

Post-Doctoral Research Opportunity: How can electricity market reform unlock affordability, fairness and equity in the transition to net zero?

ClimateXChange (CXC) wishes to offer a six month post-doctoral research opportunity within the Wholesale Electricity Markets team, in the Energy Strategy and Markets Unit at the Scottish Government.

1. The research question

The overarching question for this research is how can electricity market reform unlock affordability, fairness and equity in a just transition to net zero?

This research aims to:

- Quantify costs within the current electricity system (including network charges, system costs and policy costs).
- Assess the fairness of these costs for different socio-economic groups across Scotland.
- Recommend how future market reforms can help to distribute these in a way that avoids costs falling on those least able to afford them, in support of progress towards tackling fuel poverty in Scotland.

2. The need for this research

The energy transition represents a huge economic opportunity for Scotland, with the potential to provide good quality, sustainable, green jobs right across the country. The Scottish Government is committed to working within its devolved powers to progress the energy transition and maximise these opportunities. The Energy Strategy and Just Transition Plan (ESJTP) will set out a vision for a future net zero energy system that delivers affordable, secure and clean energy and provides high quality jobs and economic opportunities.

Reform of the GB wholesale electricity market was taken forward by the former UK Government as the Review of Electricity Market Arrangements (REMA). This provides an opportunity to take a whole-systems view in support of deploying further renewable; flexibility and storage; ensuring security of supply; and reducing costs for consumers while ensuring a fair and just transition.

There are numerous highly complex and interdependent markets at play within the broad wholesale market. Key considerations include how future market arrangements may seek to decouple the cost of gas from the price of electricity paid by consumers to support long-term energy affordability and reduce exposure to volatile global fossil fuel prices; and whether future investment policy is based on a reformed Contracts for Difference, and what shape this should take.

All of these reforms have costs and benefits; and all of them require decisions about what is fair and equitable. Delivering a fair and just transition means ensuring that costs, benefits and risks of the energy transition are distributed fairly. The benefits of electricity market reform

also need to be spread across all regions of Scotland and all socio-economic groups. This is of particular concern for those living in or at risk of fuel poverty.

3. Background

The Scottish Government's Fairer Scotland Duty Assessment for the Energy Strategy and Just Transition Plan (ESJTP) considers how a reduction in inequalities of outcome caused by socio-economic disadvantage can be achieved. It explores potential direct and indirect impacts on people living in different socio-economic backgrounds including:

- Households on a low income or living in or at risk of fuel poverty.
- Socio-economic groups with lower educational attainment (especially reading and writing, or for whom English is not their first language).
- Those with limited access to financial advice and media channels such as internet or TV to access advice.
- People living in other vulnerable circumstances including those with disabilities and those experiencing health implications linked to fuel poverty.

The assessment identified that innovative thinking is needed on how to distribute current and future energy system costs in a fair manner across society - to consumers, communities and industry.¹

A number of key themes relating to costs and fairness were also raised by stakeholders during consultation on the ESJTP including:

- The relationship between consumer costs and energy generation requires examination to understand the costs and benefits better.
- How future infrastructure costs will be incorporated into the energy system and the potential distributional impacts of such pricing.
- Concerns about the possibility of wealthier households disproportionately benefiting from the support available for home decarbonisation efforts.
- The need for an equitable sharing of costs and benefits between consumers and private investors to deliver just transition gains and a strategy for improving market structure for consumers.

Current energy markets are already creating various inequalities of outcome. High energy prices were a key driver of fuel poverty in 2022². UK Government action on electricity prices is therefore critical to ensuring that people in Scotland, especially those in or at risk of fuel poverty, can improve the warmth and comfort of their homes while accelerating decarbonisation.

Other research has identified risks relating to current energy policy and market arrangements which need to be addressed to avoid further exacerbating inequalities in the energy system³:

- As renewable generation increases, markets need to provide appropriate incentives for long-term, low carbon storage and flexibility to maximise the value derived from renewables and ensure consumers are not paying more than necessary for balancing and system costs.
- With a growing need for system management services such as balancing, the question of who is responsible for risk needs further debate so that consumers don't end up

¹ [Paying for Energy Transitions: public perspectives and acceptability \(UKERC, 2019\)](#)

² [Scottish House Condition Survey: 2022 Key Findings](#)

³ [ReCosting-Energy-Powering-for-the-Future.pdf](#)

paying disproportionately through their bills. The electricity system operator used to manage 5% of the market and is now having to balance up to 17%.

