RISC

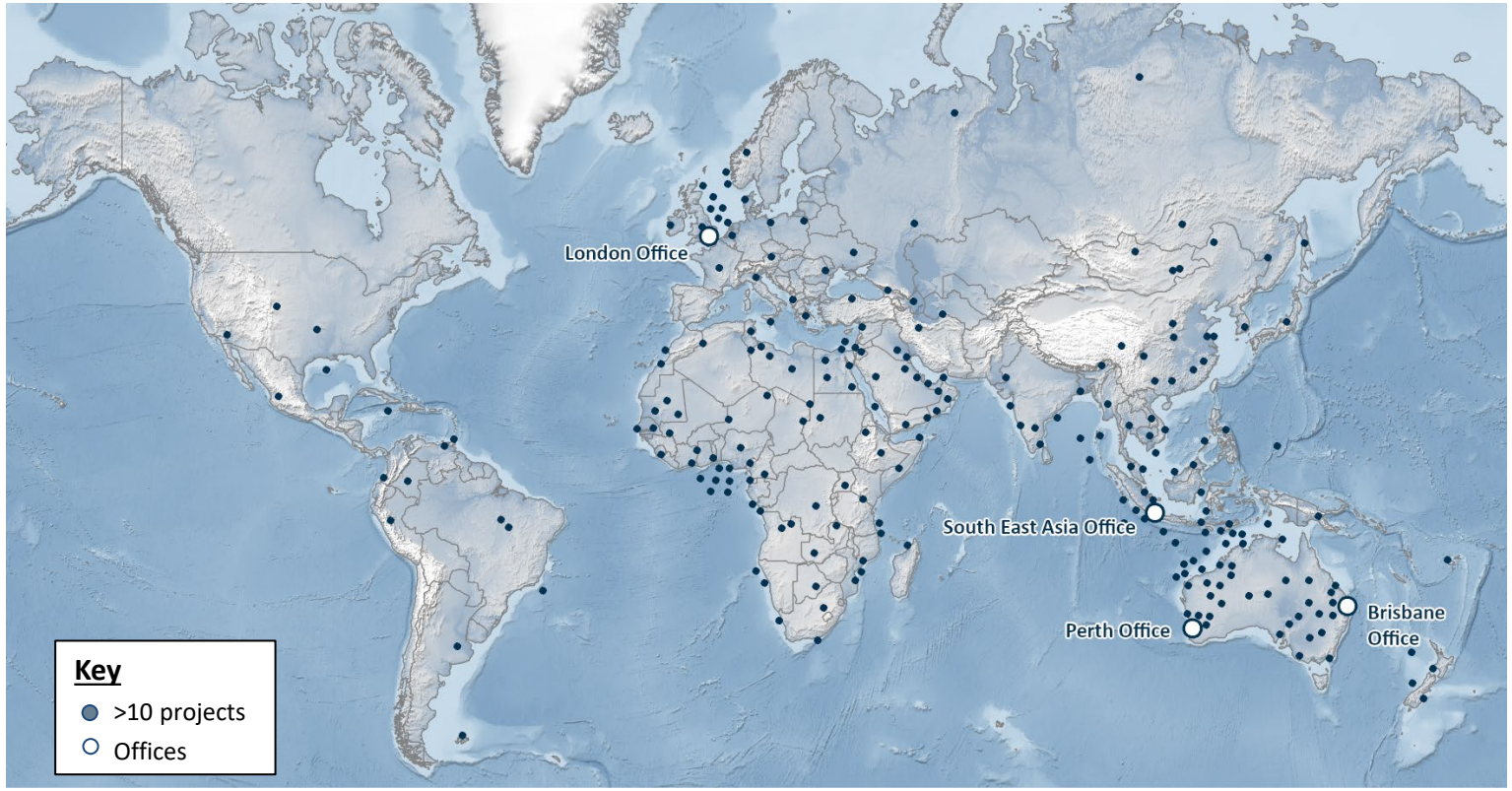
decisions with confidence

The rise of renewables…

and the increasing need for (less) gas.

Who we are

RISC is an independent advisory firm, providing insightful and impartial advice to a broad range of clients in the energy industries. We provide a more comprehensive, reliable and respected opinion faster than anyone else in the industry, enabling our clients to make their business decisions with confidence.



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My House

We have a 6 kW Solar array and a 14 kWh Battery

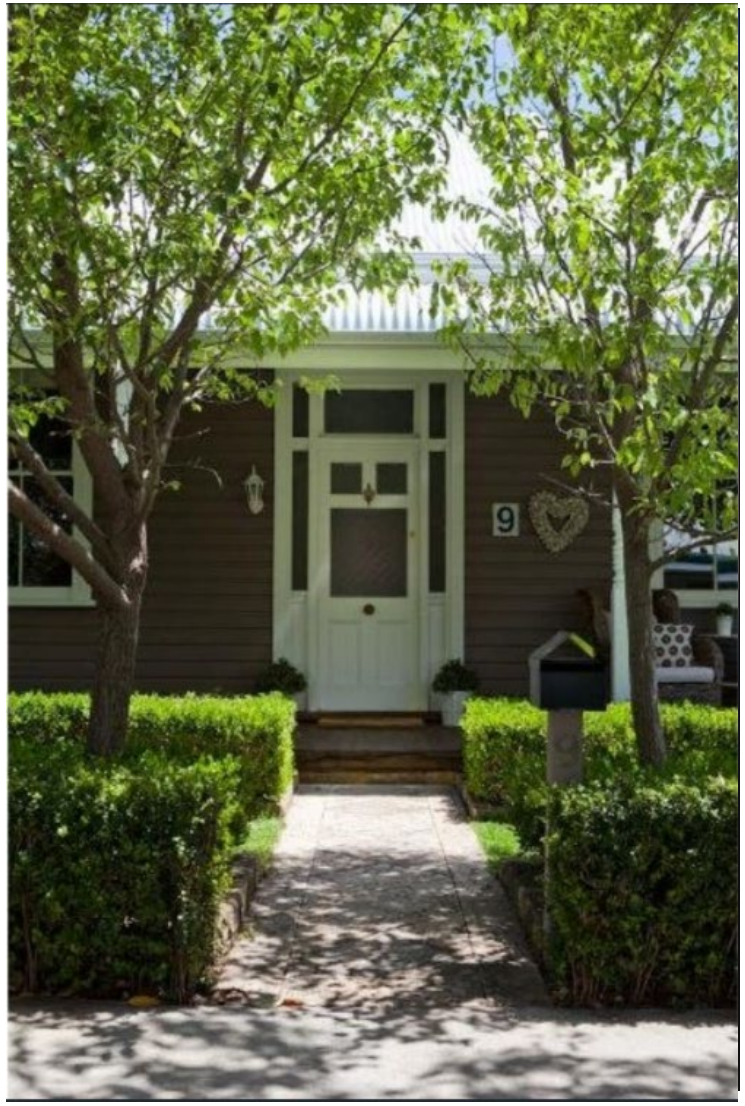
Since January:

- PV has produced: ~5390 kWh 29.0 kWh/d
- We have used: ~4220 kWh 22.7 kWh/d

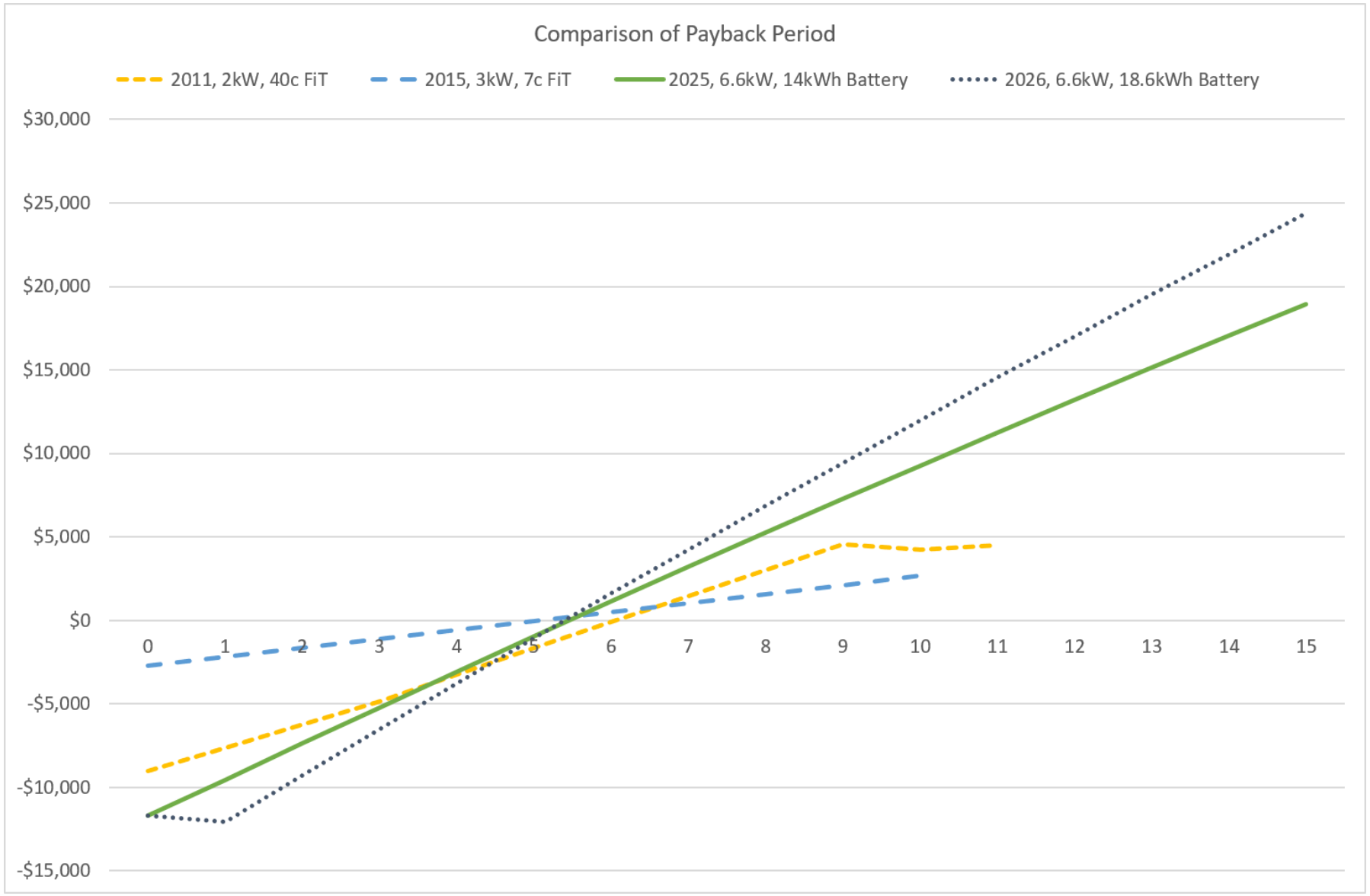
Based on the above, how self-sufficient are we?

