Off-River Pumped Hydro Energy Storage (PHES)
Site Searching Methods and Results

Kirsten Anderson, Andrew Blakers, Matthew Stocks, Bin Lu and Anna Nadolny
Australian National University, Canberra, Australia
100% Renewable Energy – RE100 – ANU, http://re100.eng.anu.edu.au
Kirsten.anderson@anu.edu.au

Methods

- The site searching methodology involves applying search criteria to land areas with elevation differences greater than 300m (or 200m for WA, NT and SA) and outside of protected and urban areas.

Results and Discussion

- The ANU study has identified ~ 22,000 potential off-river reservoir locations in Australia.
- Off-river PHES opportunities are far more prevalent than river-based sites.
- PHES is well established, constituting 97% of electricity storage worldwide.
- Unlike conventional "on-river" hydro power, off-river (closed loop) PHES requires pairs of reservoirs that are generally 10-100 hectares in size.
- Only the best 0.1% of total sites, ~ 15-30 sites (450 GWh), are required to support 100% renewable energy grid.

Future Work

- Develop a figure of merit ranking system for upper and lower reservoir site pairing.
- Apply a cost model for reservoir site locations and development.

Acknowledgements

This Program has been supported by the Australian Government through the Australian Renewable Energy Agency (ARENA). Responsibility for the views, information or advice expressed herein is not accepted by the Australian Government.