

Royal Geographic Society Qld Talk 23 Aug

A Power Network Fit for Purpose - Trevor Berrill

Thank you for the invitation - **My talk will cover the role of Renew in sustainability, and the evolving structure of the electricity network to provide sustainable clean energy.** I will mention some barriers to the uptake of clean energy, and innovations that will assist the transition. I should mention that the views expressed here are mine and not necessarily those of RENEW

Renew is a national, not-for-profit organisation that inspires, enables and advocates for people to live sustainably in homes and communities.

We have been providing **expert, independent information and advice on practical sustainable solutions** for the home for over 40 years, reaching about 250,000 people each year and helping thousands of households reduce costs and their environmental footprint. We provides information on:

- Efficient use of materials and energy,
- Solar PV power and batteries,
- Electric vehicles,
- Rainwater tanks,
- Materials and waste management.

Renew also advocates in government and industry for policies that promote best practice to cut emissions, make our homes healthier, more affordable and climate resilient.

The first question I wish to address is the evolving structure of the electricity network as we transition to a largely renewable energy fuelled power system. **A National Energy Transition Plan** is finally under development and the Australian Energy Market Operator (AEMO) already has an **Integrated Systems Plan** that is part of this as I will outline shortly.

But first, what the end-user wants from the network is affordable energy that is clean and reliable.

We can do this a number of ways including:

At the NEM level, minimising the cost of generation, storage and transmission / distribution.

At a home / business level

1. **Using more energy efficient appliances.**
2. **Improving the energy efficiency of our buildings.**
3. **Using solar PV** and with or without **storage.**
4. **Controlling when some appliances operate**, either manually or via smart controllers.
5. **Implementing Time of Use Electricity Tariffs** that reflect the price of electricity at different times of the day and year, and shift loads to off-peak periods so that you get cheaper rates.

Every kilowatt-hour saved, saves on generator, transmission, distribution and storage costs

The AEMO's Plan outlines how the network will be restructured to become a **Distributed Intelligent Network** consisting of:

1. **RE Zones** where larger scale renewable energy generators and battery storage are being located. These are regions of higher solar radiation and wind resources and an available strong high voltage transmission system.
2. **Strengthening transmission interconnections** as required.
3. **Employing Large-scale energy storage via Batteries, Pumped Hydro and Heat Storage.** This makes RE fully dispatchable and assists with maintaining grid stability.
4. **Increasing medium and small scale RE generators embedded in the distribution system** in towns and cities – providing **behind the meter on-site power**.
5. **Employing local battery storage** within the distribution system – either in households/businesses or at a suburb level, whichever is more effective and safer.

Innovations – There are a number of innovations that are key to the energy transition.

The first is that **grid stability control** is viable using solar / wind farms with **advanced grid-scale inverters and storage**.

Energy storage technologies are rapidly developing, including **Hydrogen**, which is most efficiently used for **industrial process heat**.

We need the ability to **isolate** and keep parts of the network supplied with power during extreme weather. **Battery / Inverters systems** have the ability to do this together with DSM.

Adopt Packetized Energy Management. This is a new control method that allows electricity **demand to follow supply**. It has great potential for **variable wind and solar systems**, can **reduce peak demand**, and **save on storage and transmission costs**. It's ideal for **powering hot water, pool, space conditioning and electric vehicle charging**.

It is based on a **prioritised energy needs assessment of appliances** that sends small packets of energy to appliances as required, randomly over time, instead of in large chunks. This is similar to the way information is packaged and sent over the internet.

We need to address a number of non-technical Issues to accelerate a Transition to a Clean Network

Poor Energy Efficiency is the first one - According leading energy analyst Dr Hugh Saddler, Australia's energy efficiency lags most other OECD countries. He says

Over the last 15 years, Australia has squandered its golden opportunity to decouple its energy sector from fossil fuels, unlike so many other OECD countries. As a result Australians are left with high-polluting and inefficient power, heating, housing and transport. This also drives up our cost of living and drives down our energy productivity. (Having worked in energy efficiency and energy auditing for over 40 years, I can give endless examples).

Action on Climate Change has been **stalled** for more like **30 years**, largely due to the **power and influence of the fossil fuel industry**. We must limit their **political Influence**, by starting with changes to **political party donations system**.

We need to re-assess Control / Ownership of the National Electricity System - I have just spent the last two months reviewing numerous reports and commentary on the **dysfunctional energy market** in Australia. **This raises the question of whether or not the NEM should return to public ownership** – as **privatisation appears to have failed**, for **many complex reasons**. I believe there should be a **national inquiry** to address this issue.

