

The current average price of electricity (via the UK energy price cap) from Oct-Dec 2024 is 24.5p/kWh + 60.99p/day standing charge[6], with a further increase from Jan 2025. Further, standing charges have increased overall by >60% since Sept 2021 and typically 'network costs' are responsible for >1/3 of the standing charge[7].

In the context of electric vehicle (EV) recharging, the typical charging costs of publicly accessible chargers currently range from 45 – 49 p/kWh for AC charging to 53 – 89 p/kWh for DC charging (across a range of charging powers)[8,9].

Finally, achieving a physical connection to the electricity grid remains a significant challenge, although there has been action to address these issues. Ofgem announced in November 2023 a new policy to clear 'zombie projects' and cut waiting time for energy grid connection. The policy ended the existing 'first-come, first-served' system and allowed stalled or speculative developers to be forced out of the connections queue. Ofgem provided an update on progress in connections reform (July 2024), which noted that ***the queue for connections continues to grow and, at the time, stood at 714 GW, with projects facing delays of 5.5 years between the requested date and the connection offer[10]***. NESO published Great Britain's Connections Reform: Overview (PDF) in November 2024, which sets out its

[2] https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/network-price-controls-2021-2028-riio-2/network-price-controls-2021-2028-riio-2-riio-2-network-innovation-funding/strategic-innovation-fund-sif
[3] https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2024
[4] https://www.neso.energy/data-portal/historic-demand-data
[5] https://lordslibrary.parliament.uk/renewable-energy-costs/, 8th Nov 2024.
[6] https://energyguide.org.uk/average-cost-electricity-kwh-uk/, 4th Oct 2024.
[7] https://blog.moneysavingexpert.com/2023/07/martin-lewis--why-are-energy-standing-charges-so-high--what-can-/
[8] https://www.gridserve.com/electric-vehicle-charging/our-pricing/
[9] https://www.bppulse.co.uk/public-ev-charging/pricing
[10] https://commonslibrary.parliament.uk/research-briefings/cdp-2024-0156/, 22nd Nov 2024.

proposals to introduce a reformed connections process that would be based on a combination of project 'readiness' and 'strategic alignment' that is hoped will mitigate the current queue.

Response:

The authors believe the Government is required to accept and formally include in written policy and funding support, the option to permit grid-independent (or off-grid/non-grid connected) solutions to provide EV charging infrastructure. This will directly enable a strategy to address the geographical disparities in the availability of EV charging points by supporting local, community, or private enterprise solutions to provide EV charging points in a greater number of locations than the grid can currently service. This is also relevant to addressing disparities in the availability and cost of charging infrastructure in poorer areas[11].

There is an opportunity for local renewable projects, currently, grid-connected and delivering energy to the grid at 7 – 9p/kWh[12], to consider a more economically viable alternative to use the generated energy locally to provide EV charging and achieve revenues up to 10 times higher.

Such local solutions are now, the authors believe, being formally recognised by Government as part of the recent 'Local Power Plan' within Great British Energy's remit (see section 6.3 of this reference[13]) to support the development of up to 8GW (>10% of current UK electricity generation capacity from previous data reported under 'Context') by Local Authorities and Community Groups. However, this definition must permit off-grid solutions as well as grid-connected projects.

The benefits of off-grid solutions are:

1. They avoid the grid connection queue (current average of 5.5 years);
2. Provide a local power solution that does not add to the rapid increase in grid standing charges;
3. Will be delivered where local EV charging demand is (e.g. on the strategic road network in rural areas and provide local charging hubs for smaller communities);
4. Will directly provide improved energy security (via local generation and energy use isolated from geo-political and energy market influence).

[11] https://www.theguardian.com/environment/2024/dec/29/ev-electric-cars-vehicles-charging-points-uk-report
[12] https://www.ofgem.gov.uk/energy-data-and-research/data-portal/wholesale-market-indicators
[13] https://www.gov.uk/government/publications/introducing-great-british-energy/great-british-energy-founding-statement#role-of-great-british-energy

The technology to deliver such off-grid EV charging stations exists, and centers on the use of electrical energy storage systems (namely battery energy storage), for example, see the FEVER project website (www.fever-ev.ac.uk). The FEVER team was greatly encouraged following participation in the Waitrose Farming Conference in May 2024, that there is a strong demand from the farming community, agricultural industry, and related supply chain, for greater local utilisation and financial benefit from local renewable energy production by directly supplying such electricity to local EV charging stations/hubs and not the electricity grid.

There has been, and continues to be, rapid development of grid-connected battery energy storage systems (BESS). However, recently revenues in Great Britain fell 12% from their 2024 high in October to £52k/MW/year in November[14] and could continue to fall as more BESS capacity competes for the defined grid balancing/flexibility market. The more bespoke BESS (and other forms of energy storage) used within individual grid-independent energy systems, such as for EV charging station use, will not be affected by the competitive market aggregation of grid-connected BESS and would better support both the energy and financial security from grid independent solutions.

The authors recognise that where appropriate grid connections are available in a timely and cost-effective manner, grid-connected EV charging infrastructure provides reliable and accessible EV charging solutions. However, in many parts of the country, where both population and grid infrastructure density are lower, grid-independent EV charging solutions offer the quickest connection opportunities within a cost-effective solution, and this will support improved energy security, accessibility, and local power ownership. Such grid-independent solutions to EV charging infrastructure need to be both recognised and supported by Government policy and funding support eligibility.

[14] https://modoenergy.com/research/gb-november-2024-research-roundup-battery-energy-storage-capex-long-duration-carbon-emmisions-connections-reform-recycling-clean-power-2030