Self Sufficiency	Responses
≥ 100%	
90-99.99%	
80-89.99%	
70-79.99%	
60-69.99%	
<60%	

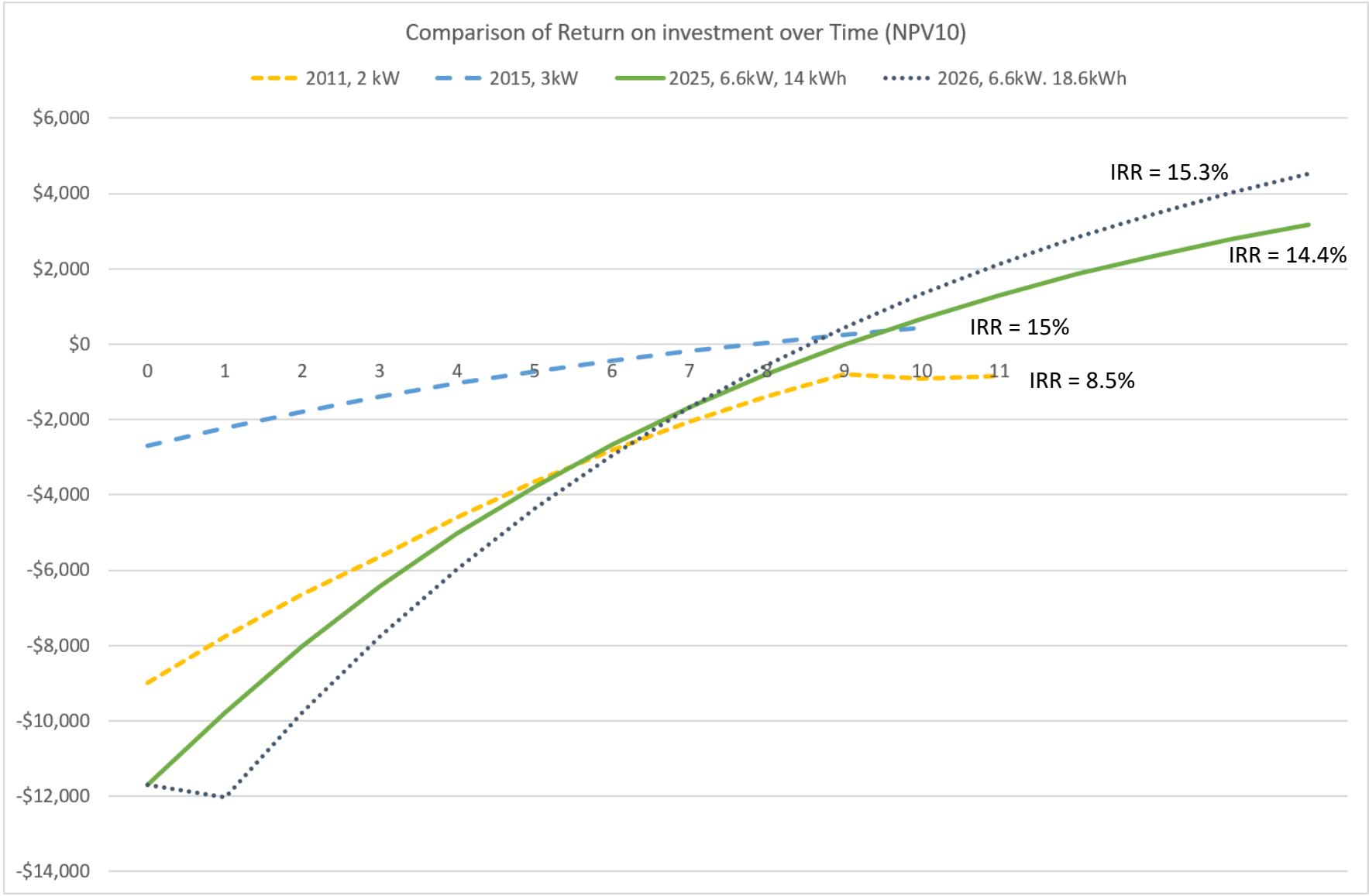
Used:	4220 kWh	
From PV and Battery:	3030 kWh	72% “self-sufficient”
Exported:	2360 kWh	44% of what we produced we exported.
Imported:	1180 kWh	We imported half of what we exported.



The economics of home solar I – Payback Period



The economics of home solar II - IRR



Which State has the highest penetration of renewables?

State	%age RES
New South Wales	38
Queensland	37
South Australia	74
Tasmania	97
Victoria	47
Western Australia	41

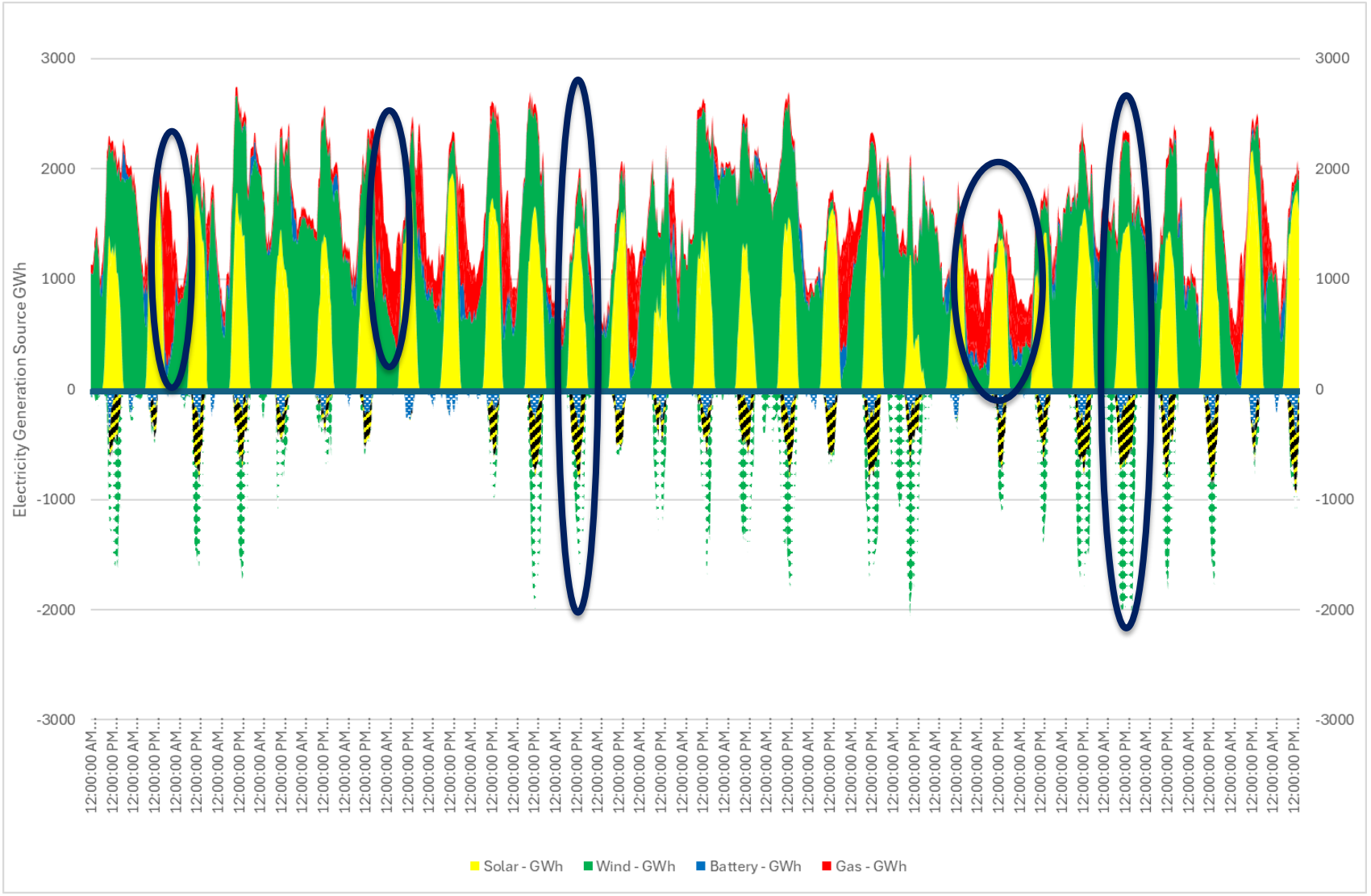
Hydropower

- Hydropower is old technology – and extremely reliable.

- It also causes major environmental and social changes...
- Between 1946 and 1965 78 dams and 54 dams were built across the Scottish Highlands
  - Corrilair Lodge was demolished in 1957 when Loch Cluanie was flooded (Great Glen Hydro-electric scheme)
  - The bridge in Loch Cluanie is normally submerged
  - A farm was abandoned in 1954 for the Upper Glendevon Reservoir project
- Between 1992 and 2008
  - ~1.3 million people were displaced for the Three Gorges Hydro-electric scheme on the Yangtze River in China.
- Snowy 2.0
  - ~70% complete?
  - $12+B vs $2B original estimate (2017).
    - ($20 B external estimates)
  - Start up in 2028 (in doubt) vs 2024.

