UK Energy Research Centre

# Whole Systems Networking Fund: progressing new voices and gender balance in the energy research portfolio

Programme report

November 2019

## Overview

Ensuring diversity in research and innovation is vital for effective delivery of the Government's Clean Growth, and broader Industrial Strategies. A recent McKinsey Global Institute discussion paper *Solving the United Kingdom's productivity puzzle in a digital age* noted that renewed emphasis on female workforce participation could deliver dividends for UK productivity, with the energy sector mentioned specifically.[1] As the Industrial Strategy argues, organisations with the highest levels of diversity are 15% more likely to outperform their rivals.

Over the past two and a half years, the UK Energy Research Centre has managed £1.5m of Engineering and Physical Sciences Research Council (EPSRC) funding through the Whole Systems Networking Fund (WSNF). It has worked with stakeholders from universities, public-private partnerships, and NGOs, to pilot a model to diversify the UKRI energy portfolio through inclusiveness, encouraging gender balance and the nurturing of new voices and ideas.

The objectives for the WSNF are:

1. To provide mechanisms for collaboration that encourage diversity, gender balance and equality, with a particular emphasis on providing opportunities for early career researchers.
2. To improve the connection and collaborations between the research groups engaged in whole systems energy research and those engaged in research focusing on a particular discipline.
3. To bring in new voices, working with policy, business and civil society to identify opportunities for wider engagement.
4. To identify and learn lessons from best practice within the UK and internationally.

[1]Jacques Bughin, et al. (2018), Solving the United Kingdom's productivity puzzle in a digital age, McKinsey Global Institute, Discussion Paper, p. 34

During the implementation stage, the objective to foster gender balance and equality, was considered a particularly important and urgent topic of focus. This finding was further reflected during our discussions with colleagues at UK Research and Innovation (UKRI), and we decided to specifically explore how gender balance of investigators could be rapidly progressed across the UKRI energy portfolio.

A total of 18 projects spanning a broad range of areas of energy research were funded. The fund was disbursed through two open calls, and through 'co-created' projects.

Overall we demonstrated that it is eminently feasible to mainstream gender balance across the energy portfolio. We offer the fund as a model for programmes to advance gender balance, with potential applicability to other protected characteristics under the Equality Act 2010.[2] The programme also highlighted the benefit in bringing in new voices and partners into the energy research portfolio, and it provided an opportunity for multi-sectorial and interdisciplinary project teams to take forward exciting new ideas and initiatives that can form a basis for further investment.

## Operation of the fund

The fund was disbursed through a combination of open call; and 'co-created' projects. The latter co-created projects were developed from discussions with stakeholders in the energy research sector and our own analysis of particular needs and opportunities; they were carefully targeted both in project design/goals and in selection of delivery partners.

Both open call and co-created projects were subject to the same assessment criteria and were managed in a similar way. Applications for open calls were made via a simple online form and were assessed with investigator names removed (anonymised), with UKERC HQ staff scoring them from 1-5 against the following criteria:

- Gender: RCUK Energy Programme grant applications and awards fall short of representing UK capacity in the space. Each project must explicitly address how they will ensure at least 50% participation of women.
- Impact for whole systems energy research and/or uptake of science/evidence for energy system transformation: the activity cannot benefit only an individual, or a single institution or even a specific discipline. Networking activities must be collaborative and cohesive.
- New voices: whether aimed at, or proposed by, early career researchers or bringing institutions together that have little interaction, the project must bring new, diverse, voices to the table.
- Not business as usual: the project must demonstrate that it would not have likely happened without the funding.
- Measures of success: the project proposers must be able to identify clear indicators to measure the success of the project.

A ranked list of projects according to those scores (again anonymised) was presented to the steering group[3] for discussion and ratification, with the top-scoring projects being selected for funding.

Once funded, projects received regular interaction with UKERC HQ team members; discussions included:

- Constructive challenge of the intellectual assumptions and approaches of project leads.
- Identifying and seeking to solve operational problems that cropped up (personnel, strategy, direction, project management).
- Offering suggestions for people/ideas/literatures that project leads could interact with or otherwise think about.
- External communications; co-development of impact generating activities.

Our view was that high-performing researchers identify areas where collaboration is important; and seek to work with the expertise that is relevant (bounded, of course, by the ability and willingness of others to collaborate with them). This pragmatic approach means that decisions on what and with whom to collaborate were ultimately taken by project leads, but subject to advice from UKERC HQ. The only non-negotiable requirement was to ensure at least 50% participation of women.

[2]These cover age, disability, gender reassignment, pregnancy and maternity, race, religion or belief, sex and sexual orientation.

