

# Data sharing workshop briefing note

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## Introduction

Sharing energy research data is good practice for responsible research and many funders now require it as a condition to receive grant funding. However, it is still often seen as a burden and many projects fail to fully deliver on FAIR (findable, accessible, interoperable, reusable) data sharing commitments. This workshop will bring together key stakeholders in the whole research lifecycle to develop recommendations to improve the level and quality of data sharing within the energy community.

## Aims and outputs of this workshop

This workshop aims to explore lessons relating to data sharing in the energy research domain from the perspective of different stakeholders, and use these lessons to develop recommendations. In short, what can those involved in funding, supporting and undertaking the research do to embed and enable a culture of data sharing regardless of the area of energy research? The main outputs will be a summary of key lessons and a set of recommendations, to be shared with participants and, through a blog, with the wider research community.

## Data sharing

The importance of sharing all outputs of research has been long established. RCUK (the forerunner of UKRI) published Common Principles on Data Policy in 2011, followed up by [Guidance on Best Practice in the Management of Research Data](#) and individual Research Councils' policies. In 2016, RCUK, HEFCE, Research England and Universities UK signed [Concordat on Open Research Data](#). Funders' interest in this topic continues with the UKRI [Current Research Data Guidance](#).

Since 2011, different domains and communities have adopted different standards for, and expectations of, data sharing, in part in response to the types of data collected in research, and taking into account any legal requirements. Historically some domains/funders have supported this, such as through the NERC and ESRC data centres, or the crystallography community, which expects use of the Cambridge Crystallography Data Centre before publication. In some other domains such as Engineering, where potential IP issues result from working with commercial partners, there are less well-developed community standards.

Meanwhile, research dealing with human subjects, which needs ethical approval, results in potential restrictions on sharing the outcomes. For these reasons and others, [significant variation is observed](#) in levels of data sharing between sectors and regions.

Despite this variation, it is now well established that sharing data and having others use and cite that data, enhances research careers and supports reproducibility by enhancing the transparency of the research.

## Is Energy Research special?

There are several areas where Energy research produces interesting data sharing challenges.

Firstly, energy research is often done in large consortia undertaking a wide variety of energy research. Each project will have to have provided information on overall data management as part of the bid, but setting effective standards and expectations to support and monitor the outcomes of all the different projects within the consortium requires significant work, which such consortia may lack the skills to do. Hiring data managers in this context is challenging when they are able to earn much higher salaries in the commercial sector.

Secondly, energy research covers a wide range of domains, as demonstrated by multi-funder projects. Each of these domains, and their attendant research councils, may have different community standards and expected deposit services attached to them. It is important to ensure that these are followed to encourage discovery and reuse, but also that it is possible to discover the complete outputs of a project and, ideally, other similar projects/ consortia, which might be expected to have useful data to share.

Further, as an applied area of study, energy research is often conducted in collaboration with commercial partners, potentially limiting researchers' ability to share certain data.

## Experiences from CREDS and UKERC

The knowledge and experience gained by the CREDS and UKERC Energy Data Centre teams supporting researchers to manage their research data has led to this collaborative workshop. Here we summarise the activities and outcomes of each centre before going on to pull out some lessons.

### The Centre for Research into Energy Demand Solutions (CREDS) activities

[CREDS](#) carries out interdisciplinary research to understand the role of energy demand change in accelerating the transition to a zero-carbon energy system, including the technical, social

and governance challenges of demand reduction, flexible demand and use of decarbonised energy.

Archiving data in CREDS is a contractual obligation and, theoretically, institutions who do not do it could have payments withheld. CREDS produced a data management plan for the whole programme and went about hiring a data manager. This proved to be difficult, requiring three recruitment rounds, and finally recruiting someone who stayed only 18 months, because there are better opportunities in commerce for people with these skills. Nevertheless, a template was produced and training provided to enable each project to produce a data management plan of its own, which most have done.

When the data manager left, an internal Research and Data Quality project was set up. The project invited someone from every one of our nine themes as a 'Quality Champion' to ensure its message reached everyone in the consortium and made regular presentations at Whole Centre Meetings. It had two main parts: the first to promote the [Transparency, Reproducibility and Quality \(TReQ\)](#) of data, which produced an excellent series of [six videos](#) (covering [Principles](#), [Pre-registration](#), [Reporting Guidelines](#), [Pre-prints](#), [Open data and code](#), and [Checklists](#)) and promoted this work through meetings, newsletters and a paper on [Improving Energy Research Practices](#). The second collected the data used within CREDS (using the data management plans) and catalogued this data. It also set up a collaboration with UKERC and the UK Data Service (UKDS) to improve the archiving and findability of CREDS data.