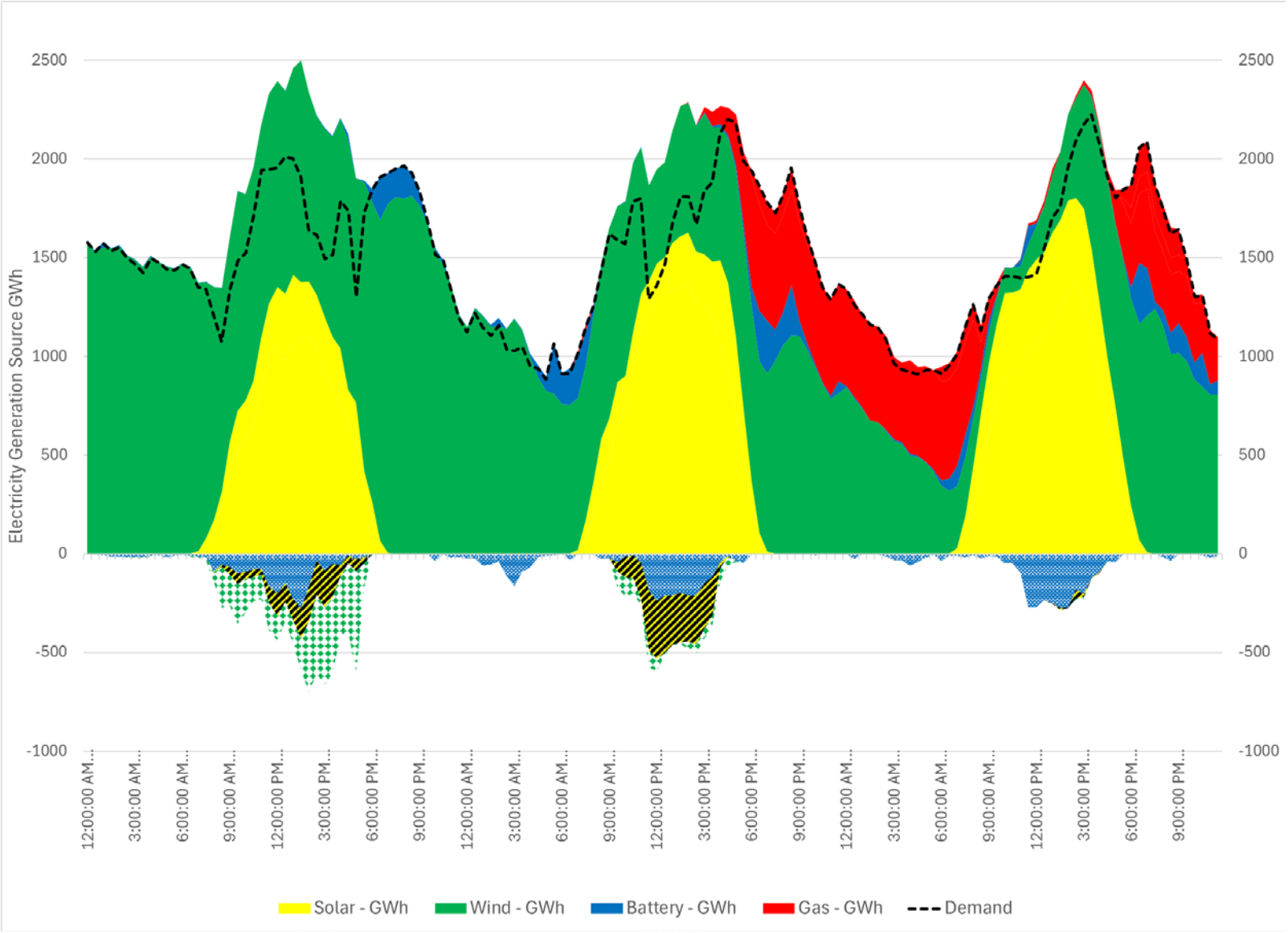
South Australia's electrical energy is supplied from a mix of sources

- South Australia 28-day period during "Spring Flank"
- Peak generation required ~ 3GW
- Periods where there is significant curtailment of renewables. Ie too much generating capacity.
  - Wind farms are often directed to stop supplying when there is too much solar generation.
- Periods where there is little renewable generation and gas needs to take a bigger share.

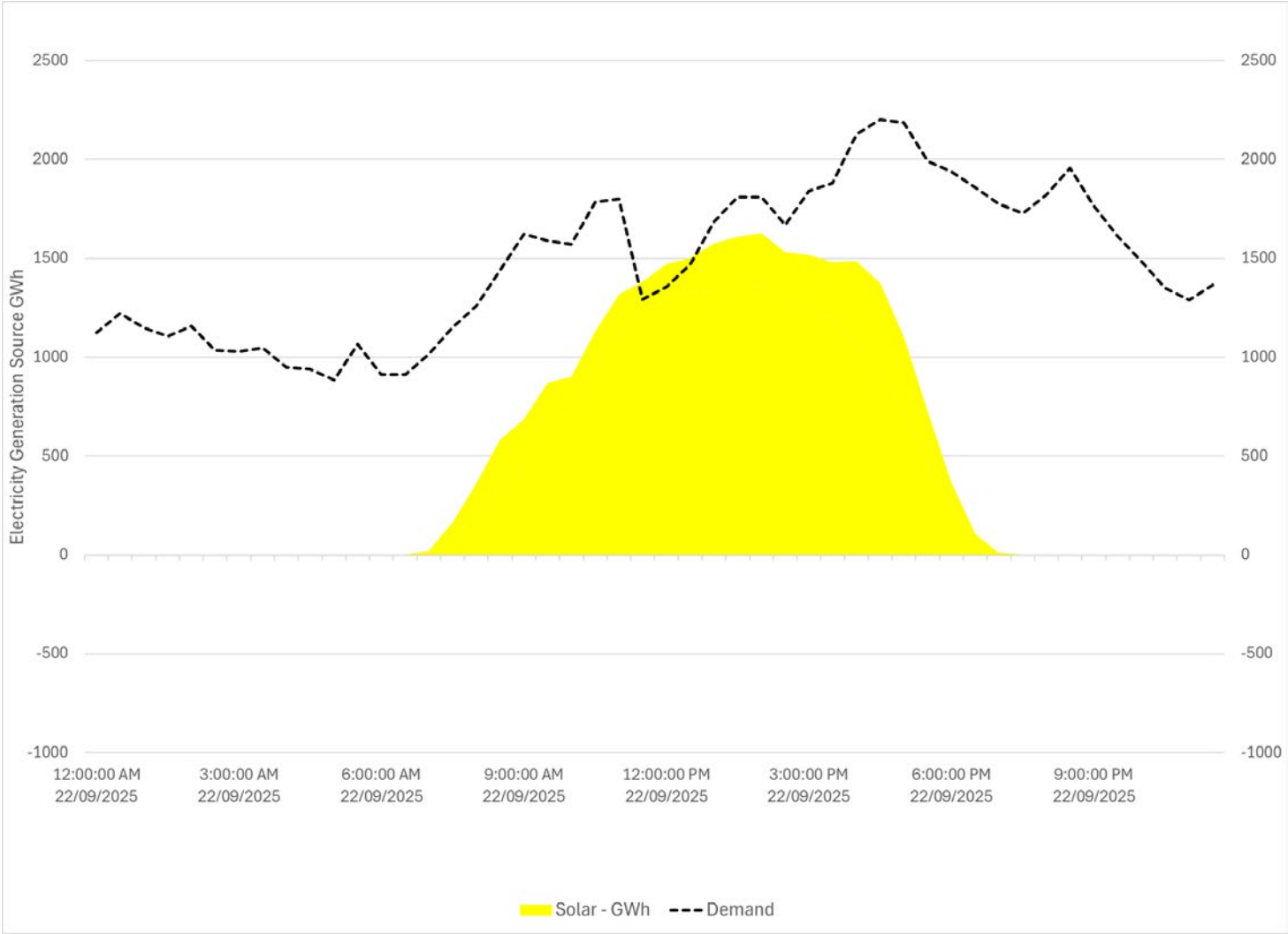


Low wind and no sun = GPG

- 3-day period 21-23 September 2025.
- Periods (middle of the day) when there is excess VRES Generation
- Periods (evening, night, morning) when there is insufficient VRES.
- Batteries still make a relatively small contribution to the generation picture.
  - But are critical for grid stability



Unpacking 1 Day (22 September 2025)