- How to ensure equity around costs and benefits: consumers who can afford to insulate their homes, install solar panels and install heat pumps stand to benefit from improved outcomes, yet increasing system costs are shared across all consumers, including those unable to engage with and adopt new technologies and services.

Overall, there is an urgent need for a better understanding of current and future energy system costs and how these are distributed across different types of consumers across Scotland – including those with different socio-economic backgrounds. This project seeks to develop a quantitative evidence base on the flow of costs and benefits, which can inform strategic discussions and help to ensure that equity, fairness and affordability are at the heart of energy market reforms. It will also draw on existing research about what people perceive as fair.

The following electricity market outcomes are of particular interest to the Scottish Government:

- Finding ways to reduce system costs, breaking the link to volatile fossil fuel prices, and removing barriers to decarbonisation and growth of our clean heat, transport and industry sectors.
- Ensuring a fair and just transition by allowing the low generating costs of renewables to be passed through to consumers (particularly those most vulnerable, including those in or at risk of fuel poverty).
- Achieving net zero by protecting and enhancing levels of investment in renewables, flexibility and networks to maximise the economic opportunities afforded by the net zero energy transition.

4. Project scope and aim

The scope of this study covers retail energy market reform and wholesale electricity market reform. It builds on recent research for CXC including “GB wholesale electricity market reform: impacts and opportunities for Scotland”.

The questions for this Research Fellow to answer are:

- How do we reach a shared understanding of the distribution of costs and benefits in different parts of the electricity system today? A methodology to quantify costs and benefits should be developed. This includes but is not limited to:
 - Transmission and distribution network charges to maintain and upgrade the grid as we transition away from a fossil fuel-based energy system.
 - Policy costs including legacy Renewables Obligation Certificates and Contracts for Difference; and other social and environmental schemes.
 - System costs including Balancing Mechanism, constraints payments and Capacity Market.
 - Wholesale electricity costs.
- What do future electricity system costs look like as we move towards net zero by 2045 and how will these be integrated into consumer bills?
- What market reforms are needed to ensure that future costs and benefits are distributed in a fair and equitable way (for example, to protect those least able to afford them and support progress towards tackling fuel poverty and wider poverty in Scotland)?

This project will work with key policy leads in the Scottish Government to:

- Conduct a quantitative review of the existing evidence base on the costs and benefits in the electricity system today (based on current market arrangements) and provide a visual representation of these.
- Analyse how the costs and benefits could evolve as we move towards net zero by 2045, for example using National Grid ESO's Future Energy Scenarios.
- Review current evidence on what people perceive to be fair and how fairness is measured.
- Identify researchers and organisations (e.g. including consumer bodies) in Scotland and across the UK who can contribute to the Scottish Government's understanding of costs, benefits, fairness and equity in electricity markets.
- Work with the Scottish Government and CXC to convene two expert panel sessions and a wider stakeholder workshop to discuss project findings.
- Establish connections into wider policy discussions within Scottish Government including on fuel poverty, consumers and networks.

The quantitative analysis of costs and benefits should consider different groups of consumers, broken down using the Scottish Index of Multiple Deprivation (SIMD). The researcher will work with the Scottish Government and the expert panel to assess the fairness of the current arrangements to different consumers (socio-economic background, geographies, domestic, business, industrial), and evaluate how these costs might change as we transition to net zero. The researcher will make recommendations about how future market arrangements can ensure a fairer distribution of costs and benefits across society.

The successful candidate will bring together Scottish Government policy teams across fuel poverty, consumers, networks and electricity markets along with stakeholders from academia, industry and consumer organisations in two expert panels and a stakeholder workshop. The Research Fellow will explore with stakeholders what steps the Scottish Government can take – acting in a reserved area – to shape electricity markets that help to deliver a fair and just transition to net zero. An important part of this work will be to develop a shared understanding of what “fairness” means.

