

2023 DER in Energy Markets

Premium Report

Preface

Intro

The 2023 DER in Energy Markets Report looks at energy market data in the Australian National Electricity Market from October 2022 – September 2023 (12 months). It examines how distributed energy resources are participating in various energy markets, how much market participants such as retailers and aggregators are earning in those markets and how that value is flowing to consumers.

This is a new and emerging sector of the energy industry where information and knowledge can often be hard to find. The aim of this report is to surface insights through data to help stakeholders better understand what's happening and how things work.

It's important to note that there are many other ways to incentivise and value consumer energy decisions and assets that include network tariff reform, innovation in retail tariffs and better information. The intention of looking at DER participation in markets is to peek at the cutting edge of DER operations and business models.

For the purposes of this report DER refers to small electrical assets such as rooftop PV, batteries at a home or business, air conditioners and smart EV chargers. We've also included some distributed connected batteries less than 5MW.

Feedback

This report is a bit of an experiment, with the intention to publish updates annually. Hopefully over time as more DER market data becomes available the richness of information in the report will increase. If you have any comments or suggestions about the report or what you might like to see next year, please email mitch@grids.dev

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Executive Summary

1. DER are operating in many NEM markets through a growing number of participants

- FCAS: \$32M earned in the last 12-month by DER through 15 participants operating 42 aggregated facilities, with 80% of the revenue going to EnelX and Energy Locals.
- WDRM: \$367k earned in the last 12-month through 1 participant with 67MW of registered capacity. 205MW was dispatched at an average price of 1,833/MWh.
- RERT: Only 2 small QLD dispatches in the 2022-23FY, but this summer may see RERT relied upon.
- Unscheduled Demand Response: Lower wholesale volatility in the last 12-months have led to low returns. Fixed payments to residential customers on VPP plans (e.g. \$20/month VPP credit) likely to have been at a large loss to VPP retailers.
- Community batteries may represent an opportunity for DER aggregators to acquire more capacity. While majority of current federal funding to community batteries has gone to network, those networks will lease the systems to market participants to use in the energy markets.

2. DER aggregator earnings in markets are often volatile or uncertain, creating risks in offering fixed-payment or long-term deals to consumers

- DER generate market revenue similar to a peaking generator with high variability year to year.
- This can make offering firm energy offers to consumers risky, as retailers need to either hold back more value as collateral or take financial risk. The alternative is to offer variable payments which creates uncertainty for the consumer.
- While there are existing ways to hedge against some of these risks, allowing DER to participate in state and federal capacity schemes creates another avenue for smoothing out volatile energy market outcomes.

3. Residential consumers are limited in which retail VPP plans they can join

- 10 VPP plans were reviewed. Battery systems compatible with at least one of those plans were only compatible with 2.9 of the plans on average.
- Over time as industry matures and standardises, we expect that number to increase and retailers to be able to operate these fleets at lower costs and complexity.

Layout of the deck

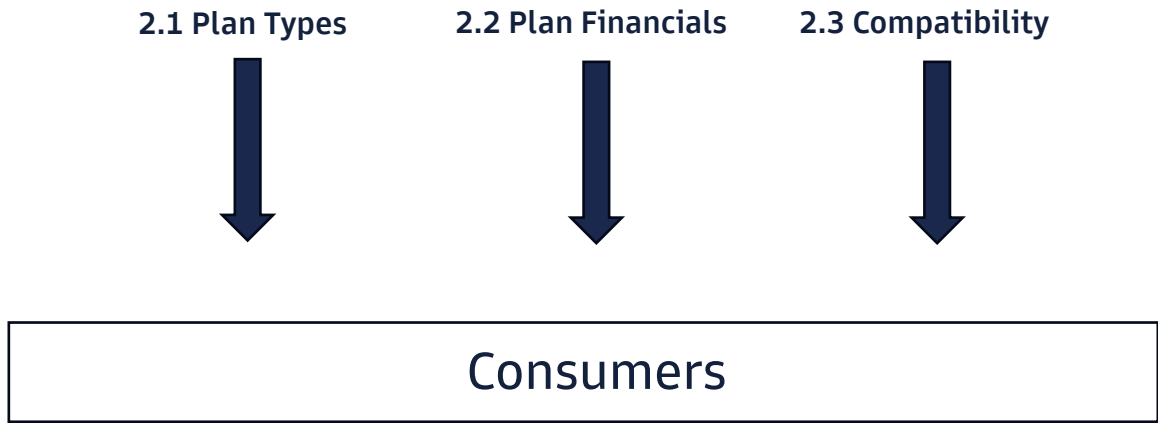
1. How DER Participants Make Money In Markets



Future Value

- 1.5 Community Batteries
- 2.4 Capacity Schemes

2. Productising This Value To Consumers



The deck is broken up into 2 parts:

Part 1 examines how participants make money from DER in various ways. This defines the total pool of value to be shared between retailer and customer. Here we'd like to see healthy competition and value flowing freely.

