



# LEGISLATIVE ASSEMBLY

FOR THE AUSTRALIAN CAPITAL TERRITORY

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STANDING COMMITTEE ON ENVIRONMENT, CLIMATE CHANGE AND BIODIVERSITY

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## Submission Cover Sheet

Inquiry into Renewable Energy Innovation  
in the Australian Capital Territory

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# Standing Committee on Environment, Climate Change and Biodiversity

## Renewable energy innovation in the Australian Capital Territory

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### Terms of reference

- a) opportunities and challenges to boost renewable energy research, technology development and new zero emissions industries in the ACT;*
- b) opportunities and challenges to establish the ACT as a national hub for renewable energy technologies and industries including zero emissions vehicles;*
- c) opportunities and challenges to innovatively finance and/or manage renewable energy in the ACT;*
- d) strategies to address limitations to collaboration and innovation between renewable energy stakeholders;*
- e) the effectiveness of administration and funding of Australian Capital Territory Government policy and regulatory settings relating to renewable energy, climate action and emissions reduction;*
- f) opportunities and challenges in battery storage including neighbourhood-scale batteries and vehicle-to-grid technologies; and*
- g) any other relevant matters.*

### Background

About 70% of Australia's emissions relate to fossil fuel energy and 10% to fugitive emissions from fossil fuel mining. It is abundantly clear that solar PV and wind will overwhelmingly be the method of driving fossil fuels out of the national economy. This is occurring initially in the electricity sector. Later, electrification of land transport and heating allows solar and wind to drive fossil fuels out of those sectors.

Stronger transmission (to smooth out local weather) and storage is needed to support high levels of solar & wind. In Australia, storage is overwhelmingly in the form of pumped hydro and batteries (including vehicle batteries). Little seasonal storage is required in Australia [1,2].

Canberra is a small jurisdiction with little manufacturing. Its capacity to contribute to the global renewable energy industry is enhanced by the following characteristics:

- A strong commitment by Government to reach zero emissions at an early date
- Substantial presence of several renewable energy companies, largely as a result of the Government project to achieve 100% renewable electricity via reverse auctions
- A strong renewable energy R&D community, primarily at the Australian National University.

Canberra's residual emissions and the obvious paths to decarbonisation are:

1. Internal combustion engine (ICE) vehicles: replace with electric vehicles (EV)

2. use of gas for air and water heating: replace with electric heat pumps
3. waste: high temperature incineration to eliminate methane

All three items offer commercial prospects for Canberra through national path-finding leadership, following the model for reverse auctions. i.e. offer contracts or incentives to companies to roll-out technology in Canberra as the national first mover in return for establishment of HQ in Canberra or some other offset benefit.

## Vehicles

Canberra can seek to become the far-ahead national leader in EV uptake. This could be achieved through the following (amongst other measures):

- Offer a contract to convert the ACT Government vehicle fleets (including buses) to EV in return for an EV manufacturer establishing a strong administrative and R&D presence in Canberra – similar to the process of reverse auctions for electricity. Facilitate a similar arrangement for large fleet owners in the commercial and institutional sectors.
- Offer negative registration fees during the initial growth phase of EV sales (i.e. the fees on ICE vehicles become slightly larger to cover the cost of a subsidy to EV vehicles)
- Offer transit lane access and preferred parking arrangements until EV sales reach (eg) 10% of the total

## Air & water heating

Canberra can seek to become the far-ahead national leader in uptake of heat pumps. This could be achieved through the following (amongst other measures):

- Ban gas in new suburbs (already underway)
- Strongly discouraging (or banning) gas as a like-for-like replacement
- Organise a large-scale auction program to replace existing gas air & water heaters in Government-owned houses with electric heat pumps, to entice companies to establish a strong administrative and R&D presence in Canberra – similar to the process of reverse auctions for electricity.
- Organise a series of large-scale auction programs to replace existing gas air & water heaters in privately-owned houses with electric heat pumps, to entice companies to establish a strong administrative and R&D presence in Canberra – similar to the process of reverse auctions for electricity.

