

Australian Energy Transition Research Plan Design Issues Paper

Response from the ANU Energy Change Institute

Question 1: Would you or your organisation be willing to participate with ACOLA in the development and ongoing support of a Research Plan?

- Yes

Question 2: What should be the scope of the Research Plan (how should we define 'energy', 'transition' and 'research')?

- 'energy'
We agree with the Design Issues Paper that the scope should embrace all forms of energy: electricity, stationary, transport, embedded etc.
- 'transition'
We believe that it is important to indicate the timeframe for the transition being considered. For the energy transition itself, we are clearly considering the period from now until we reach a fossil fuel-free economy, hopefully by the middle of this century.

In this context we envisage a research plan that captures these long term goals but also articulates clear short term research objectives that support these long term goals.

We also believe that it will be necessary to clearly articulate phases of activities within the research plan. These phases might be characterised over rolling 5 year horizons: key research to enable effective input into the transition till 2025; refinements and extensions learning from experience until 2030; and fine tuning based on the trajectory of the transition into the mid-2030s. There will always be opportunities for foundational research to contribute at any stage in the transition once it has reached maturity.

- 'research'
We agree with the document that all disciplines from science and technology to the human and social sciences should contribute.

However, the scope should include the regional dimensions of energy transition in Australia, including how to make economic and social change more acceptable in fossil fuel producing regions; opportunities for renewable energy growth in regional and rural areas.

We also need to place the scope within the context of Australia being a major global energy exporter. Our fossil fuel energy exports and the energy embedded in other potential exports (such as hydrogen and refined metals) will also need to transition

to an energy export future based on renewables – a completely new paradigm. This deserves a stand-alone dot point under “the scope should incorporate” :

“Research into the transitioning of Australia’s global role as a major energy supplier and the exporter of embedded energy products, as it transforms to an energy export future based on renewable energy.”

Further, we would like to emphasise as we do in Q4, that Australia is a global pathfinder in the transition to renewable energy, so we have the opportunity to provide leadership in energy transition research – and engage with international research in this space. In particular, given that energy exports may well dominate domestic energy use, we should include another dot point under:

*“wide and inclusive whole of Australia context, that concentrates on Australia’s **domestic and export** needs and research priorities, and engages:*

- With key overseas energy users, stakeholders and collaborators”

Question 3: What processes and products should the Research Plan deliver?

We believe there should be more emphasis on how the funding of research arising from the Plan can be identified. Options could include:

- Creating a list of Energy Transition Research Priorities for existing funding sources (ARC, ARENA etc.)
- Suggestions for research funding from new funding sources (regulators, government agencies, State governments, peak bodies etc.)
- The development by COAG of a funding strategy, potentially with a levy on energy companies. There will be greater engagement if COAG funds as well as directs the plan.

Other products could include:

- Reports to support the energy transition of key sectors of the economy – laying out cross-sector couplings and their timeframes e.g. EV development in parallel with RE electricity to capture the greatest emissions reductions
- The creation of an Energy Transition Roadmap – based on a Sankey diagram with energy flows in all sectors of the economy represented, and indicating increased electrification and gradual penetration of RE over time.

Question 4: What existing research plans and design approaches can ACOLA draw on for the proposed Research Plan?

We should emphasise that while we can always learn from overseas experience, Australia is a global pathfinder in the transition to renewable energy, so we have the opportunity to provide leadership in energy transition research.

We should, however, particularly examine approaches being used in the following countries and organisations:

- German Energiewende – including the annual independent, government commissioned expert assessment of progress with the energy transition (“Energiewende Monitoring”); and research funding programmes such as the KOPERNIKUS programme.
- Processes underway with the Global Power System Transformation Consortium (GPST) – AEMO is the Australian link
- Processes underway with the Energy Systems Integration Group (ESIG) – AEMO is the Australian link
- ARENA has successfully funded portfolios of research and development over the last decade. ARENA has been adept at identifying areas where such R&D is necessary and then funding parallel streams of work that greatly enhance the capability and capacity nationally.
- UK approaches.

Question 5: How would you or your organisation like to be engaged in the development of the Research Plan?

- The ANU Energy Change Institute (~300 researchers including PhD students) is ready and has the capability to contribute substantively across the full spectrum of research disciplines. Within and affiliated with the ECI are the following programs, centres, and institutes with specific capability and capacity in this area:
 - The ANU ECI Grand Challenge program – *Zero-Carbon Energy for the Asia-Pacific* – has deep capability (~40 research staff) to contribute to the energy export transition.
 - The Centre for Climate and Energy Policy (CCEP) has strength in economic and policy analysis and has established links with the leading German researchers and institutions in the Energiewende process.
 - The Battery Storage and Grid Integration Program has 35+ staff and students who can contribute to areas of the transition related to the secure and reliable integration of renewable generation and distributed energy resources (DER) into the electricity system.
 - The solar PV and solar thermal research groups in the College of Engineering and Computer Science have about 90 staff and PhD students who engage in energy technology research and applications – particularly to the transition.
- The ANU Climate Change Institute also has expertise on the energy transition, some of it shared with ECI e.g. economic policy applicable to both, such as carbon pricing.
- The ECI is also able to engage in consultation through ERICA.

Question 6: How should ACOLA govern and fund the development and ongoing support of the Research Plan?

- Seek funding to carry out the planning process from Government
- Use the State-of-Energy-Research Conference (run by ERICA) for annual reporting of energy transition research, and as a forum to consult the research community
- Have a strong and independent Steering Committee to provide frank and fearless advice that is not captured by vested interests (including international representatives from the German Energiewende, NREL, IEA etc.)

- Establish a National Energy Transition Research Centre?

Question 7: What do you see as the key risks that ACOLA will need to manage in the development of the Research Plan?

- The Plan is ignored: mitigate by proposing to COAG that it requests the Plan, and then COAG can respond to the annual update of the Plan
- The Plan is captured by incumbent energy industry stakeholders: mitigate through the independence of the Plan assessment process (including by international representatives from the German Energiewende, NREL, IEA etc.)
- Lack of cross-institutional collaboration: mitigate by ensuring that funding is not driven by short term competitive processes.
- Lack of collaboration between technology and social science disciplines: mitigate by funding incentives that encourage disciplines to work together rather than independently.

Question 8: Are there any other issues that ACOLA should be considering in the design of the Research Plan?

- The Plan should be sufficiently flexible to evolve with changing circumstances – including a rapid response capability to address e.g. COVID-19 recovery, sudden closure of major thermal power stations etc.