UKDS has run two bespoke archiving training sessions to help researchers develop their skills, as well as having a range of training resources on their website. They also help individual researchers with specific queries. Researchers submitting data to UKDS are subject to a rigorous process whereby their data and supporting documents are reviewed and corrected as necessary, to ensure the data submission has some quality control attached to it.

This workshop is part of the CREDS/UKERC collaboration and aims to take what we have learned, work with system stakeholders to come up with recommendations to improve systems still further, and pass these on to new consortia for implementation.

## UK Energy Research Centre (UKERC) activities

The [UKERC consortium](#) carries out interdisciplinary, whole systems research into sustainable future energy systems, addressing the challenges and opportunities presented by the transition to a net zero energy system and economy.

In UKERC's fourth phase (2019-2024), data management planning is a KPI and is managed by the Energy Data Centre (EDC) on behalf of UKERC. The EDC have adopted the approach "**As open as possible, as closed as necessary**". We recommend that data which is to be shared is deposited in a domain repository such as the EDC or the UK Data Service, where the potential re-users will expect to find it. The EDC has a metadata record for all shared data regardless of its location.

All identified projects within the seven UKERC themes and three rounds of FlexFund funding have been expected to produce a data management plan. The EDC team have regularly followed up with UKERC colleagues to track progress and offer specialist advice. When there was a change in staffing, the EDC team ensured that supporting DMPs remained a priority activity. The team have provided [UKERC guidance on data management](#), covering topics from data management checklists to research software, and provided information & advice in theme meetings and individual sessions.

As a result, data has been deposited with the EDC and UKDS from completed projects in four themes. A small number of projects are not expected to deposit data at all, due to the nature of the research (e.g. elite interviews).

While not all projects have produced a data management plan, all projects know that they should. We anticipate at the end of Phase 4; it will be easier to discover and re-use the outputs than from previous phases; moving data sharing forward in the UKERC community.

## Shared challenges and lessons learnt

There are some shared challenges which have been raised through UKERC and CREDS experiences, these are highlighted here, and we are interested to explore these in addition to workshop participants' own experiences.

- **Resourcing to support data management and sharing:** Both UKERC and CREDS identified the need for specialist data managers/stewards within the project to support researchers. This is a specific specialism and they can be hard to recruit and retain.
- **Time, effort and incentives to make data shareable:** This is not necessarily an issue only for energy researchers, but perhaps the benefits and pay-offs are linked to the domain. Depending on the specific domain, expectations and knowledge around data sharing can be patchy.
- **Setting project expectations:** Sharing research data is not embedded in internal systems to ensure that credit is recognised. Projects should include guidance on how data from the project should be cited. Information on data management and sharing should be included

in induction material, so that people joining later in the lifetime of a consortium are not left out, and any project reporting, so that data management is part of project planning, management and delivery.

- **Expectations of project organised funding:** Energy consortia usually have flexible funds to help decentralise Research Council funding. UKERC funded external researchers through the FlexFunds calls and expected DMPs and shared data; this should be a standard approach.
- **Differences in underpinning domain's culture:** The Energy Research community is multi-disciplinary which highlights the differences in expectations, training and disciplinary norms.
- **Responsibilities in large multi-institutional research centres:** CREDs and UKERC, and other research centres, are not legal entities, so the institutions employing the researchers have a role to play in areas such as ethics approval for research, which should help to ensure data management is a central concern. Differences in practice between institutions can make a clear message on behalf of a centre harder to disseminate and can lead to differences in expectation.
- **Changes in publisher/funder expectations:** The importance of depositing data in a reputable repository as part of the publishing process and creating data access statements is becoming more embedded in researcher practice and is starting to drive data deposits.
- **Modelling data:** A lot of Energy research outputs are models. How models and their outputs are shared and used effectively with other forms of data is a challenge that needs further consideration and work.
- **New types of data container:** Energy researchers are adopting new forms of research outputs including Jupyter notebooks which are more of a challenge to deposit and curate; demonstrating that data sharing and management is a constantly evolving field and needs to be supported by expert data stewards.