LARGE FLOATING SOLAR ON GRAHAMSTOWN DAM

Feasibility & Viability

21 OCTOBER 2025 – NEXTWATER – DANIEL LIVINGSTON, DUNCAN JINKS, MADDISON CARBERY

HUNTER WATER CONTEXT

Hunter Water: 600,000+ customers

Net Zero 2035 Goal

6MW solar installed
8MW planned

Solar on WWTW ponds planned (1-2MW systems)

GRAHAMSTOWN DAM: A UNIQUE OPPORTUNITY

Significant Evaporation – shallow water (~25% pa)

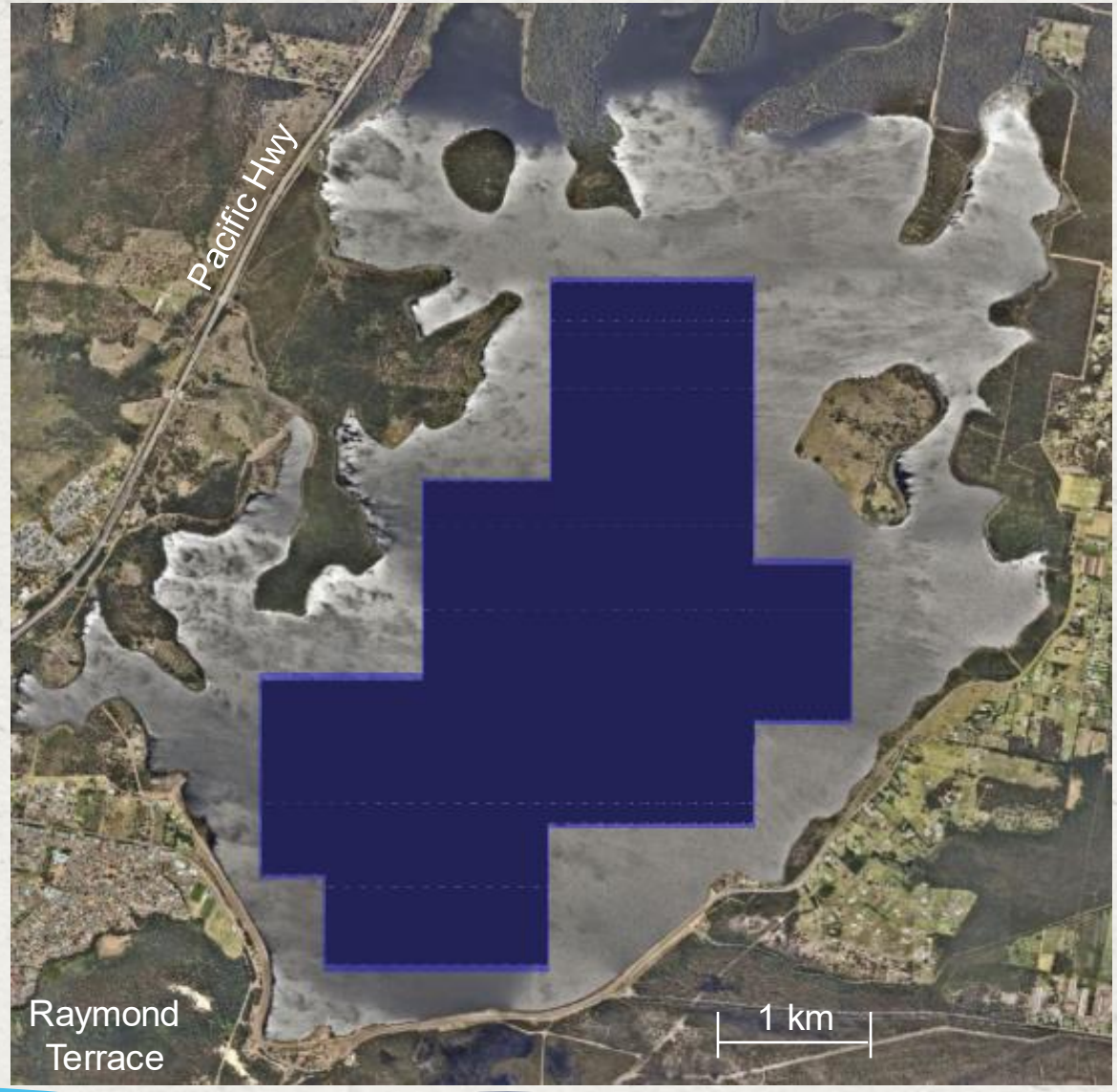
Large electricity demand nearby

INDICATIVE SYSTEM

~ 1 GW

50% of dam covered

Estimated cost: $1.4 billion