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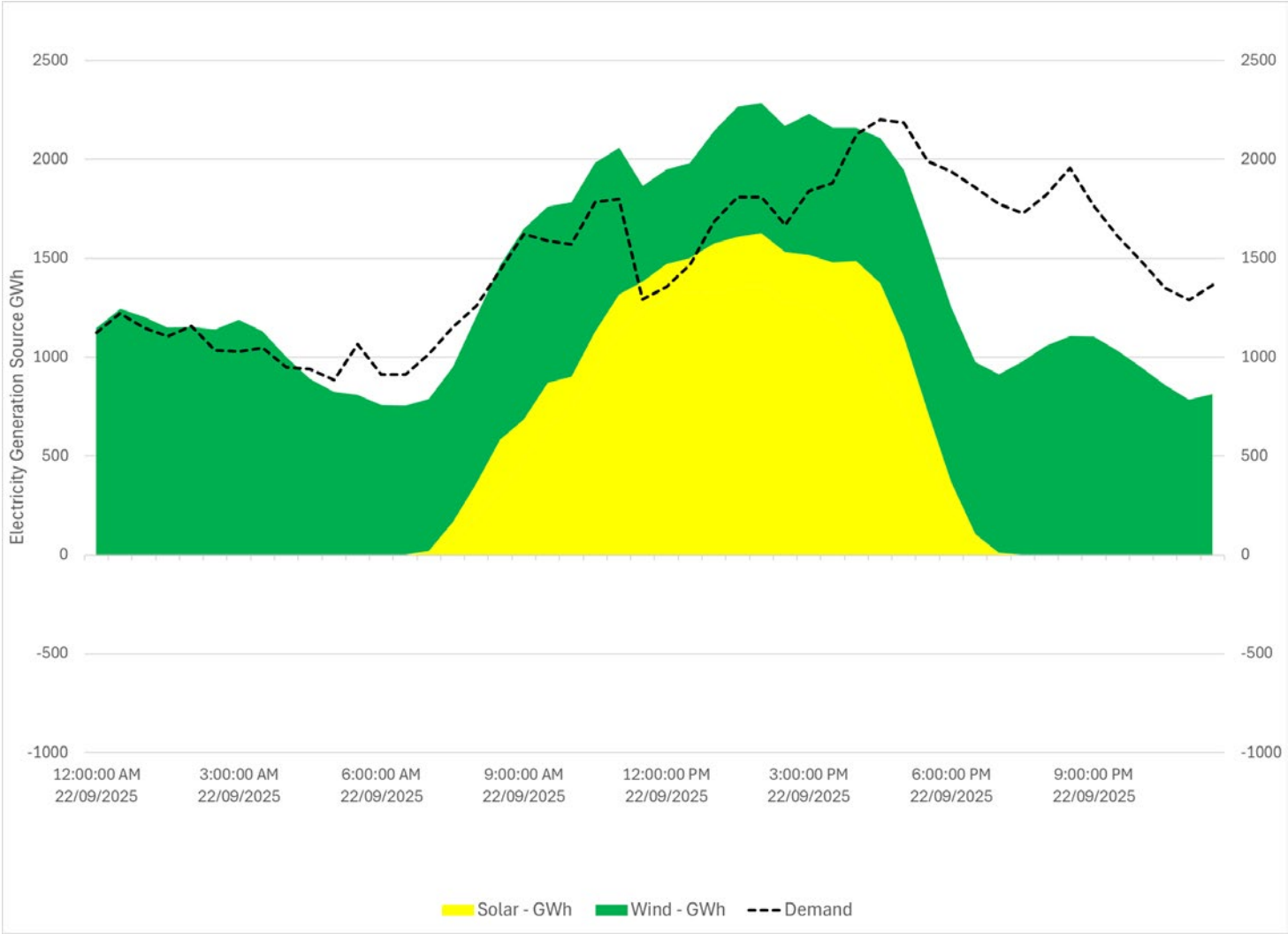

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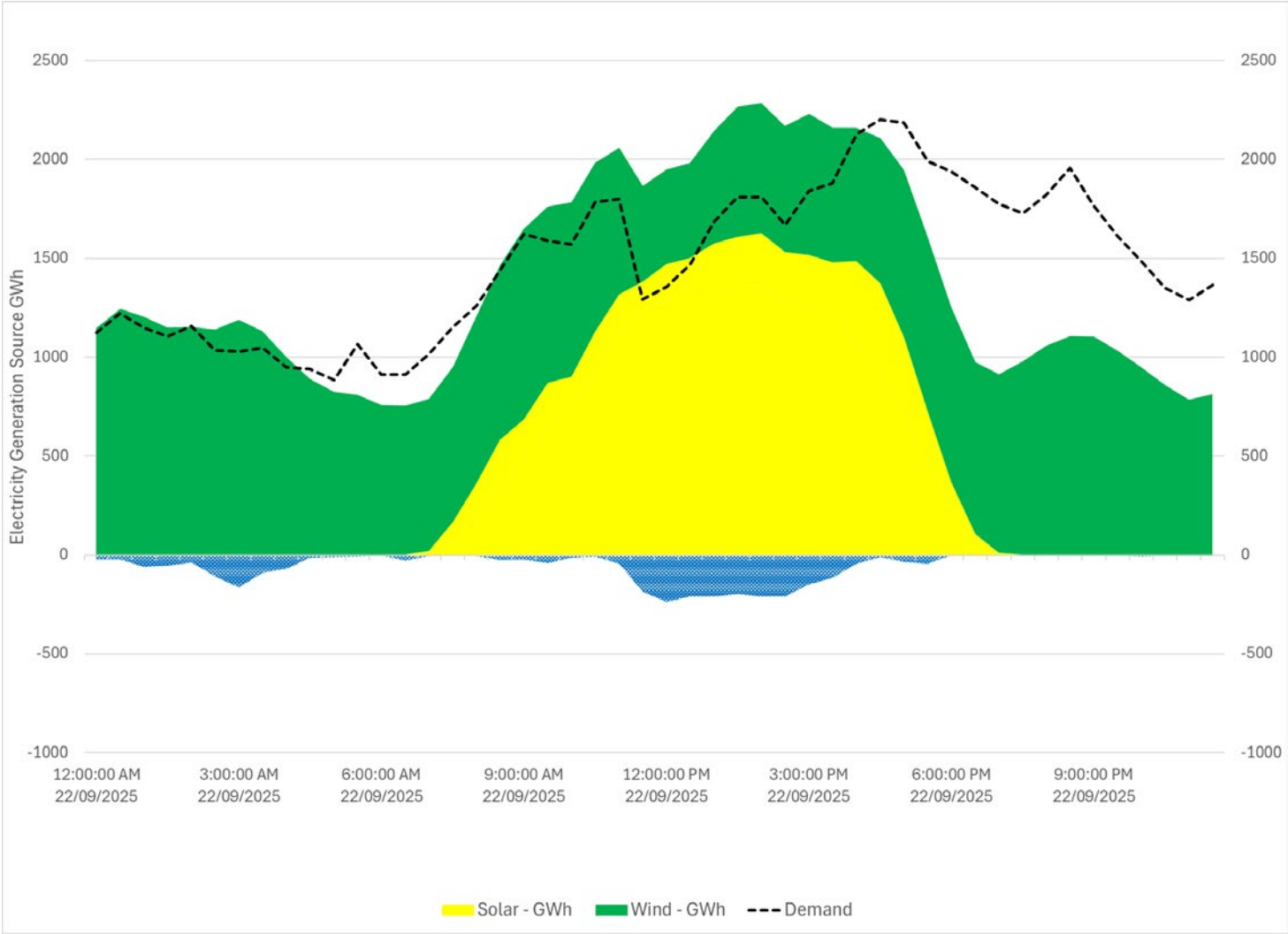
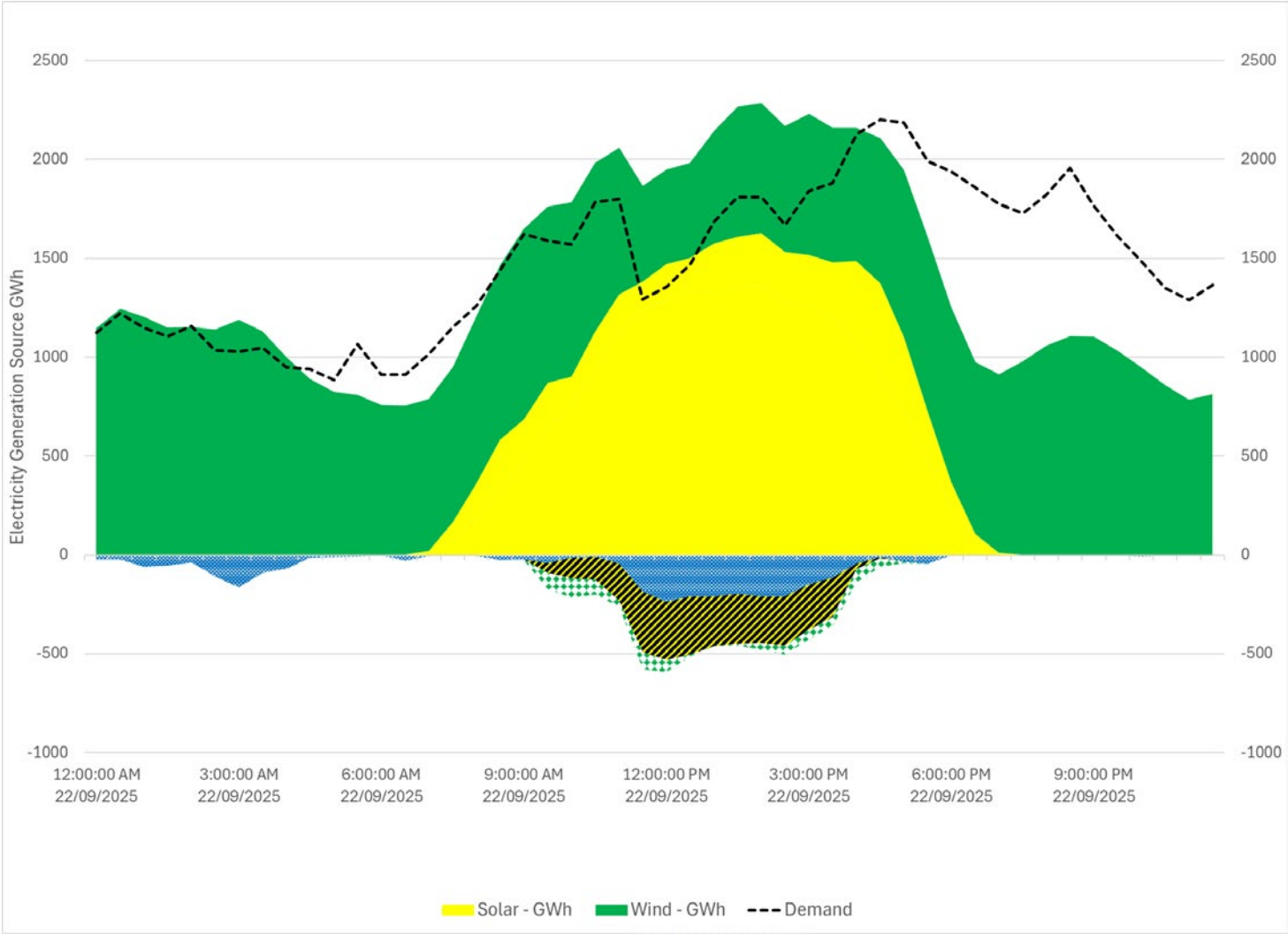