[3]Dr Mike Weston (first call chair), Prof Jim Watson (second call chair), Prof Mel Austen, Dr Frin Bale, Prof Feargal Brennan, Eric Brown, Eva Gromadzki, Chris Open, Prof Tim Green FREng, Prof Tadj Oreszczyn, Dr David Reiner, Dr Biljana Stojkovska, Prof Neil Strachan, Prof Patricia Thornley, Prof Alison Walker, Mike Woodcock, Gary Wilson, Philippa Oldham, Dr Kathryn Magnay, Dr Jim Fleming, Jasmine Cain.

Pro-active engagement with projects was valuable in encouraging dialogue and mutual learning. In many cases, conversations developed into genuine dialogue that were enlightening for all sides and generated new ideas and approaches. While project leads were asked to identify deliverables at the beginning of each project, ideas were allowed to arise spontaneously, and changes of project direction encouraged.

A standard contract was used for all projects, however in many cases amendments were required to meet the needs of project partners. Contracting was found to be a central part of the work, it was therefore important to ensure that staff time was properly resourced, incorporating legal and financial expertise into the grant.

## Awarded projects

18 projects in total were funded and allocated on merit, 54% (£628k) of the project funding was delivered through open call, the remaining 46% (£537k) through co-created projects.

The fund covered many of the major areas of energy research, as indicated by the following break-down of projects by International Energy Agency (IEA) category:

- Fossil fuels: oil, gas and coal: £180k (15%)
- Renewable energy sources: £179k (15%)
- Nuclear fission and fusion: £60k (5%)
- Hydrogen and fuel cells: £59k (5%)
- Other power and storage technologies: £414k (36%)
- Other cross-cutting technologies or research: £271k (23%)

## Project development and delivery

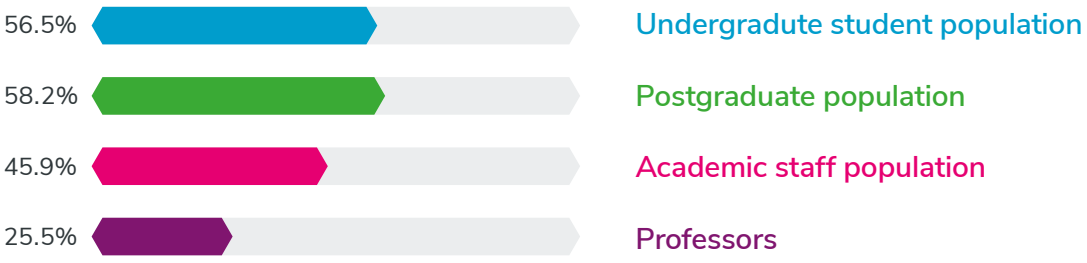
Our primary operational task has been to coordinate the actions (big and small) of around 100 people, across 20 or more organisations. Overall, the fund has delivered substantial impact.

For example, three strands of work responding to UK industrial strategy – solar, North Sea energy economy, and decarbonisation of road freight – have produced unique cross-sectoral and cross-government conversations with BEIS, Department for Transport, the Committee on Climate Change (CCC), and UK-based industry (e.g., Siemens, NSG, Volvo, National Grid, etc.). Whole systems recommendations and learnings emerging from these projects will be brought together at the programme conclusion meeting in December.

A team from the University of Exeter delivered a project exploring gender balance in energy research. They analysed the available data the provided a breakdown of funding awarded by gender, and spoke to female energy academics about their lived-experiences. EPSRC provided the team with a summary of diversity data and the UKERC Energy Data Centre provided a database of energy research awards (see Figure 1 below).

The resulting report, *Power Shift*, outlined their findings and set out four key ways in which UKRI, other funders and universities can better support and progress female energy academics and improve gender balance, these were: look at the data; fund more women; stimulate career progression for female energy academics, and; build on what is working.

**Higher education female population in 2017-18**




**Source: Authors analysis from HESA data**[8]

Figure 1: Higher education female population in 2017-18. Graph from Power Shift: How to build Gender Balance in the Energy Research Portfolio

Another strand of work looking at exploring new ways for UK academia to support policy development achieved a major win in the revision of Automated and Electric Vehicles Act 2018, gaining amendments in the primary legislation based on the latest scientific evidence. This was a partnership between UKERC and other stakeholders in the academic community, the House of Lords, UK government, and Environmental Defense Fund Europe who led the project.

Projects concerned with decarbonisation of heat in Northern Ireland (NI) have developed new ideas and points for engagement in this vital but contentious area. This has been achieved by building a network of people who have knowledge and experience on heat issues, including government, NGO, and private sector – and gathering a gender-balanced data set on the attitudes of Northern Ireland consumers based on survey and focus group work. The NI government and stakeholder community is now far better prepared to tackle the heat decarbonisation challenge, if or when devolved government resumes.