Stakeholders will include, but not be limited to: Scottish Government policy teams, UK Government market reform policy teams, Electricity Systems Operator, Ofgem, researchers and experts across Scotland and UK with an interest in electricity market reform, industry bodies and renewable generators, storage and flexibility providers, the Just Transition Commission, and Consumer Scotland.

The researcher must engage closely with the Scottish Government and key academics in Scotland. The researcher will be invited to attend regular team meetings with the relevant teams in the Scottish Government. Regular progress updates towards the aims stated above are also expected.

5. Audience

The work is commissioned on behalf of the Scottish Government. The results must be presented in a format and language that can be easily understood by readers across different policy areas and without an academic background. Written outputs must be well presented and written in Plain English.

6. Outputs

The primary output will be a final report in the CXC house style. The final report will cover:

- Findings from the evidence review.
- Detailed methodology setting out how costs, benefits and value flows were assessed and quantified.
- Visual depiction (and underlying workings and Excel files) of costs, benefits and value flows within the current energy system, and an indication of how these need to change to be considered fair.
- Outputs and recommendations from the expert panels and stakeholder workshop.
- Next steps for research to inform policy development in Scotland and GB-wide market reform.

There will also be a final presentation to stakeholders to discuss the research findings.

We understand that the successful researcher will want to produce academic outputs (e.g. journal paper(s)). However, the primary output will be the above report to the Scottish Government and will follow the CXC reporting guidelines and comply with public sector accessibility requirements: UK Government’s guidance on [Publishing accessible documents](#).

The ownership of the research material including the final report and any data produced as a result of the research lies with ClimateXChange on behalf of Scottish Ministers. The research may be published on the ClimateXChange website, the date and format of which will be determined by the Scottish Government and ClimateXChange. One or more drafts are likely to be required before a final version is agreed.

ClimateXChange supports the Scottish Government Open Research Guidance for RESAS, summarised as “open as possible, closed as necessary.” This means that all products will be placed in the public domain, unless there is a strong argument otherwise (for example to comply with data protection regulations). Descriptions of all projects and related products will be uploaded to the ResearchFish system.

7. Project governance

A Steering Group will be established to support delivery of the project. The steering group’s role is to guide and direct the research. It will include representatives from Scottish Government and ClimateXChange, along with the successful academic institution and researcher. External members will be considered depending on requirements.

The lead contact for ClimateXChange will be the CXC Project Manager, Nicola Dunn, who will liaise with the successful institution and the lead researcher. Regular update calls will be scheduled between the researcher, the Scottish Government and the CXC Project Manager to discuss progress and address any issues, escalating to the researcher’s Principal Investigator (PI) and or steering group for consideration where necessary.

8. Project timetable

Milestone	Completed by
Appoint successful researcher/institution*	9 September
Confirmation of arrangements, including supervisory group and researcher/institution and any access to SG estate/IT	16 September
Project kick-off meeting, to confirm	w/c 7 October

Milestone	Completed by
<ul style="list-style-type: none"> • Scope • Boundaries • Timeframe • Secondment arrangements with the Scottish Government 	
CXC/Scottish Government induction	25 October
Regular discussion of progress (researcher, CXC & Scottish Government)	Fortnightly
Two expert panel sessions	Target dates to be suggested in submission
Stakeholder workshop to discuss interim findings	tbc January 2025
Submission of draft report and findings	14 February 2025
Steering group meeting to discuss draft findings	28 February 2025
Submission of final report	14 March 2025
Final stakeholder presentation	31 March 2025

* The assessment panel may wish to interview potential candidates (online) in the week beginning 6th September.

9. Application process

Applicants are invited to put forward proposals on how to best meet the research aims within the budget available. A full explanation of your chosen approach meeting the ‘award criteria’ and key tasks listed below, including any limitations, should be provided.

The research will use a combination of desktop research and engagement with government policy officials, researchers and other stakeholders. Applicants should address the following key tasks in their submission:

- Engaging with core Scottish Government team.
- Approach to review of existing evidence base, including providing details on the proposed approach to developing cost benefit analysis.
- Developing a stakeholder engagement plan for identifying key researchers in this area.
- Approach to planning for workshop.
- Approach to writing final report.

