

## EPSRC National Centre for Energy Systems Integration

# ‘Who Ultimately Pays for and Who Gains from the electricity network upgrade for EVs to support the UK’s Net Zero Carbon Ambition?’

### CESI Flexible Fund Project (FFC3 - 007) Final report

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#### Overview

This report details the programme of activity and outputs of the CESI flexible fund project “Who ultimately pays for and who gains from the electricity network upgrade for electric vehicles (EVs) to support the UK’s Net Zero Carbon Ambition?” conducted by the [Centre for Energy Policy](#) (CEP), University of Strathclyde between June 2020 – April 2021. The project was intended to provide evidence and insights on the role of supply constraints, wages, and electricity price impacts in driving policy trade-offs associated with transitioning from conventional to EVs in delivering private transportation services as part of wider decarbonisation actions and net zero planning.

This report sets out how this ambition was met in line with the agreed milestones and deliverables and detailing the emerging impacts from the research programme.

#### Project deliverables and outputs

The project commenced, with the publication of a [research brief \(D1\)](#) at the end of June 2021, outlining and highlighting the research questions, objectives, modelling approach/ strategy, including drawing attention the range of stakeholders actors who will benefits from the findings, insights and narrative emerging from the research? In particular, public policy and regulatory authorities who face the challenge of delivering a ‘just transition’ to a net zero future, while ensuring that this is done in a way that does not dampen economic prosperity/sustainability. OA,

CC and AK, were also invited to present the briefing paper at CESI's Ops committee meeting (25<sup>th</sup> June 2020). The discussion and outcomes from the meeting also supported the delivery of the stakeholder mapping and engagement planning activity (**D2**).

A core part of the research programme involved collaborative scenario design in developing the policy facing analysis and reporting. This involved collaboration with key CESI actors (i.e the Director, Associate Directors, Work Package leads, Co-Investigators and Researchers working across academia, policy, and industry), with the aim of drawing on their existing and ongoing research and expertise to inform our modelling work – particularly on the energy system scenario development. This project deliverable (**D2**) was initially planned as a series of workshops during the first two months of the project. However, due to the impacts of COVID of online working, we organised targeted/tailored meetings with the project team and collaborators individually. The collaborators we engaged with during this period include Professor Phil Taylor, Co -Director CESI, Professor David Flynn (and research team)- Heriot Watt University, Professor Phil Blythe, Scientific Adviser, Department of Transport (DFT) and Dr Colin Herron (MD Zero Carbon Futures).

In relation to **D3** our extended abstracts submitted for presentation at the International Association of Energy Economics (IAEE) conference were accepted and OA and CC presented at the online conference held 7<sup>th</sup> - 9<sup>th</sup> June 2021, with over 150 sessions and 1000 attendees. The presentations focused on key findings and outcomes emerging in terms of key drivers, causal processes, and supply constraints of enabling and realising more rapid EV-roll out by 2050 with net zero focus and some of the question and challenges around how the pace of adoption of EV smart charging impacts the energy system.

Our first [policy brief \(1\)](#) **D4** set out the initial findings from the research and was presented at the CESI Industrial Innovation Board and International Scientific Advisory Board on 14 October 2020 by Professor Karen Turner (PI) and later published at the end of December 2020. Shortly after this, we made advancement with our modelling work and analyses with the key update of using the most recent national accounting tables (2016) produced by Office of National Statistics (ONS) for calibrating our model-noting that our previous research used 2010 estimates.

Our results and findings emerging, following the update of our modelling framework informed the write up of the academic paper (**D5**) which again focused on demonstrating the key drivers, determinants and policy trade-offs around the sustained economy wide cost and benefits in enabling and realising EV rollout for net zero. The paper was initially submitted to Energy Policy journal (May 2021), where we have previously published the paper linked to our first CESI project. However, we have subsequently identified the *Transportation* journal as a more appropriate title to submit the paper for consideration of publication and the team is currently in process preparing the paper for submission by end of October.

As mentioned in our project progress report in June 2021, policy brief (2) **D6** which is focused on consolidating our research findings and insights throughout the project, remains the only outstanding

deliverable. Our plan is to publish and disseminate the brief closer to the UN Climate Conference (COP26), using this hook to extend the reach and impact of the brief and to incorporate it into CEP's and the wider University's strategic communications activities around COP26.

## Impact

Through this research programme, CEP have continued to make novel and specific developments in interacting dynamic economy wide and energy systems models. This is already playing a key role in interacting with other ongoing series of projects in partnership with Bellona Foundation (with funding from the Children's Investment Foundation) including consideration of public budget impacts and implications associated with the transition from conventional to electric vehicles and a UK Energy Research Centre (UKERC) funded project focusing on the economy-wide and socio-economic impacts of the decarbonisation of heat.

We have also engaged with policy and regulatory decision makers at different stages during the project to elicit applied and policy relevant insights. Key findings, evidence and insights from this project have been presented and discussed with SP Energy Network (SPEN), Department for Transport (DFT), Department of Business, Energy & Industrial Strategy (BEIS), and Office of Gas and Electricity Markets (OFGEM).

All outputs from the project so far have been sent to CESI for documentation and dissemination, again with only one outstanding - policy brief (2) - due by the end October. See Table 1, for summary of the project deliverables, notes and status.



**Table 1. Summary of project deliverables**

	<b>Deliverable</b>	<b>DOI/links/Notes</b>	<b>Status</b>
<b>D1</b>	2-page briefing paper	<a href="https://strathprints.strath.ac.uk/72954/">https://strathprints.strath.ac.uk/72954/</a>	complete
<b>D2</b>	Completion of collaborator and stakeholder mapping and engagement planning	See paragraph 2 of project deliverables and outputs section	complete
<b>D3</b>	Extended abstracts for conference: submitted and accepted for presentation at IAEE conference (June 7-9, 2021)	<i>Can spending to upgrade electricity networks to support electric vehicles (EVs) roll out unlock value in the wider economy?</i> <a href="#">Abstract Presentation</a> <a href="#">Fullpaper</a> Presenter: Dr Oluwafisayo Alabi  <i>How the Pace of Adoption of Electric Vehicle Smart Charging Impacts the Energy System?</i> <a href="#">Abstract Presentation</a> <a href="#">Fullpaper</a> Presenter: Dr Christian Calvillo	complete
<b>D4</b>	Policy brief (1)- economy wide impacts of electric price in driving policy trade-offs	<a href="https://doi.org/10.17868/74635">https://doi.org/10.17868/74635</a>	complete
<b>D5</b>	Preparation of journal paper: Advanced version of paper for submission to peer-reviewed journal	Paper submitted to Energy Policy – revision of paper required. However, we subsequently made decision to submit the paper to another Journal ( <i>Transportation</i> ).	complete
<b>D6</b>	Policy brief (2)	Our plan is to publish and disseminate the brief closer to COP26 to take advantage of emerging policy windows. We aim to have this read by end of October.	in progress