

Costs of subsidies for renewable energy and associated need for energy storage

March 2024

DIRECT AND INDIRECT SUPPORT FOR RENEWABLES

Subsidies to renewables (\$ million per annum)

- LRET 33,000 GWH times \$44.25 per MWh. \$1460
- SRES 37.9 million to be surrendered this year times \$39.65 \$1503
- 25 % reduction by 2030. ACUs 6.9 rising to 49.4 million by 2030 or total 145 million; if price remains \$37.75, annual average cost for 24 million is \$906
- RERT, FCAS and system security \$400
- [Clean Energy Regulator](#) \$750
- State Schemes (2019) \$1408
- Capacity Investment Scheme \$68B investment by 2030 (\$10.3B per year) 55 % of costs to governments \$5775

Long term (assume 15 year annualised)	Fund	Annualised
• Hydrogen Headstart	\$2B	\$133m
• Expansion of transmission from \$23B to \$100B	\$77B	\$510m
• CEFC	\$20B	\$1333
• ARENA	\$1.5	\$100
• Snowy 2	\$20B	\$1333
• TOTAL		\$15,611

Other Support for renewables

- Commonwealth and State Departmental and other institutional staffing and their regulatory controls
- CSIRO allocation of public funds to GENCOST and other tasks that adversely impact upon hydrocarbons
- Planning regimes that use bogus warming and indigenous issues to hinder approvals involving hydrocarbons
- Inaction by States Grants Commission in not penalising those states that impede use of energy resources (thereby rewarding states that refuse to make full use of the energy resources available to them)
- Tolerance of banks, superannuation funds and other financial agencies in discriminating against coal and gas

WIND DROUGHTS IN A RENEWABLE ONLY SYSTEM

Wind Droughts

The amount of storage required is unknown and estimates vary.

If a wind drought were to last 2 days – a not unusual event - in a wind-only system with demand at 330,000 GWh (current levels increased by a quarter because of EVs and other energy changes) this means an average daily use of 900 MWh. Storage needed would be 1,800 GWh. But this would assume that the replenishment would be immediate. A mixed system of wind and solar would require less storage because the *dunkelflaute* effects would be modified by the solar output but wind is a cheaper source of electricity.

Estimates of Costs of Storage

Battery	Storage (MWh)	Cost	Cost/MWh
Greenbank battery	400	325,300,000	813,250
Stanwell battery	300	269,100,000	897,000
Borumba	48,000	14,200,000,000	295,833
Snowy 2.0	325,000	10,000,000,000	30,769

Source Qld State budget, Graham Young

Aggregate Storage Installation Costs

Taking into effect realistic replenishment trajectories, no losses in the transport to and from storage and assuming a perfect operating system of limitless transmission, and no growth in current demand, Global Roam's [Paul McArdle](#) estimated the need at 9,000 GWh which is 70,000 Hornsdale batteries or 25 Snowy 2's or \$6.3 trillion. That is more than twice the nation's GDP for a system that would also be prone to a great deal more breakdowns than has been experienced under the present coal dominant supply.

[Francis Menton](#) estimates that 26 days storage is required for a wind only system. For Australia, this means 13,000 gigawatt hours of storage, which is 25 times what the AEMO Integrated Systems Plan envisages. A [study](#) by Boston and Bongers put the storage requirements of a 50/50 wind and solar at 3,300 GWh (\$2.3 trillion) for a 4-day wind drought.

APPENDIX

Federal renewables funding so far:

- \$10b – CEFC
- \$6.0b – Snowy 2.0
- \$4.0b – Snowy 2.0 transmission
- \$3.5b – Climate Solutions Package
- \$3.0b – Marinus Link
- \$3.0b – BOTN
- \$2.5b – Emissions Reduction Fund
- \$1.5b – ARENA
- \$1.0b – Grid Reliability Fund
- \$0.5b – National Hydrogen Strategy
- \$0.6b – Kurri Kurri Power Station

Renewable Energy Target

- \$4.1b (2010-2020)
- \$1.4b (2021-2022)

Renewables funding still to come:

Federal

- \$20b (more like \$40b) – Rewiring the Nation (transmission)
- Renewable Energy Target
- Hydrogen
- Electric Vehicles
- National Restructuring Fund

States

- NSW – renewable energy zones
- VIC – reverse auctions and transmission, SEC
- QLD – \$62b to close coal, plus wind and solar contracts and renewable energy zones
- SA – synchronous condensers, batteries, transmission