Part 2 examines how that value is converted in consumer offerings, specifically on the residential side. What are the types and value of offers on the market? And what are some of the challenges and opportunities in future VPP programs?

How DER Participants Make Money In Markets

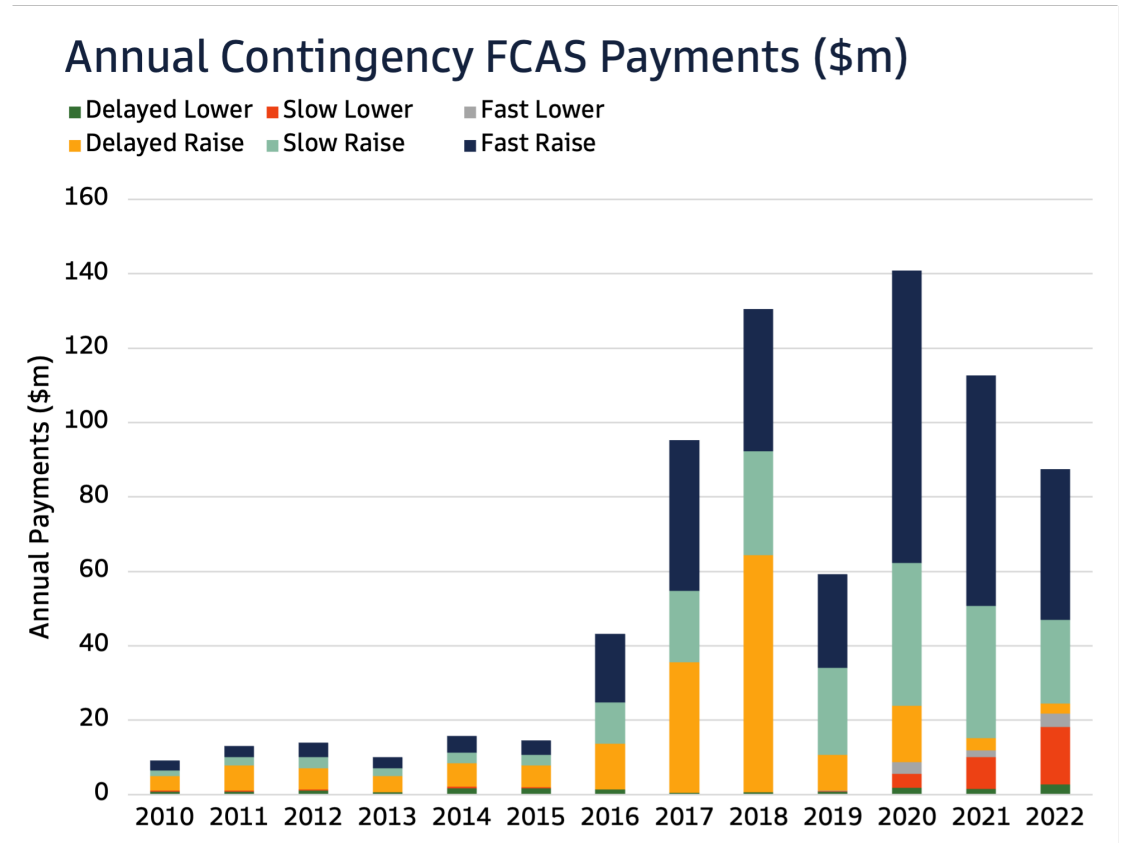
What are Contingency Frequency Control Ancillary Services (FCAS)?

Sometimes in the NEM things suddenly turn off with absolutely no warning. This could be a generator, a load, or even an interconnector.

To manage the risk of this **contingency**, generators and loads are paid to stay in reserve and spring in to action when a large energy imbalance occurs in the energy system. This is called **contingency FCAS**.