INVESTIGATIONS…

Energy & carbon markets

Evaporation reduction

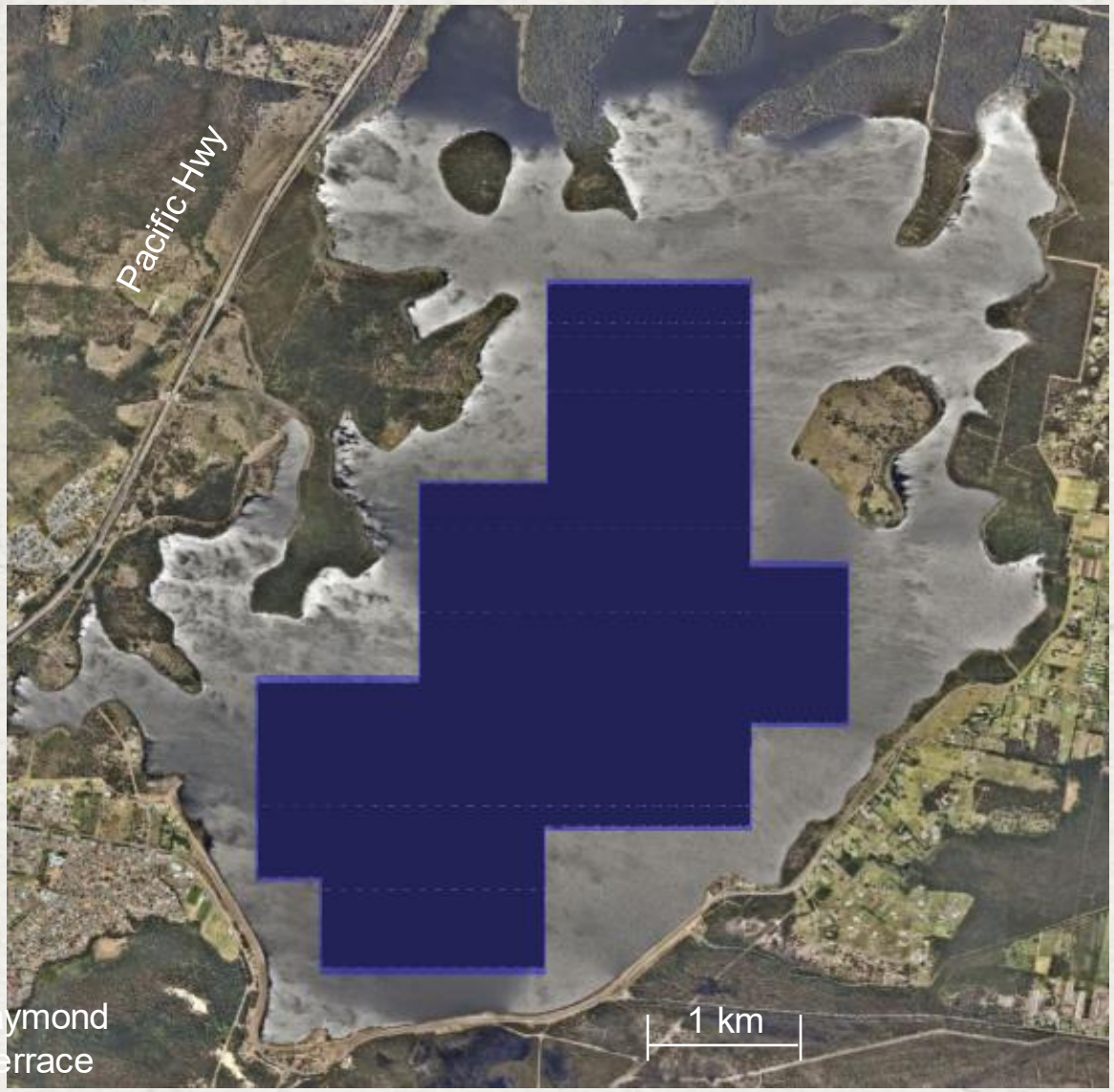
Infrastructure costs

frontier economics

Water Quality & Ecological Impacts

Beca hunterh2o

Methods:
- Literature review
- Market testing
- Expert advice



ECONOMIC ANALYSIS: KEY FACTORS

Floating 20-30% higher capex than land solar

~$1400/kW (at 1 GW size)

Land availability?

Daytime spot price

Assume: $65/MWh

Batteries?

Discount rate: 7%

Capacity Factor

Maintenance Costs
Project Life (25y)

Benefit breakdown:

Electricity:	74%
Green certificates:	20%
Evaporation Reduction:	6%

Financial Risk

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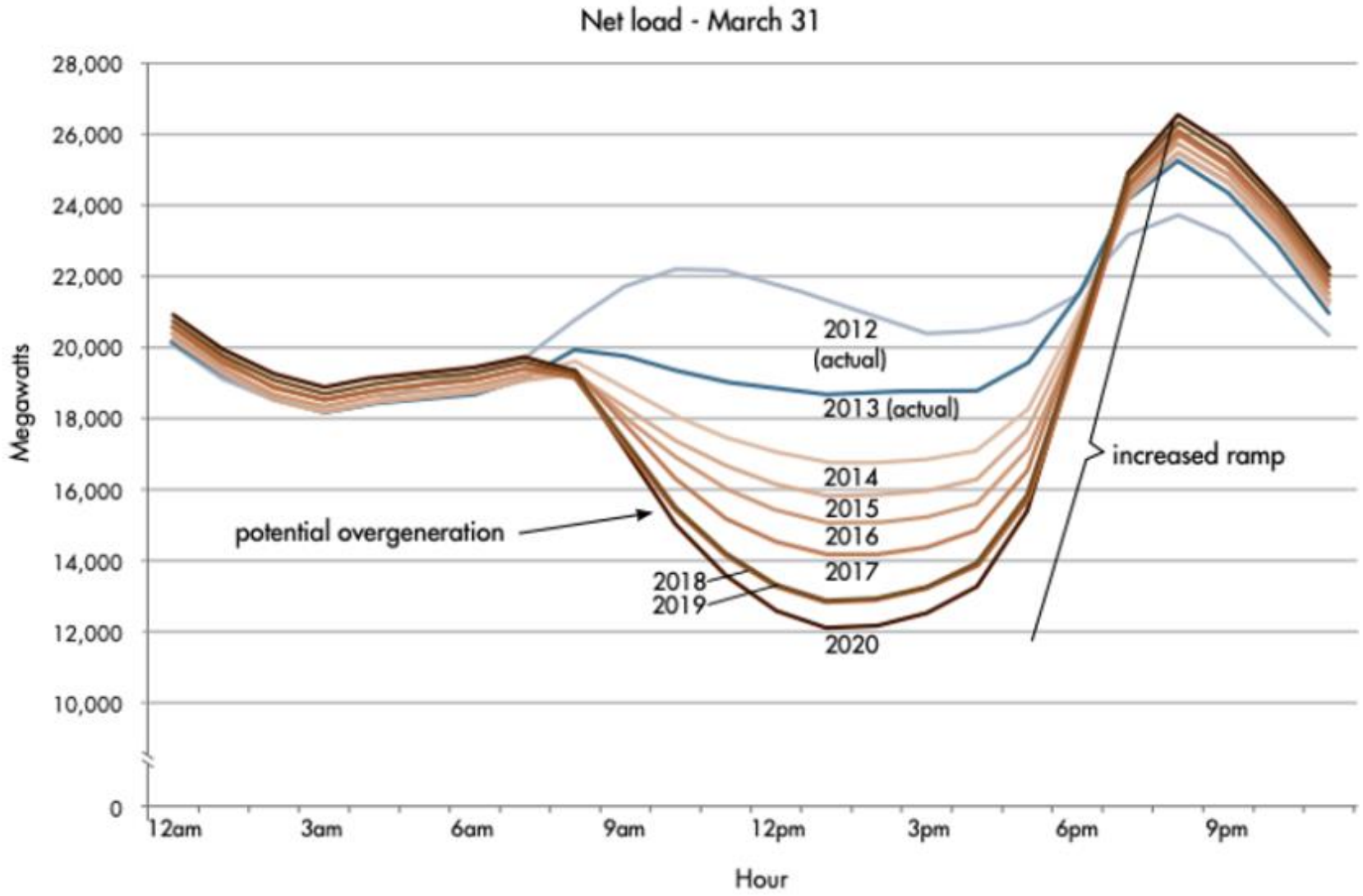
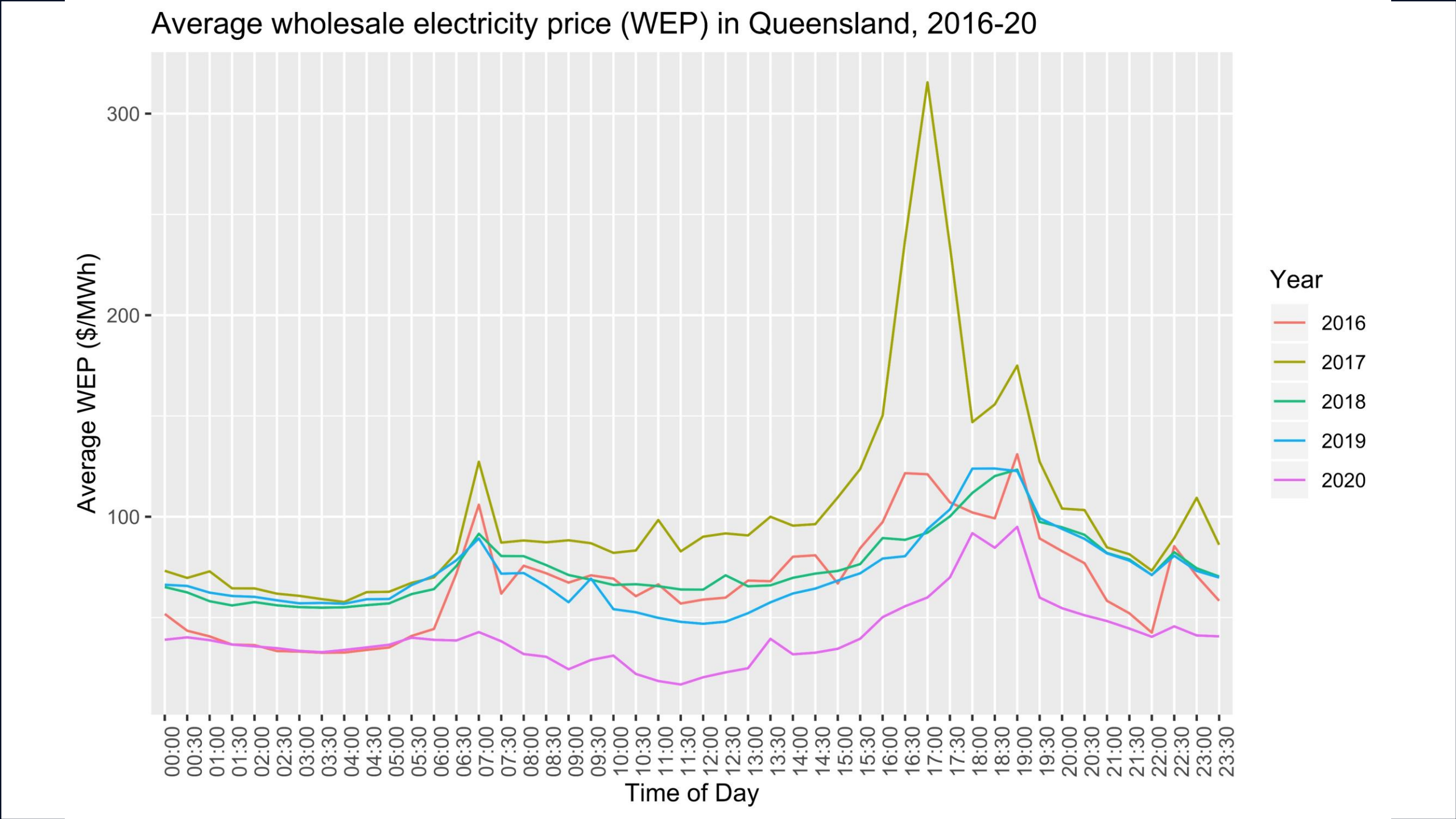
THE DUCK CURVE
(Net load chart)