Achieving these outcomes has required UKERC to adopt a management approach that is both flexible and pragmatic, aided by the fact that few projects had substantial co-dependencies. Therefore, individual projects could occur in parallel rather than one depending on the successful completion of another to go ahead.

The latter co-created projects were developed from discussions with stakeholders in the energy research sector and our own analysis of particular needs and opportunities; they were carefully targeted both in project design/goals and in selection of delivery partners.

### Co-created projects

In the case of two co-created projects, we brought different organisations together to deliver the work and used extensive engagement, and formal contract, to encourage collective action.

In the case of the solar commission project, we first developed a scope with our academic partners Supergen Solar Network+, the EPSRC CDT in New and Sustainable Photovoltaics, and University of Bath (the first two are UKRI EPSRC programmes; only the latter is a legal entity). We then identified Regen (a non-profit consultancy active in the field of renewables) as the core delivery partner, given their knowledge of government, and awareness of a systems approach. A contract was made with Regen with an explicit requirement to work with the academic parties. This encouraged mutual exchange of ideas, and a successful project was delivered.

In the second case, we developed a joint project between two public-private partnerships, namely, Energy Systems Catapult (ESC) and Advanced Propulsion Centre (APC). A slightly different approach was taken. Having identified the potential for synergistic working between energy system modellers and automotive industry, we approached both organisations with our proposal and an offer of funding, as well as incorporating members of both organisations in the steering group for the fund. Following senior level engagement, extensive meetings were held with both parties to scope the project and agree on a shared agenda. We collectively decided the division of work/finance between the parties; then contracted the work via two separate contracts (one to each organisation). Each contract contained a clause requiring the organisations to work together. This proved a successful approach.

All other projects were delivered with a contract to a single organisation, but with encouragement to collaborate. As a point for learning, it would be useful in some cases in future to formally lock-in collective working in the manner we did either with Regen/University of Bath or with APC/ESC. This approach obviously requires resources in time and effort in the development and contracting phase – investing extra effort at the beginning of the project.

## Key learnings

### Measures to broaden the talent pool: particularly around gender

We asked all applicants to indicate how they would ensure 50% participation of women, and scored their proposals on this criterion. The applications were assessed blind - all personal information relating to names and organisations were redacted from the applications, to eliminate biases that may arise from assessors' expectations.

In terms of the messaging around the programme, while the commitment to gender balance was prominent, we ensured that all communications were about encouraging new voices, connections and ideas.

The goal was to present a welcoming and inclusive environment which encouraged both men and women to participate.

Gender balance concerns and benefits all of us and should be seen as integral to high quality research. As Rebecca Pearl-Martinez and Jennie Stephens write in their article in The Conversation[4], addressing the energy gender gap by encouraging a more diverse workforce leads to more innovation and productivity. They also write that companies with more female members on their boards are likely to increase investment into renewable energy and reduce carbon emission within the supply chain. This gender balance ethos was used in messaging throughout the fund in such places as our website, funding criteria, a short specially commissioned film[5] for use on social media, twitter, in verbal communications, events and so on.

As a mark of success, 80% of project leads were women.

Figure 2: Female Early Career Researchers at the IVUGER funding retreat

## Connecting disciplinary focused and whole systems energy research

Several of the funded projects included a whole systems perspective with regards to defining and characterising their topics or challenges, while also promoting interdisciplinarity within their approaches - through workshops and events to define agendas or identify opportunities. One example is Solar + Storage waste pathways, which brought together researchers in order to develop and explore a future whole systems research agenda for solar and battery waste. The workshops gained insight from a very broad range of academic disciplines (including engineering, biotechnology, economics, business studies, and geography), many of whom had not crossed paths previously to discuss recycling, resource management, waste policy, supply chains and geopolitics.

Another project, Zero-IN on NI heat, brought together a diverse range of stakeholders for a series of workshop that aimed to identify pathways towards industrial heat decarbonisation in Northern Ireland. The all-female project team, led through the University of Ulster, included participants from the Department for the Economy, the Northern Ireland Utility Regulation Authority, Northern Ireland Renewable Energy Industry Group, National Energy Action Northern Ireland, Invest NI, and NI Electricity Networks. The breadth in representation was replicated during workshops, enabling a consumer-oriented approach and inclusiveness.

Speaking to participants at some of the workshops, many told of their excitement at being given an opportunity to attend such an interdisciplinary event and to engage with ideas and framings different to their own. A repeated sentiment was that the challenges that were discussed were so broad that their solution would require a whole systems approach.

