Getting the energy transition right: The case for an integrated energy RD&I initiative

As the transition to a net zero economy begins in earnest, Australia's research and innovation ecosystem has a significant role to play to help businesses, households and governments decarbonise their energy use and operations. While Australia has made significant progress in deploying renewable energy, there are still substantial gaps in our arsenal to decarbonise the entire energy sector.

The energy transition has two interlinked components – energy demand and energy supply. All too frequently, research efforts are focused on technologies to decarbonise energy supply, without regard for the role that demand-side measures such as energy efficiency, electrification and demand flexibility can play in reducing emissions rapidly and inexpensively.

Linked to the supply-side focus, research efforts have also focused on energy *technologies*. On the demand side, many of the technologies needed are mature. Instead, RD&I is needed to design and deliver new processes, markets, and policies that cater to energy users' circumstances and behaviours – from households to industrial energy users.

Integrated energy systems are the key to accelerating the transition

Optimising energy supply and energy demand simultaneously – through an integrated approach that values both sides of the energy system equally – has the potential to significantly speed up the transition and reduce the cost of infrastructure. For example, using flexible demand technologies that are optimised to consume renewable electricity when it is available, could save up to **$18 billion** for consumers.

However, significant research development and innovation (RD&I) is needed to grasp the opportunities presented by integrating and optimising supply and demand in the energy system, through flexible demand, grid-interactive buildings and digitalisation technologies.

Integrated energy systems need an integrated approach to RD&I

Activity is needed at all stages of the research, development and innovation chain to deliver an integrated energy system – one that optimises energy supply with energy demand, and successfully integrates decarbonisation technologies into household and business daily use.

A holistic approach to RD&I entails integrating the perspectives of the research community, consumers, businesses, governments and others to maximise the efficiency and impacts of RD&I efforts.

A sharper focus on the demand side also means integrating approaches from multiple disciplines. Unlike the basic and applied research required to discover new technologies, there is still substantial interdisciplinary R&D (including STEM and HASS disciplines) required to understand how to deploy these technologies for best effect, considering human behaviour, institutional factors and business models – amongst other things.

It's time to get serious about integrated energy RD&I

As Australia's RD&I efforts – at 1.68% of GDP[1] – lag our international competitors, we run the risk of not undertaking the necessary RD&I to meet our energy transition needs. This is especially so as energy RD&I comprises only 5% of our national RD&I effort – when the energy transition is likely to be the most pressing and urgent of the challenges facing us.

While energy RD&I efforts such as those through ARENA and several CRCs have made some progress to better direct RD&I towards parts of the energy system beyond supply, delivery and storage technologies, a fully integrated energy RD&I capability remains elusive – meaning that our transition will be slower, more expensive and more emissions-intensive than necessary.

Our organisations support calls for Australia to increase its support for RD&I to at least 3 per cent of GDP[2], including an urgent increase of *energy* focused RD&I investment, starting with a new $1 billion allocation to support breakthrough research for the clean energy transition. We further call for the establishment of a dedicated centre for energy integration RD&I, bringing together academics, policymakers, industry and NGOs to help develop knowledge, expertise and solutions to solve energy problems with an integrated, holistic approach.

Supercharging our energy RD&I effort cannot wait

The Energy Efficiency Council and Energy Research Institutes Council of Australia recommend that Commonwealth, State and Territory governments urgently make a step-change investment in energy RD&I, starting with an additional $1 billion towards energy transition RD&I over the next decade.

Further, we recommend that Commonwealth work with universities and other stakeholders to establish a centre for integrated energy studies as soon as possible to build knowledge and expertise to accelerate the clean energy transition.

Luke Menzel
CEO, Energy Efficiency Council

Dani Alexander,
CEO, UNSW Energy Institute,
Chair, ERICA

[1] Australian Council of Learned Academies, 2022, *Australia's Funding of Energy Research – Quantum and Comparison*, https://acola.org/wp-content/uploads/2022/09/ACOLA-2022-AETRP-Report-2-research-funding.pdf. While more recent data collected by the IEA suggest energy RD&I funding may have increased in 2022, levels fell again in 2023 and remain well below average funding levels from 2009-2013. See, IEA, 2024, *Energy Technology RD&D Budgets Data Explorer*, https://www.iea.org/data-and-statistics/data-tools/energy-technology-rdd-budgets-data-explorer.

[2] For example, Group of Eight, July 22 2024, *Media Release: Go8 Roadmap to lift Australia's R&D intensity to 3% of GDP*, https://go8.edu.au/go8-roadmap-to-lift-australias-rd-intensity-to-3-of-gdp#:~:text=The%20Group%20of%20Eight%20%28Go8%29%20comprising%20Australia%E2%80%99s%20leading,to%203%20per%20cent%20of%20GDP%20by%202035.