Too much VRES leads to curtailment



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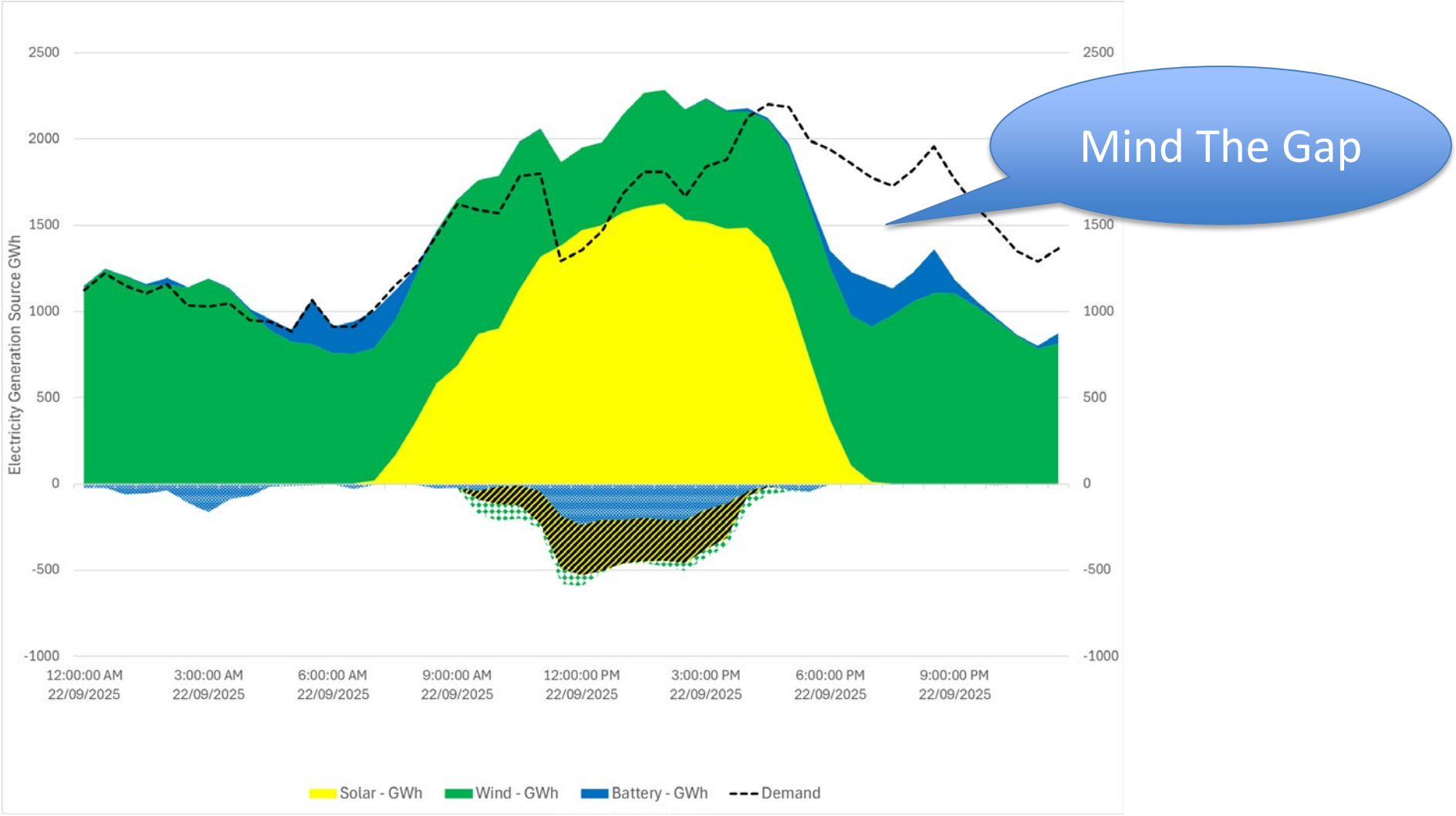

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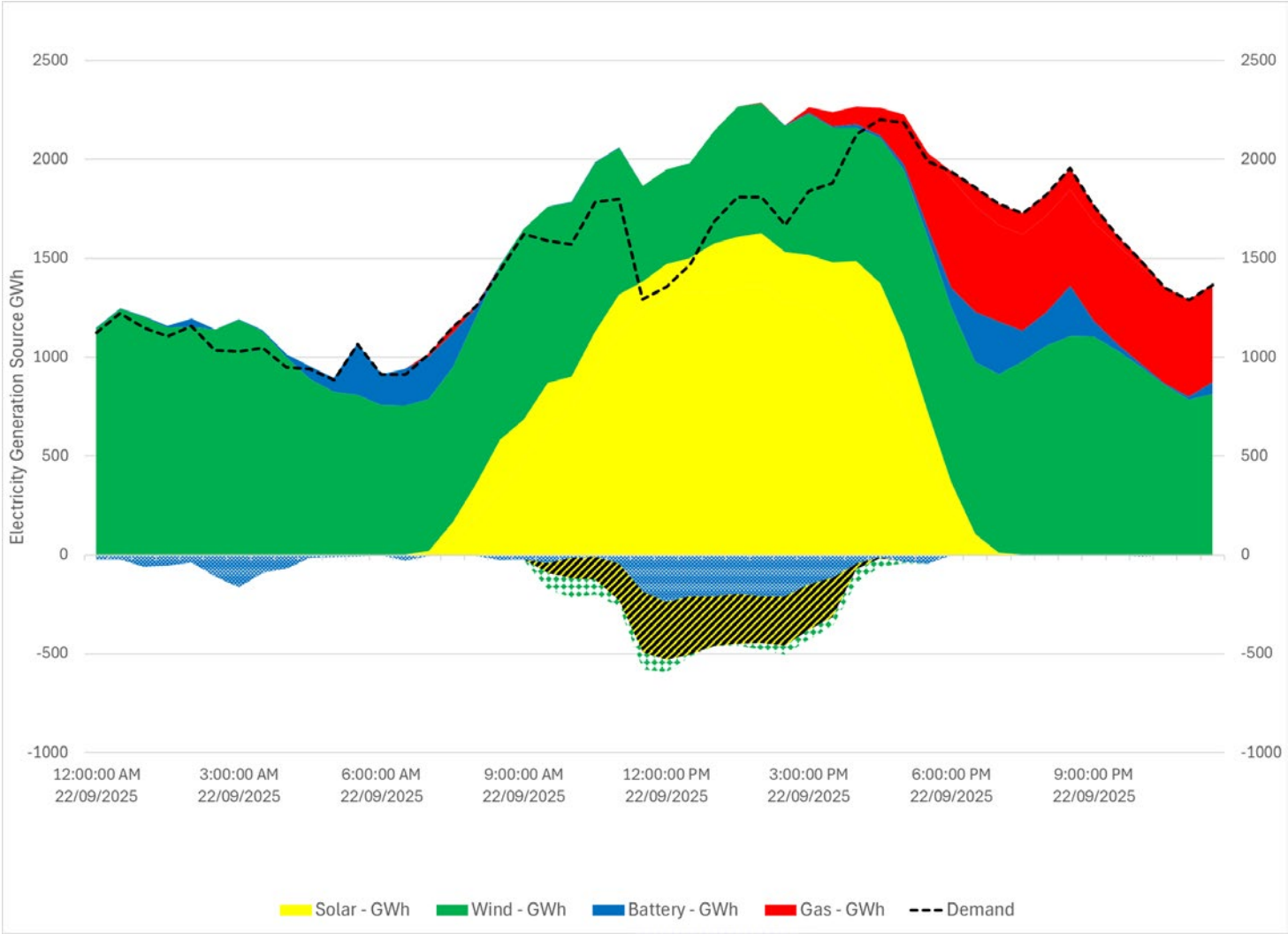
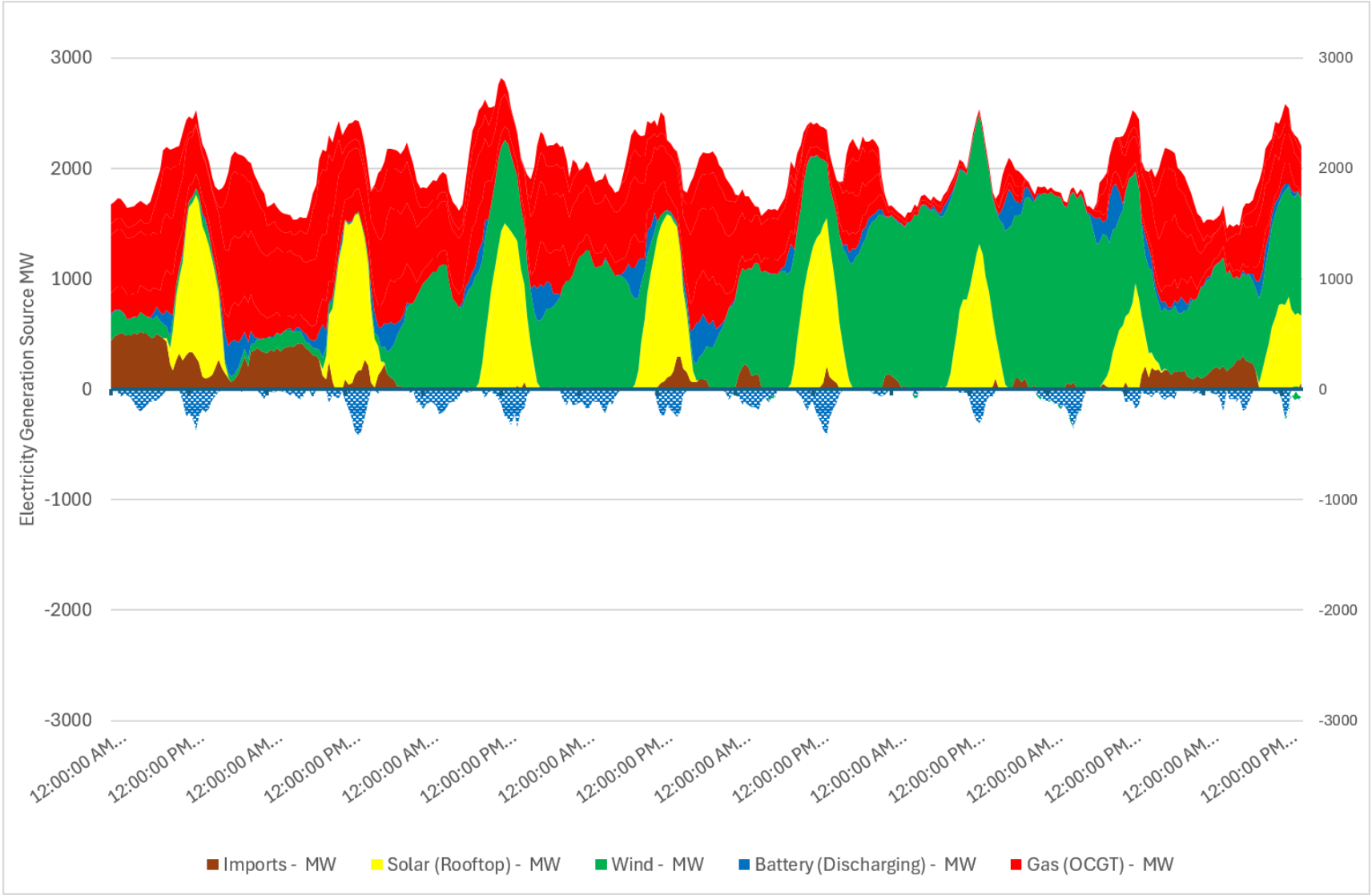