There are other economic considerations - We need to halt Subsidies to the fossil fuel industry – The IMF, IEA and UN have all repeatedly called for their removal!!

Globally subsidies amount to **\$5.9 trillion** in 2020 (Source: IMF)

In Australia it was **\$11.6 billion** 20/21 (Source: TIA)

We need to include External Costs of pollution fully to ensure we are paying fairly for our use of fossil fuel and ensure the mining industry cleans up its legacy. This includes:

1. **Mine rehabilitation** costs estimated at \$6 billion in Qld alone (Source: Main et al)
2. **Fly ash disposal** from Power Stations – This material **contains many toxins**. (Source: Environmental Justice Australia).
3. **Annual air pollution and health costs** are estimated **\$7.6 Bill NEM \$1.1 Bill (Qld only)** (Source: Australian Academy for Technology Science and Engineering)

These Subsidies and avoidance of External Costs make fossil fuels appear cheaper than they really are and:

- Distorts markets
- Encourages wasteful consumption
- Increases pollution
- Discourages and diverts investment from Clean Technologies

There is increasing Nimbyism that is blocking solar / wind farm & transmission / distribution line development. This requires broad **public education and consultation** of what is required to transition to renewable energy.

There is a need to speed up the Recycling PVs and Wind Turbine Blades

There is a need to ensure that the Mining Industry powers itself by renewables and operates with **best practice environmental management** in all parts of the world. Combine this with the rapid **transition to a circular economy** to reduce waste and minimise mining.

In summary, we need to:

- **Implement AEMOs ISP** together with national and regional plans to transition fossil fuel dependent communities.
- **Greatly accelerate** our adoption of best practise **energy efficiency** measures and technologies.
- **Stop subsidising the fossil fuel industry** and **re-direct those funds** to clean energy development.
- **All of the above is now URGENTLY required to address the existential threat of Climate Change.**

References

National Planning

AEMO Integrated System Plan <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp>

<https://www.energy.gov.au/government-priorities/energy-ministers/priorities/national-energy-transformation-partnership>

<https://www.irena.org/energytransition/Energy-Planning-Support/National-Energy-Transition-Planning-Dashboard>

UNs Sustainable Development Goals -

<https://www.sciencedirect.com/science/article/pii/S0305750X19303985>

Packetised Energy Management <https://www.youtube.com/watch?v=NU3woCaFSZs&t=625s>

Remove Subsidies to Fossil Fuels

\$5.9 trillion <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

<https://www.iea.org/topics/energy-subsidies>

<https://www.undp.org/publications/fossil-fuel-subsidy-reform-lessons-and-opportunities>

The Australia Institute (2022) Australian Fossil Fuel Subsidies Surge ..

<https://australiainstitute.org.au/post/australian-fossil-fuel-subsidies-surge-to-11-6-billion-in-2021-22/>

Externalities of Fossil Fuel Use

Biegler, T. (2009). *The Hidden Costs of Electricity: Externalities of Power Generation in Australia*. Report by Australian Academy of Technological Sciences and Engineering. www.atse.org.au

Environmental Justice Australia (2019). Report on Coal Ash Waste Hazard

<https://envirojustice.org.au/blog/projects/coal-ash-wast/>

Main, L. & Schwartz, D. (2015). Industry insider warns taxpayers may foot bill for mine rehabilitation unless government, industry step up. ABC Landline report. <http://www.abc.net.au/news/2015-09-19/taxpayers-may-foot-bill-for-mine-rehabilitation/6787954>

Political Influence by Fossil Fuel Lobby

Revolving door <https://michaelwest.com.au/revolving-doors-how-the-fossil-fuel-lobby-has-governments-ensnared/>

Greenhouse Mafia https://en.wikipedia.org/wiki/Greenhouse_Mafia

<https://www.abc.net.au/news/rural/2022-08-17/bhp-coal-queensland-blackwater-south-mine-royalty-rises/101340898>

Greenwashing by Santos [Greenwashing case against Santos shifts the dial on climate lawfare \(afr.com\)](https://www.afr.com/greenwashing-case-against-santos-shifts-the-dial-on-climate-lawfare) and <https://reneweconomy.com.au/this-is-total-total-greenwash-santos-claims-massive-new-oil-project-will-be-carbon-neutral/>