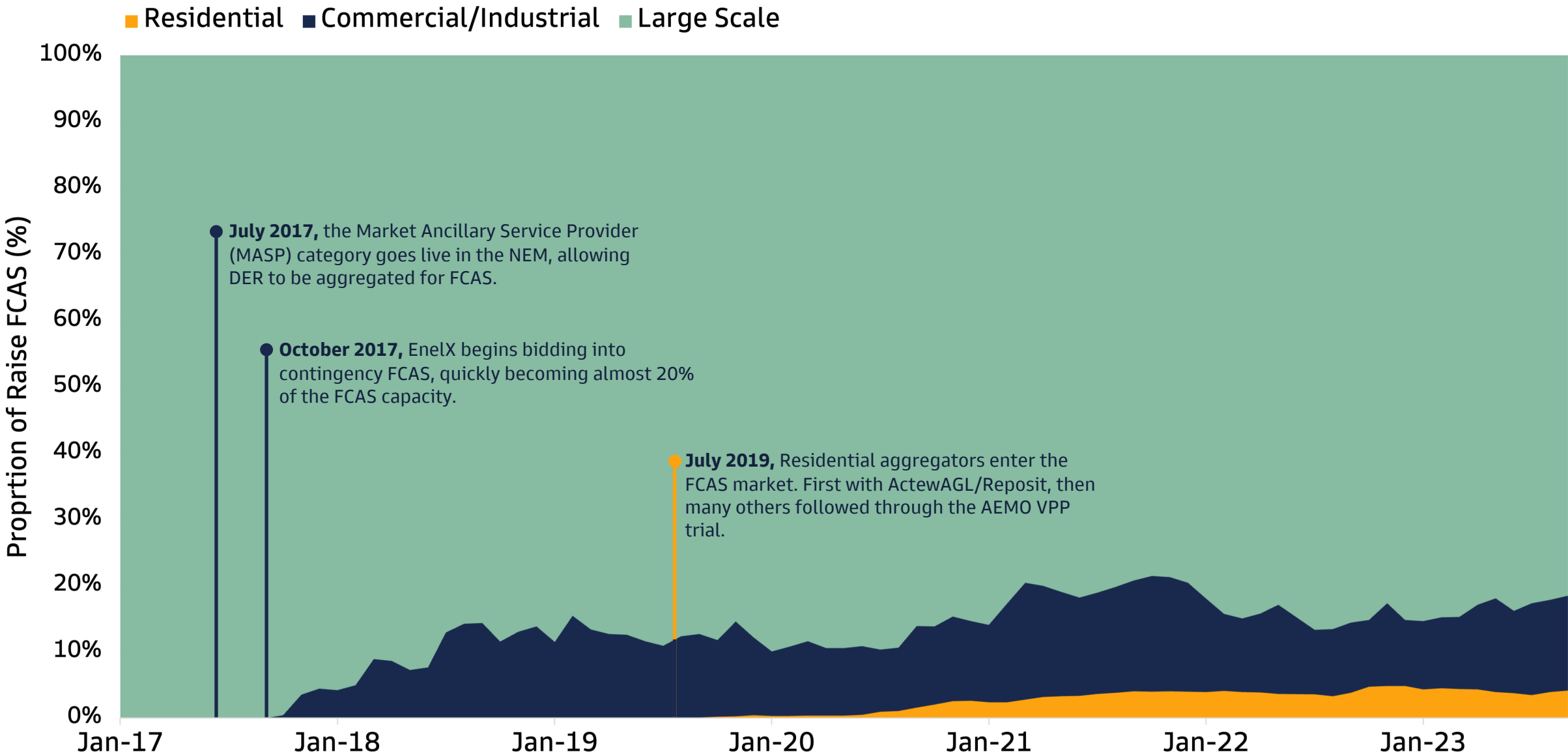
Contingency FCAS used to be a small market with few participants. Since 2016 with prices increasing dramatically, many new participants and technology types have entered this now lucrative market.

Contingency FCAS is a “shallow market”, in that only a few hundred mega-watts of it are required. Because of this many expect contingency FCAS prices to fall in the coming years as more flexible capacity such as batteries come online.