Low wind and no sun = GPG

- 7-day period 23-30 June 2026.



Low wind and no sun = GPG

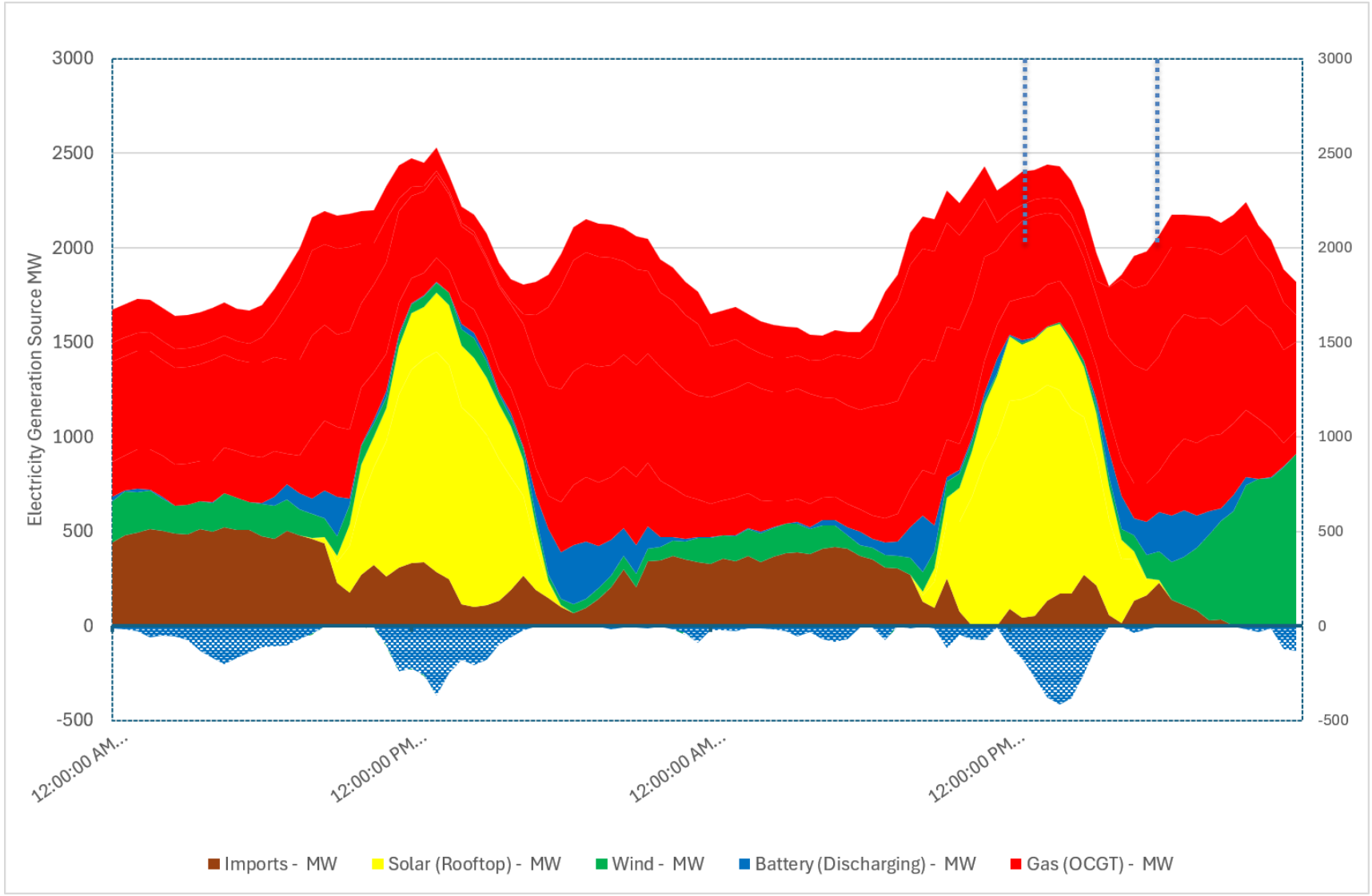
- 23-24 June 2026.

12.30pm 23 June

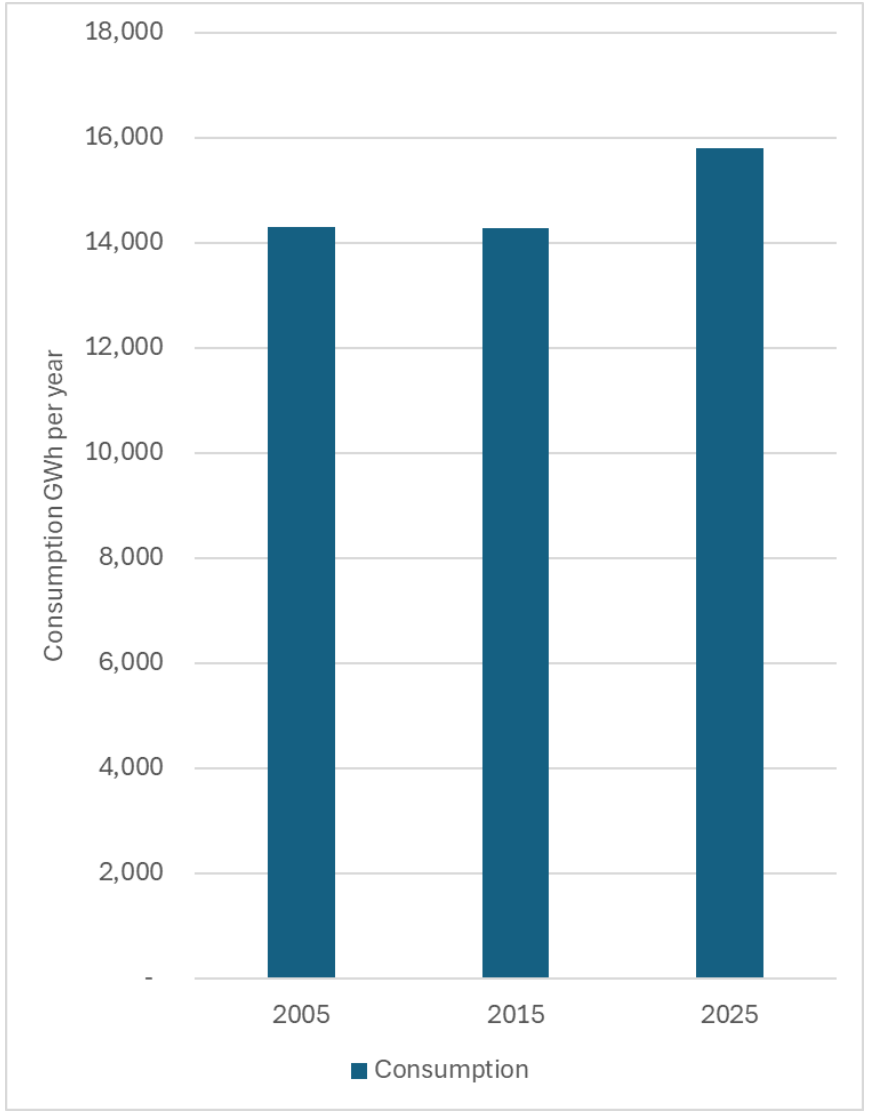
- Solar: 1,500 MW (65%)
- Wind: 7 MW (0%)
- Gas: 800 MW (32%)