[4]https://theconversation.com/dear-hillary-where-are-the-women-in-your-energy-strategy-58847

[5]https://youtu.be/zR7qt6GhBXA

## Working with a wide range of stakeholders

To encourage new voices, we relaxed the standard rules that allow only permanently employed academics to apply for funding, letting any university staff apply (as well as staff from other types of organisation not on the official funding list). There is evidence that female investigators in universities might be in junior and temporary roles, or leave academia for other sectors. This fact had to be pointed out to some university finance departments, in cases where bureaucratic obstacles were preventing applicants applying.

The scheme also allowed for funding of organisations not normally eligible for Research Council funding.[6] In practice this meant 36% (£416k) of project funding was allocated to 'ineligible' organisations (e.g., Advanced Propulsion Centre, Energy Systems Catapult, and various NGOs).

The NGOs had to accommodate the 80% full economic cost (FEC) rule[7]; this proved challenging for some, but solutions were found and funding went ahead. In a handful of cases, our funding made a major contribution to the overall budget of the NGO, in one case accounting for as much as 7% (based on Charity Commission records). The slow speed of contracting and various stipulations around risk associated with Research Council contracts presented a further complication, mostly for organisations unfamiliar with the Research Council funding landscape, but all of these were successfully negotiated. Overall an extra effort was expended developing projects outside the normal 'supplier base' (universities).

There is a case to be made concerning diversifying project partners in terms of sector – and giving those partners funding, independence and esteem – as a means to accrue diversity of experience, perspective and approach. This facilitates genuine collaboration and the exchange of ideas and methods between the university sector and external, non-academic entities.

There is a somewhat connected case to be made for facilitating interactions that fall outside the core university remit of academic research and teaching. A key aim was to get academics to work with partners in the public, private, and third sectors. That was achieved. Not only may it yield excellence with regards to specific tasks, but it could also produce better value for money as the available infrastructure and expertise is expanded to aid delivery.

## Learn lessons from best practice within the UK and internationally

As stakeholder engagement and networking was an element included in the plans for most projects, there has been significant exchange of lessons learnt and best practices within different disciplines and bodies of knowledge in the UK throughout the programme. The Solar Commission did, for example, gather a unique partnership of leading academics, system operators and industry to share best practice and identify opportunities for UK innovation in solar energy. The Heat Network, to offer another example, connected the campaigning organisation 10:10 (now rebranded as Possible), the public, illustrators, researchers and heat installers. There are more examples to discern among the individual project reports see the associated working paper: *Whole Systems Networking Fund: Project highlights.*

A smaller number of projects included an international element within their scope, though many projects took influence from international scholarship or experience during the course of their implementation.

Two projects had a clearly defined international scope, one exploring community energy resilience in the electricity sector in the UK, Nepal and Malawi, and the other exploring solar waste pathways in the UK, India and Kenya. The expertise involved also included insights from Bangladesh, Myanmar, Sri Lanka, Zimbabwe, Zambia, South Africa, Mozambique, and USA.

Best practices and experiences from USA were also included in the Solar Commission through representation from NREL, and the three Northern Ireland-based projects have benefited from significant knowledge exchange with Irish colleagues due to the close connections and shared context on the island of Ireland.

We are keen to continue to support best practice exchanges in the UK and internationally, though it is important that such events take place in a face-to-face environment, and that they are adequately resourced and accessible.

[6]https://www.ukri.org/funding/how-to-apply/eligibility/

[7]The stipulation is that Research Councils will provide funding at 80% of the full economic cost (fEC); the recipient must agree to find the balance of fEC for the project from other resources. For example, in the case of a grant from the funder of £60k this would mean the recipient would need to offer £15k (fEC therefore £75k).

I Figure 3: Individuals trialling the 'Carbon City Zero' card game developed by Possible

# Conclusion

At the conclusion of the Whole Systems Networking Fund, we have successfully allocated 80% of the funding to projects led by women. This is dramatically in advance of the average in the EPSRC energy research portfolio – estimated to fall between 5-13% over the past eight years.[8]

Overall we demonstrated that with the appropriate mechanisms in place mainstreaming gender balance across the energy portfolio is achievable. We offer the fund as a model for programmes to advance gender balance, with potential applicability to other protected characteristics under the Equality Act 2010. The programme also highlighted the benefit of bringing in new voices and partners into the energy research portfolio, and it provided an opportunity for multi-sectorial and interdisciplinary project teams to take forward exciting new ideas and initiatives that can form a basis for further investment.

The overarching recommendation is that the approaches taken in this programme and the lessons learned should be applied at a larger scale. This includes expanding the approach to include other protected characteristics.


# Acknowledgements

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[8]Basia Cieszewska, Jess Britton, & Julie Smith (2019), Power Shift: How to build Gender Balance in the Energy Research Portfolio, University of Exeter/ UKERC, p. 22

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