Source: http://www.caiso.com/


Average wholesale electricity price (WEP) in Queensland, 2016-20
Average WEP ($/MWh)
300
200
100
Time of Day
00:00
00:30
01:00
01:30
02:00
02:30
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Year
2016
2017
2018
2019
2020

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CAPACITY FACTOR

16%

25%

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MARKET TESTING – FLOATING SOLAR CONSTRUCTION

15 responses

Strong interest

Limited capacity & experience

More maturity in Asia & Europe

Australia: relatively abundant land

International partnerships

ABC: 500 kW system in Warrnambool – largest in Aus

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EVAPORATION REDUCTION OPTIONS

$6 / MWh (Evaporation)

Vs

$65 / MWh energy

Coverage amplification:

30% → 50%
50% → 70%

Technology type	Examples	Evaporation reduction	Relative Cost : Benefit	Notes
Floating Solar (FPV)	PV panels on pontoons	40–80%	Much higher	Dual benefit
Modular Floating Covers	Modular balls, shade structures	70–95%	Much higher	Potential WQ Risk
Suspended Covers	Shade cloths	50–90%	Much higher	
Chemical Covers	Monolayers (e.g. WaterSavr)	30–60%	Slightly higher cost	WQ Risk
Biological Covers	Duckweed, aquatic plants	10–55%	Cost similar to benefit	WQ Risk

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OWNERSHIP & RISK MODELS

Major Financial Risks	Project Structure Options
Capital Cost	HW Develop under PPA
Construction delays	Joint Venture
Electricity revenue	Lease to Developer
Marginal Loss Factor	NSW Long Term Energy Service Agreement

WATER QUALITY & ECOLOGICAL IMPACTS

Direct impacts	Indirect impacts
Shading	Temperature, DO
Wind blocking	Bioflim growth
Material leaching, toxicity	Algae growth
	Hydrodynamics & variable WQ

CONCLUSIONS & KEY INSIGHTS

Cost benefit prohibitive now

Could become attractive in future

Worthwhile to do readiness activities

WHAT'S NEXT FOR HUNTER WATER'S ENERGY & WATER RESILIENCE IN FLOATOVOLTAICS?

Going Ahead: Small Scale Behind-the-meter Floating Solar with WQ investigations

Watching Brief

- Daytime electricity price (batteries)
- Capital Cost
- Value of evaporation benefit
- WQ Impact investigations
- Innovation for capacity factor
- Developer interest

THANK YOU

Any questions?

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