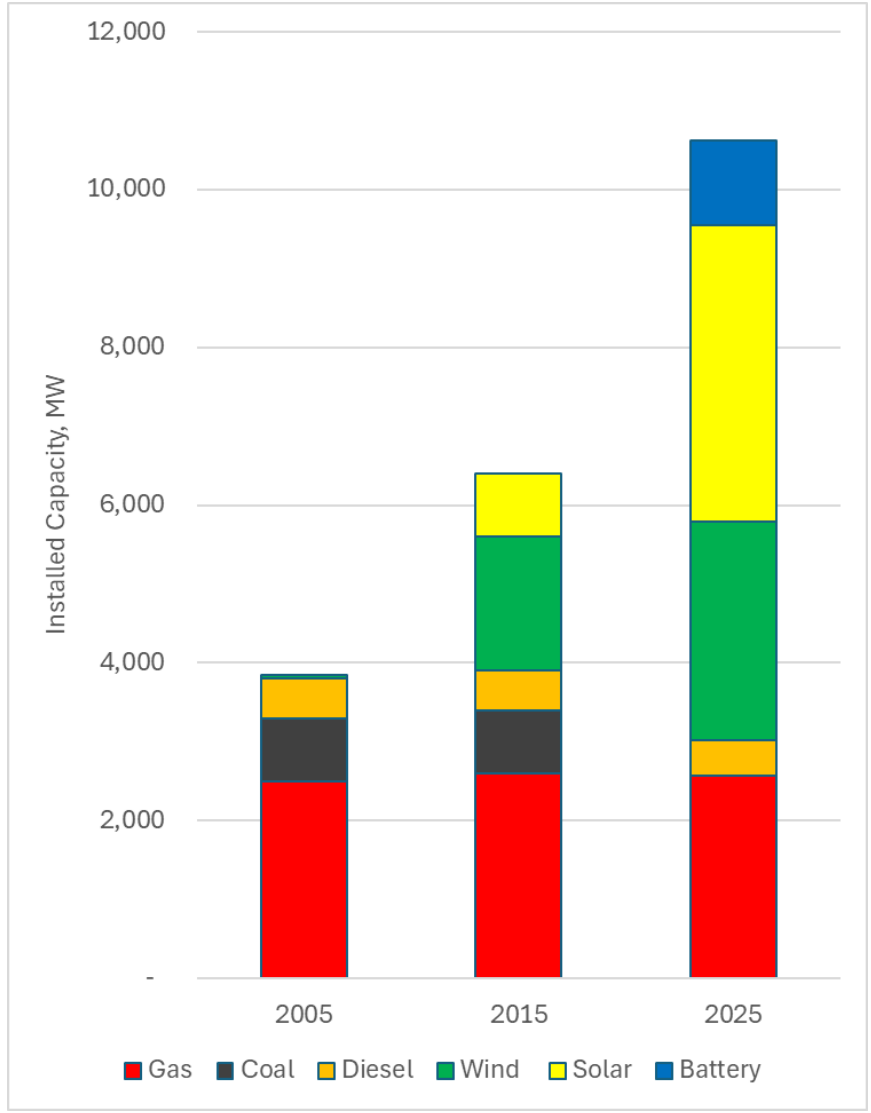
6.30pm 23 June

- Solar: 0 MW (0%)
- Wind: 200 MW (9%)
- Gas: 1,600 MW (76%)
- Battery: 250 MW (12%)

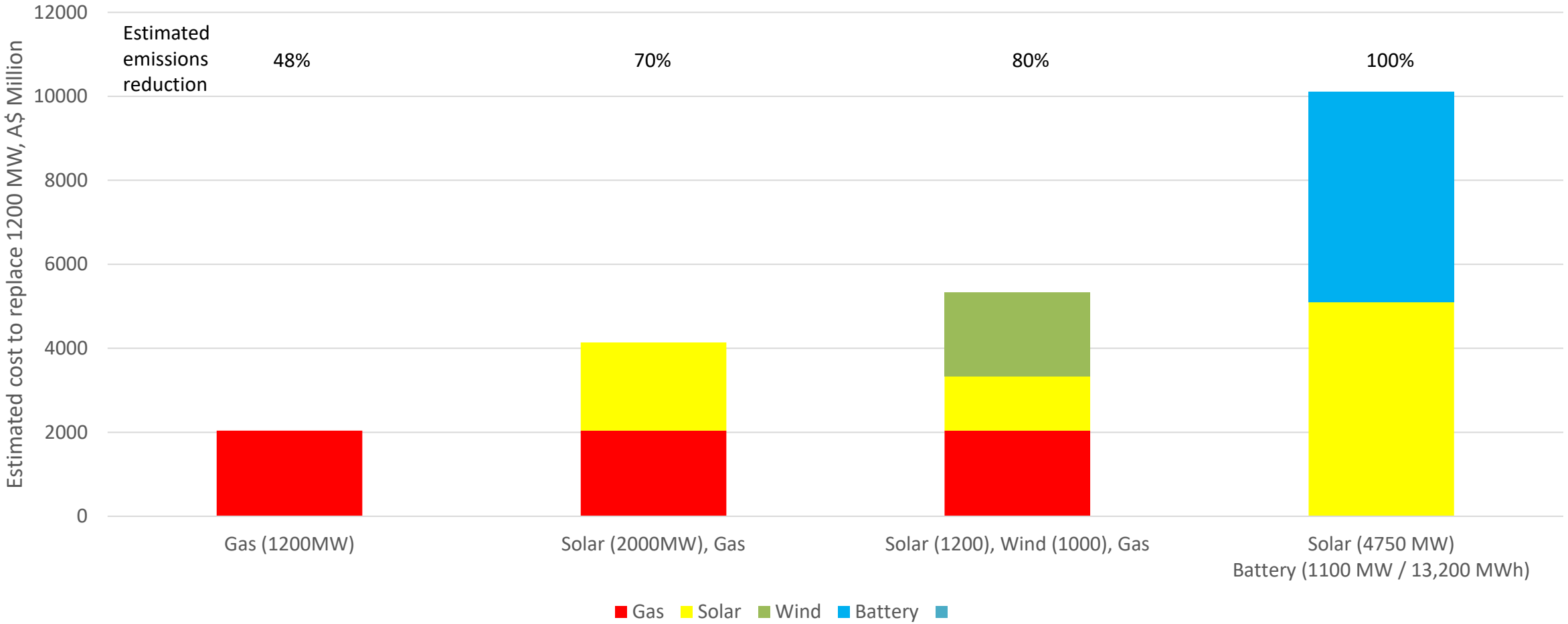


Changes in consumption and installed capacity





What's the cost of replacing Coal



Gas Costs based on Snowy Hunter Power project (2024), and GHD estimate for WA ERA (2022), $1.7 million/MW.
Solar costs based on announced cost of Blue Grass Solar, $215 million for 200 MW, $1.08 million/MW.
Wind costs based on announced cost of Herries Range, $2 billion for 1000 MW, $2 million/MW.
Battery based on announced costs of Stoney Creek BESS, $350 million for 125 MW, 1000 MWh, Liddell BESS, $750 million for 500 MW, 1000 MWh.

Diversification of energy supply does not equate to cheaper electricity

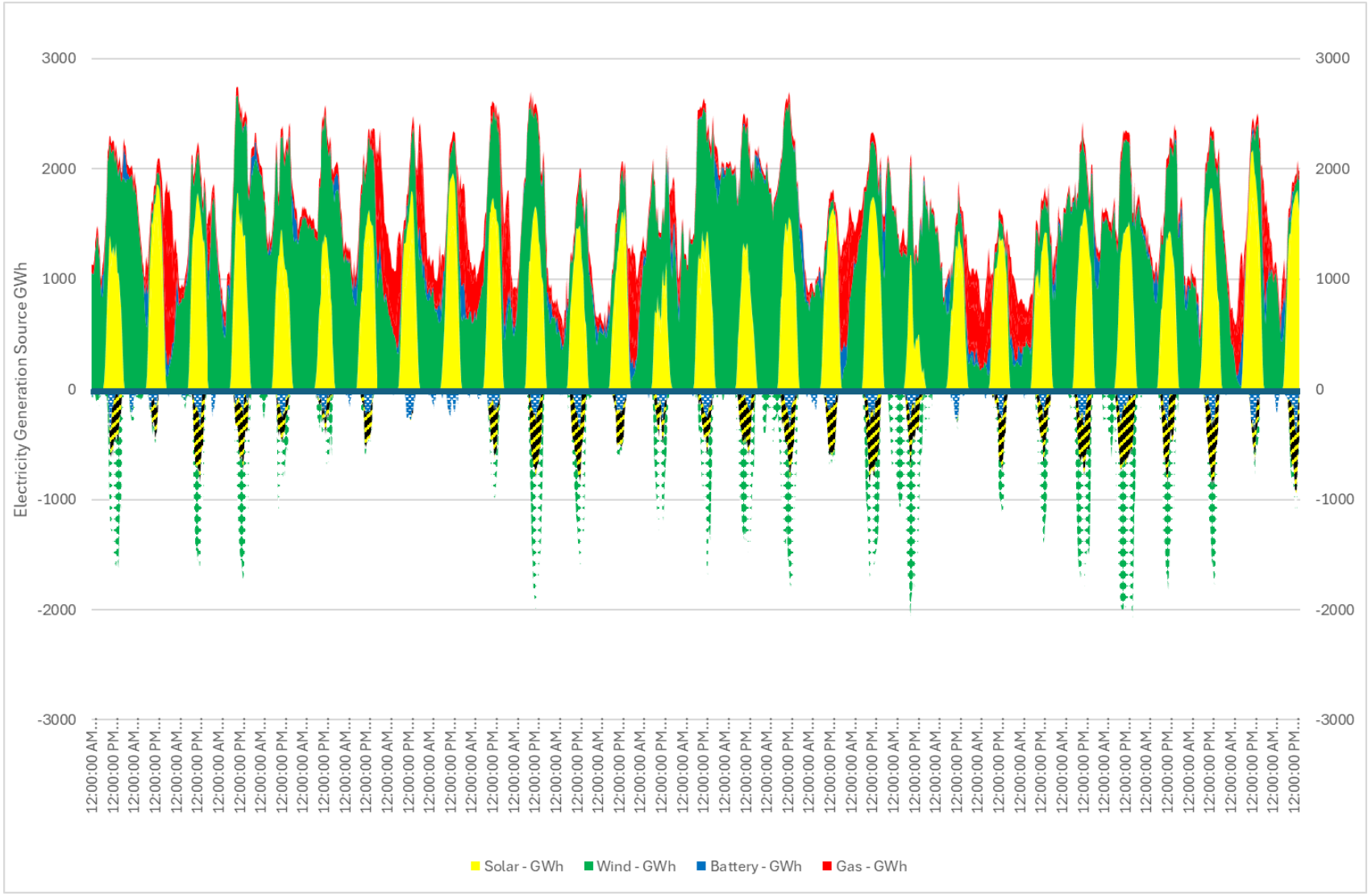
Replacing Coal with a mixture of renewables and gas is the cheapest and easiest way to significantly reduce emissions whilst maintaining security of supply

- RISC's long-held view that replacing coal with a mixture of renewables and gas is now supported by evidence from systems with high renewables penetration.
- Changing power generation systems from "coal dominated" to "renewables dominated" takes time (~20-year timeframe).
  - It's also expensive, building duplicate and back-up systems is not cheap.
- Building excess supply also causes other problems:
  - Intermittency.
  - Price volatility.