The researcher will work closely with the Wholesale Electricity Markets Team throughout this project.

10. Eligibility

Applicants must demonstrate they meet the following eligibility criteria for the research associate and the hosting organisation.

Organisational

- existing in-house capacity to carry out research that extends and enhances other research happening in the UK
- the capability and skills to independently undertake and lead a research programme

Individual

- have completed your PhD at a UK research organisation
- qualitative and quantitative research skills, including experience in cost benefit analysis
- experience of working with a wide range of stakeholders
- excellent verbal and written communication skills
- demonstrable understanding of electricity markets
- be eligible to work in the UK for the period of the research
- have at least 12 months active postdoctoral experience (at full-time rate) measured from passing your viva voce to the competition closing date

11. Submitting a proposal and award criteria

Deadline for submissions – 12 noon on **21 August 2024**. Submissions should address the following criteria, which will form the basis for assessment

Price 20%

Quality 80%

Quality criteria	Descriptor	Weight
Research expertise	<p>Detail the knowledge, experience, expertise and capability that is required for this research, including as a minimum:</p> <ul style="list-style-type: none"> • the researcher • the individual (proposed Principal Investigator or Supervisor) who will be supporting the researcher • evidence should be provided of previous research and knowledge exchange work relevant to the research requirement (including working hyperlinks) with an emphasis on policy-focussed research and communication • a statement demonstrating institutional capacity and CVs of relevant staff should be provided, along with the number of person days proposed 	25%
Research methodology	<p>Detail your approach to a high quality and workable research methodology that will deliver the outputs in the required timescale, including as a minimum:</p> <ul style="list-style-type: none"> • how the evidence will be identified, reviewed and assessed • the proposed approach to address the research objectives • the suitability, robustness and limitations of the methodology • ethical procedures that will be followed 	25%
The need for this research	<p>Demonstrate your understanding of the requirements, including as a minimum:</p> <ul style="list-style-type: none"> • the policy environment and the supporting role of research • the cross-sectoral nature of the project • the need for this research • the research aim, and how the proposal will address this need 	15%

Quality criteria	Descriptor	Weight
Quality assurance	<p>Provide details of quality assurance procedures to demonstrate how the research will be continuously delivered to a high standard, including as a minimum:</p> <ul style="list-style-type: none"> • issues of quality control at different stages of the project, including initiation, stakeholder engagement, analysis and report writing • provide a risk assessment matrix detailing any risks identified in relation to the delivery of this contract, and proposed mitigation measures to minimise their probability and impact 	15%

Your submission should be a single document of no more than 8 pages (excluding CVs) in PDF format with the file name in the following format name of submitting organisation – IQ21-2024 PDRO electricity market.

File size should not exceed 5MB.

You should highlight any potential conflicts of interest in your proposal.

The costs of proposals for this project are expected to be no more than £90,000 (excluding VAT). However, ClimateXChange would welcome proposals for less than this amount. We welcome consortium bids.

Proposals need to be submitted to lee.callaghan@ed.ac.uk and cc'd to nicola.dunn@ed.ac.uk for evaluation by **noon on Wednesday 21 August 2024**.

Depending on the quality of proposals received, CXC may chose not to appoint any contractor.

12. Clarification questions

We will respond to any clarification questions received while the project call is open and publish them on the CXC website on the [Work with us page](#).

13. Terms and conditions

The institution/organisation of the successful applicant shall be required to enter into a contract for services/research with the University of Edinburgh whose terms shall govern the post-doctoral research opportunity (the “Contract”).

The payment terms for the Contract will be expressly linked to the Project timetable and will be subject to milestone delivery.

The contract for ClimateXChange (between University of Edinburgh and Scottish Government) is scheduled to end in March 2025.

14. Travel policy

In line with the [Scottish Government travel strategy](#) and the [University of Edinburgh Sustainable Travel Policy](#), we expect contractors to use low-carbon travel options for any in-person meetings, and to only travel when necessary.