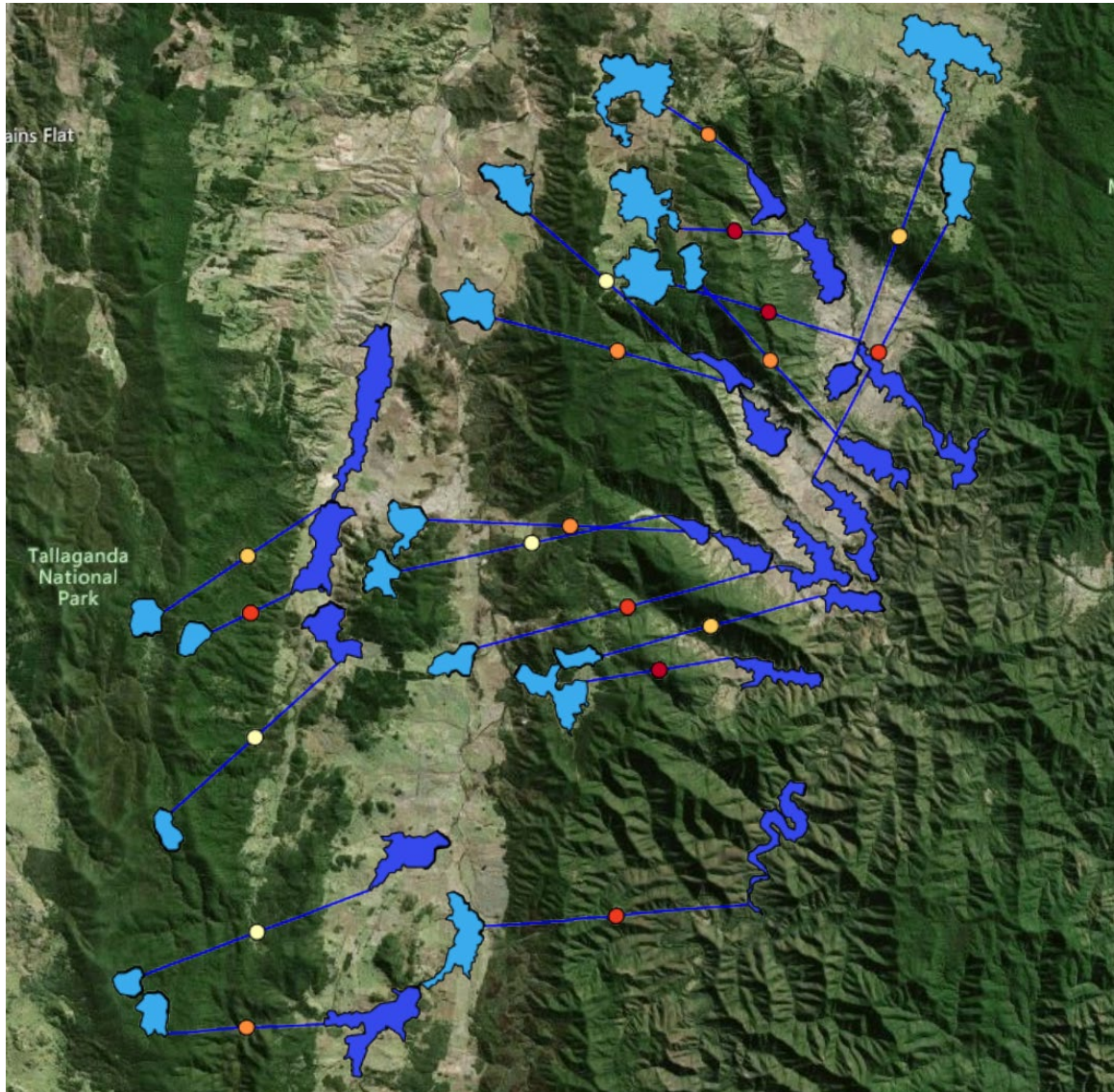
## Rooftop solar

Aim for 80% of houses to have rooftop solar by 2026:

- Organise a large-scale auction program to install rooftop PV in Government-owned houses, to entice companies to establish a strong administrative and R&D presence in Canberra – similar to the process of reverse auctions for electricity.
- Organise a large-scale auction program to install rooftop PV in privately-owned houses, to entice companies to establish a strong administrative and R&D presence in Canberra – similar to the process of reverse auctions for electricity.

## Storage

An excellent off-river pumped hydro storage site is available near Araluen, which could be used to support massive scale-up of solar and wind in the Federal electorate of Hume (to the NE of Canberra). Perhaps this could be explored with the NSW Government.



*Araluen pumped hydro opportunities [3-5]*

## Hydrogen

There is a lot of hydrogen hype. The focus of Canberra should be strongly on solar & wind electricity generation, transmission, storage, integration and use because these are directly relevant to Canberra. Hydrogen will be little needed in Australia for energy storage or transport because its efficiency is very low (~25% round trip) and its cost is high compared with batteries/pumped hydro and electricity transmission respectively. Hydrogen-powered vehicles have little chance of competing with electric

vehicles given the overwhelming market share of the latter. This includes long distance vehicles (the Tesla semi EV has a range of 500-800km [6]) and EV mining vehicles (eg battery-swap technology charged from local solar & wind). The export market for hydrogen is substantially limited by the enormous potential for lower-cost offshore wind in Japan, Korea and northern Europe. Hydrogen will be needed in the 2030s and 2040s to provide hydrogen atoms (as distinct from energy) for the chemical industry (eg for ammonia synthesis or iron ore reduction).

## University R&D

A valuable way for the ACT Government to help Canberra R&D is to use company offset money (however generated) to leverage ARENA and ARC Linkage grants. This allows \$1 of company money to leverage \$3-4 more dollars from the Federal Government.

## References

1. Andrew Blakers, Bin Lu, Matthew Stocks, '100% renewable electricity in Australia', *Energy*, vol. 133, pp. 471-482, 2017, <http://www.sciencedirect.com/science/article/pii/S0360544217309568>
2. Bin Lu, Andrew Blakers, Matthew Stocks, Cheng Cheng, Anna Nadolny, "A zero-carbon, reliable and affordable energy future in Australia", *Energy*, Volume 220, 2021, <https://doi.org/10.1016/j.energy.2020.119678>
3. <http://re100.eng.anu.edu.au/global/index.php>
4. Matthew Stocks, Ryan Stocks, Bin Lu, Cheng Cheng, Andrew Blakers, "Global Atlas of Closed-Loop Pumped Hydro Energy Storage", *Joule*, Volume 5, ISSUE 1, P270-284, 2021, <https://doi.org/10.1016/j.joule.2020.11.015>
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