- The role of gas remains relatively consistent. It remains a part-time supplier.

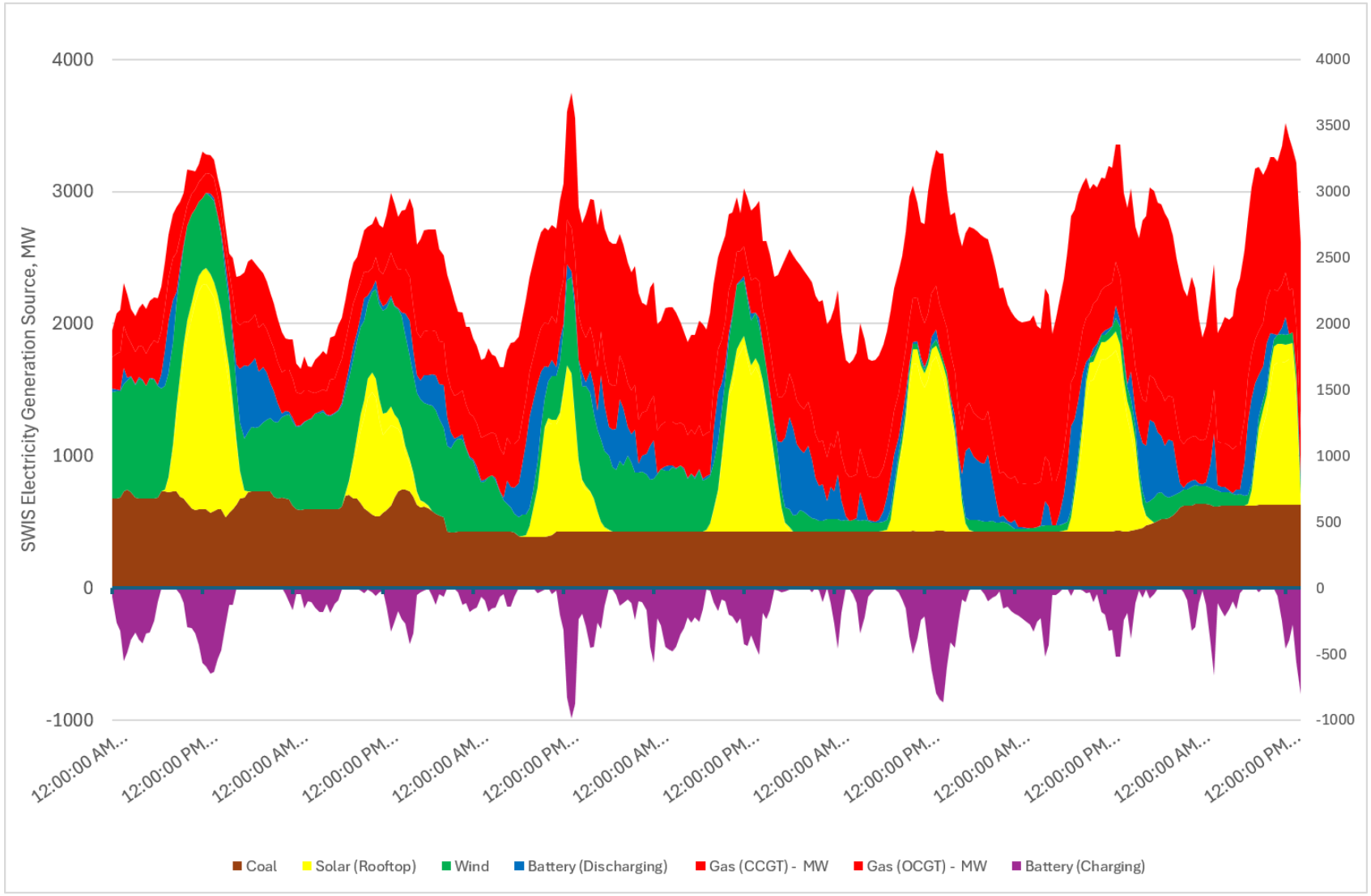
- Unfortunately, the promise of a cheap renewables based secure supply is unrealistic.
- Reducing emissions through a renewable dominated system with adequate back-up is achievable but it will have to be paid for.

How do new VRES projects get sanctioned in this market?



SWIS Fuel Mix (not a lot different)

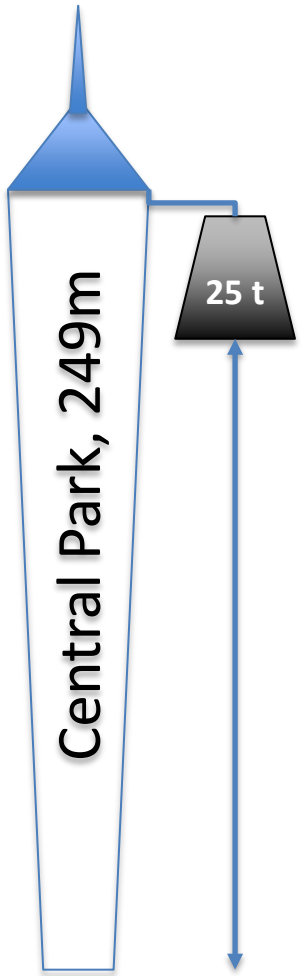
- Recent performance of the SWIS
- July 15-22, 2026.



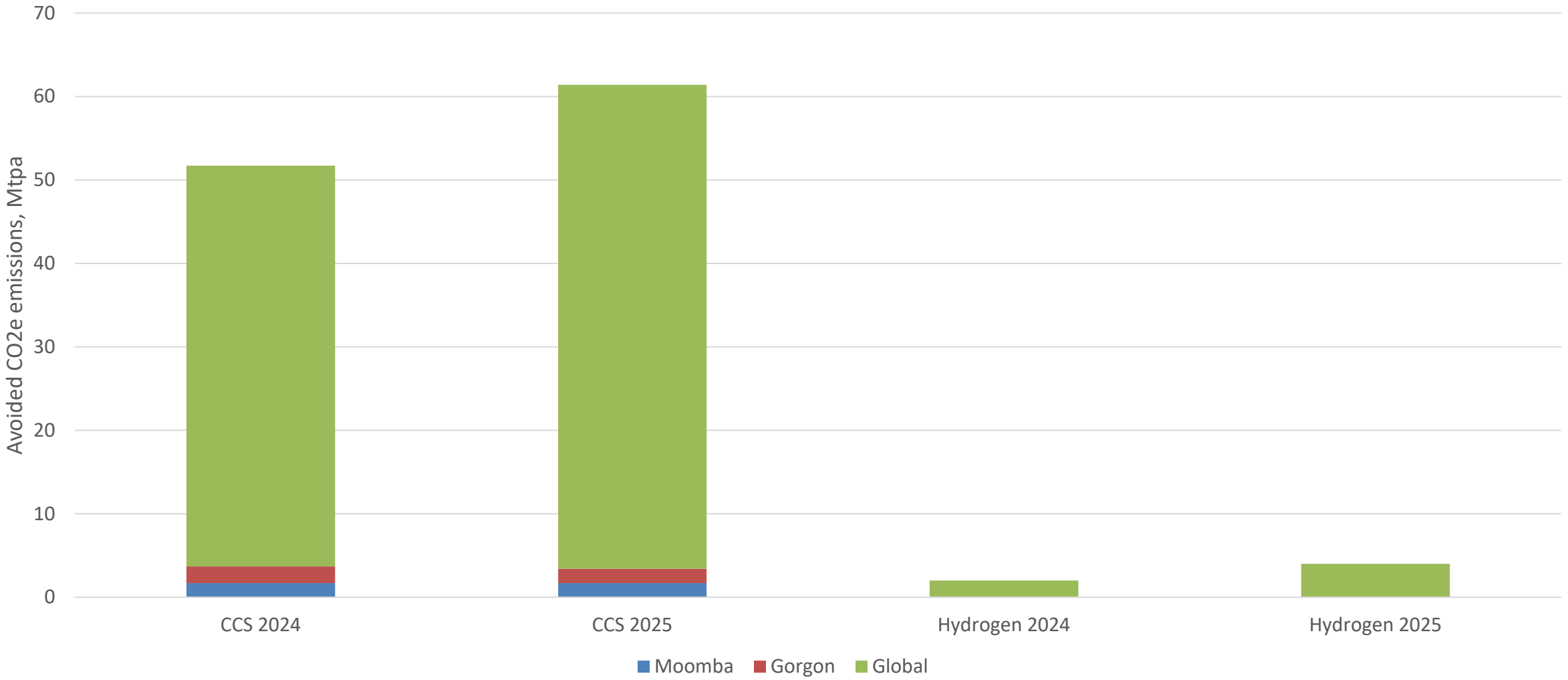
The end?

Batteries vs Gravity

14 kWh = 50 MJ



Relative impact on CO2e emissions CCS



IEA Global Hydrogen Review 2026
Global CCS Institute

Energy Density

- Why is Energy Density important?
- Why are we not designing cars to run on Hydrogen or Uranium?

Fuel Type	Reaction Type	Energy Density (MJ/kg)	Energy Density (MJ/m^3)
Ethanol	Chemical	20	23,530
Ammonia	Chemical	22.5	12,000
Crude Oil	Chemical	42	38,515
Diesel	Chemical	45	38,250
Petrol	Chemical	46	34,615
Natural Gas	Chemical	52	40.6
Liquefied Natural Gas (-160°C)	Chemical	55	23,612
Hydrogen	Chemical	142	12.9
Liquefied Hydrogen (-253°C)	Chemical	142	8,000
Lithium-ion Battery	Chemical	0.5	
Wood	Chemical	16	
Coal	Chemical	~30	
Uranium-235	Nuclear	3 900 000	

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