4.4 Proposed data collection on grid-scale battery storage

21st APEC workshop on energy statistics

13 September 2023

Edito Barcelona, Senior Research Fellow

Asia Pacific Energy Research Centre

Outline

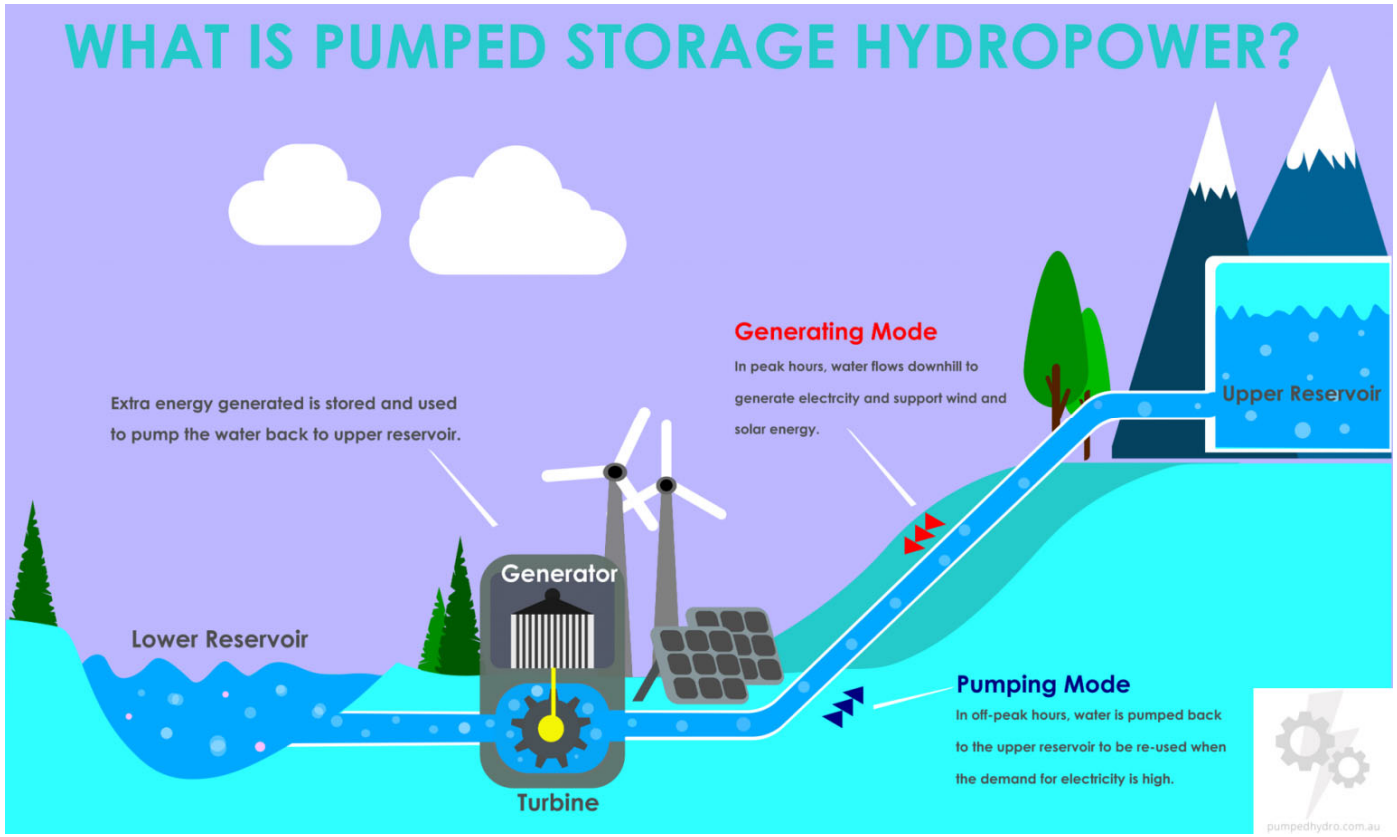
- Background
- Pumped-storage hydro
- Grid-scale battery storage
- Proposed collection of electricity storage data

Background

- The increasing share of variable renewables in electricity grids brought about risks in grid stability
- One of the solutions to address this risk is energy storage
- Just four years ago, there were concerns about the availability of rare earths that would be needed in large scale batteries
- In 2022, according to IEA data, about 12 GW of grid scale battery storage were installed, with about 80% of which were in China and the USA
- In 2019, less than 2 GW were installed

Pumped-storage hydro

- Currently, **pumped-storage hydro** is the most widely used storage technology



Source of image: https://pumpedhydro.com.au/education/what-is-pump-storage-hydropower/

Grid-scale battery storage

- **Batteries** (large-scale) are increasingly being used now with China and the USA leading the number and sizes of installations in the world.

