Transparency, Reproducibility and Quality in Applied Energy Research:

Challenges and Solutions

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Energy research presents specific challenges for reproducibility…

- Energy is a multi-disciplinary field combining many disciplines with different theoretical frameworks and research methods.
- This makes it tricky to agree on 'gold standards' and for researchers to judge the quality of work outside their expertise
- Much work in the energy field is fast-moving and highly context dependent. Not all studies would be expected to replicate later on or with different participants.
- Many studies are extremely resource intensive, meaning that replication studies would be prohibitively expensive.

Nonetheless, energy researchers can and should apply open science tools to improve the transparency, reproducibility, and quality of their work…

We've developed practical guidance for energy researchers outlining how open science tools can be applied despite these challenges…

We selected tools based on 3 inclusion criteria:

1. Applicable to a wide and multidisciplinary variety of approaches
2. Can be flexibly employed
3. Low barrier to entry

We suggest that any researcher in applied energy should be:

- Preregistering studies
- Using appropriate reporting guidelines
- Sharing data and code
- Publishing preprints

We share practical guidance on how to apply these tools, including a **checklist** that can be appended to a publication showing how these tools were used.

Open discussion:

- Which of these challenges are unique to energy and which are also present in other applied fields?
- Have you successfully encouraged uptake of open science tools amongst colleagues in your own field? If so, what worked for you?
- Are you aware of open science guidance for multi-disciplinary research fields that you think we should look at?

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