Answers to questions on notice from the
Senate Select Committee on Energy Planning and Regulation in Australia

by Prof. Michael Brear, University of Melbourne

Senator CANAVAN: Okay—both renewables and firming. That's what I wasn't sure about. Do you have a breakdown? How much of that is storage, compared to just renewables?

Answer
The table below shows the proportions of the capacities of renewables, storage and natural gas fired electricity generation and other forms of firming in 2050 over the 5 core, net zero scenarios for the domestic energy system in the Net Zero Australia Project [1]. We require the domestic energy system to achieve net zero by 2050 in this modelling.

	Renewables	Energy Storage		Gas and other firming
	(GW)	(GW)	(GWh)	(GW)
No abatement target	109	18	384	47
Net Zero Scenarios	328-576	70-92	739-1041	33-77

This table also shows the same information for the core scenario that had no abatement constraint applied. This scenario achieves negligible abatement by 2050 whilst, like the net zero scenarios, also minimising the total costs of the Australian domestic energy system over 2020 to 2050.

Senator CANAVAN: Okay. Great. Just while I'm on the report—it's been a little while since I looked at it—you mentioned in your submission the problems of land access. How much land is needed to build renewable energy? Maybe I will just add the next bit of my question in now. How much is needed for—for want of a better word—reforestation, carbon sinks et cetera?

Answer
The table below shows the areas of renewable generation, transmission and new tree plantings in 2050 over the 5 core, net zero scenarios for the domestic energy system in the Net Zero Australia Project [1]. These new tree plantings are approximately 8% of Australian agricultural lands, and was expected to not compromise agricultural production provided that means of improving agricultural productivity and other forms of land sector abatement are implemented simultaneously [1]. This table also shows the same information for the core scenario that had no abatement constraint applied.

	Renewables	Transmission	New tree plantings
	(km^2)	(km^2)	(km^2)
No abatement target	6,515	807	0
Net Zero Scenarios	22,072-43,997	1,774-2,785	51,000

Two reference areas are also provided to aid the interpretation of these areas:

1. The table below presents these same areas as a % of the total Australian land area of 7.688 million km^2 [2].
2. Australian land clearing over 1990 to 2022 was 181,603 km^2 or 2.36% of the total Australian land area [3]. This period is similar to the 30 years (from 2020 to 2050) that the Net Zero Australia Project considered for the decarbonisation of the Australian domestic energy system.

	Renewables (%)	Transmission (%)	New tree plantings (%)
No abatement target	0.08%	0.01%	
Net Zero Scenarios	0.29-0.57%	0.02-0.04%	0.66%

References

1. https://www.netzeroaustralia.net.au/
2. https://www.ga.gov.au/scientific-topics/national-location-information/dimensions/area-of-australia-states-and-territories
3. https://greenhouseaccounts.climatechange.gov.au/