Source of image: https://climate.mit.edu/posts/economics-grid-scale-energy-storage-wholesale-electricity-markets

Proposed data collection in APEC

- Currently, only the output (in GWh) of pumped-storage hydro are collected by the EGEDA secretariat; pumped-storage capacity (MW) is not collected
- For the collection of 2022 annual data, the secretariat will revise the annual electricity and heat questionnaire to collect electricity storage data

Proposed collection of electricity production data

2023 data collection

APEC-ASEAN joint format for annual energy data
Electricity production (Table 1a)

Unit: ***GWh***

		Thermal			Hydro	Nuclear	Geo-thermal	Other renewable energy								Others[3]	Total
		Coal	Oil	Gas				Solar	Tide, wave, ocean	Wind	Biomass	Industrial wastes[1]	Renewable municipal solid waste	Non-renewable municipal solid waste	Biogas[2]		
		A	B	C		E	F	G	H	I	J	K			L	M	N
Main activity producers																	
Gross electricity production	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electricity plants	2																0
CHP plants	3																0

2024 data collection

APEC-ASEAN joint format for annual energy data
Electricity production (Table 1a)

Unit: ***GWh***

		Thermal			Hydro		Nuclear	Geo-thermal	Other renewable energy								Battery electricity storage	Others[3]	Total
		Coal	Oil	Gas	Storage and run-of-river	Pumped-storage			Solar	Tide, wave, ocean	Wind	Biomass	Industrial wastes[1]	Renewable municipal solid waste	Non-renewable municipal solid waste	Biogas[2]			
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Main activity producers																			
Gross electricity production	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electricity plants	2																		0
CHP plants	3																		0

Electricity stored in batteries

APEC-ASEAN joint format for annual energy data

Supply to demand (Table 4)

		Electricity	Heat	Chilled water
		GWh	***10^10 kcal***	***10^10 kcal***
		A	B	C
Gross production	1	0	0	0
Own use by site	2	0	0	0
Net production	3	0	0	0
Imports	4			
Exports	5			
Used for heat pumps	6			
Used for electric boilers	7			
Used for pumped storage	8			
Stored in batteries	9			
Used for the production of chilled water	10			
Used for electricity production	11			
Energy supply	12	0	0	0
Transmission and distribution losses	13			
Total consumption (calculated)	14	0	0	0
Statistical differences	15	0	0	0
Total consumption (observed)	16	0	0	0

Net electricity generating capacity

2023 data collection

APEC-ASEAN joint format for annual energy data

Net electricity generating capacity[1] (Table 6)

Unit: MW

		Thermal			Hydro	Nuclear	Geo-thermal	Other renewable energy						Others[4]	Total
		Coal	Oil	Gas				Solar	Tide, wave, ocean	Wind	Biomass	Wastes[2]	Biogas[3]		
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
Main activity producer	1														0
Autoproducer	2														0

1. The Net Electricity Capacity is the maximum power that can be supplied, continuously, with all of the plant running, at the point of outlet to the network.
2. Wastes includes renewable industrial wastes and municipal solid wastes
3. Biogas includes landfill gas, sewage sludge gas, other biogas from anaerobic fermentation and biogases from thermal processes
4. Others includes non-renewable industrial waste and municipal solid wastes

2024 data collection

APEC-ASEAN joint format for annual energy data

Net electricity generating capacity[1] (Table 6)

Unit: MW

		Thermal			Hydro		Nuclear	Geo-thermal	Other renewable energy						Battery electricity storage	Electricity imports	Others[4]	Total
		Coal	Oil	Gas	Storage and run-of-river	Pumped-storage			Solar	Tide, wave, ocean	Wind	Biomass	Wastes[2]	Biogas[3]				
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Main activity producer	1																	0
Autoproducer	2																	0

Summary

- The secretariat would use the electricity and heat questionnaire to collect electricity storage and capacity data.

Asia-Pacific Economic Cooperation

APERC
Asia Pacific Energy Research Centre

Thank you.

https://aperc.or.jp