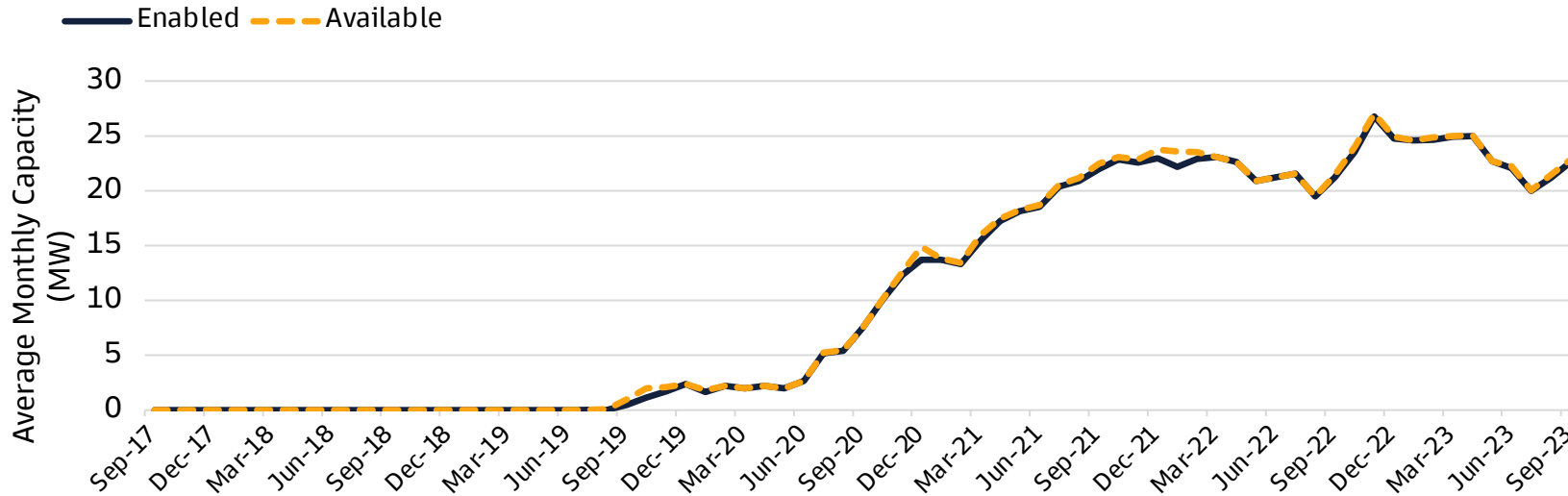
DER has provided 10-20% of contingency FCAS in the NEM since 2018

Proportion of DER Participation in Contingency Raise FCAS

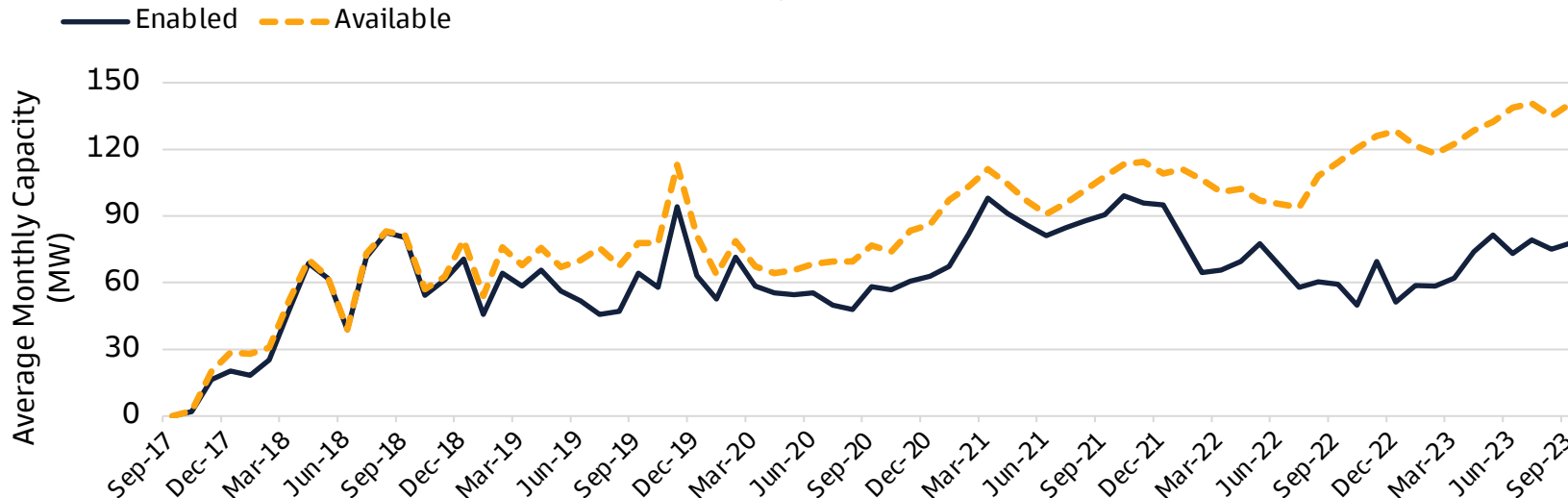


Residential capacity is always enabled due to \$0 bidding, C&I capacity is more selective due to bidding at higher prices

Residential FCAS Raise Availability/Enabled



Commercial/Industrial FCAS Raise Availability/Enabled



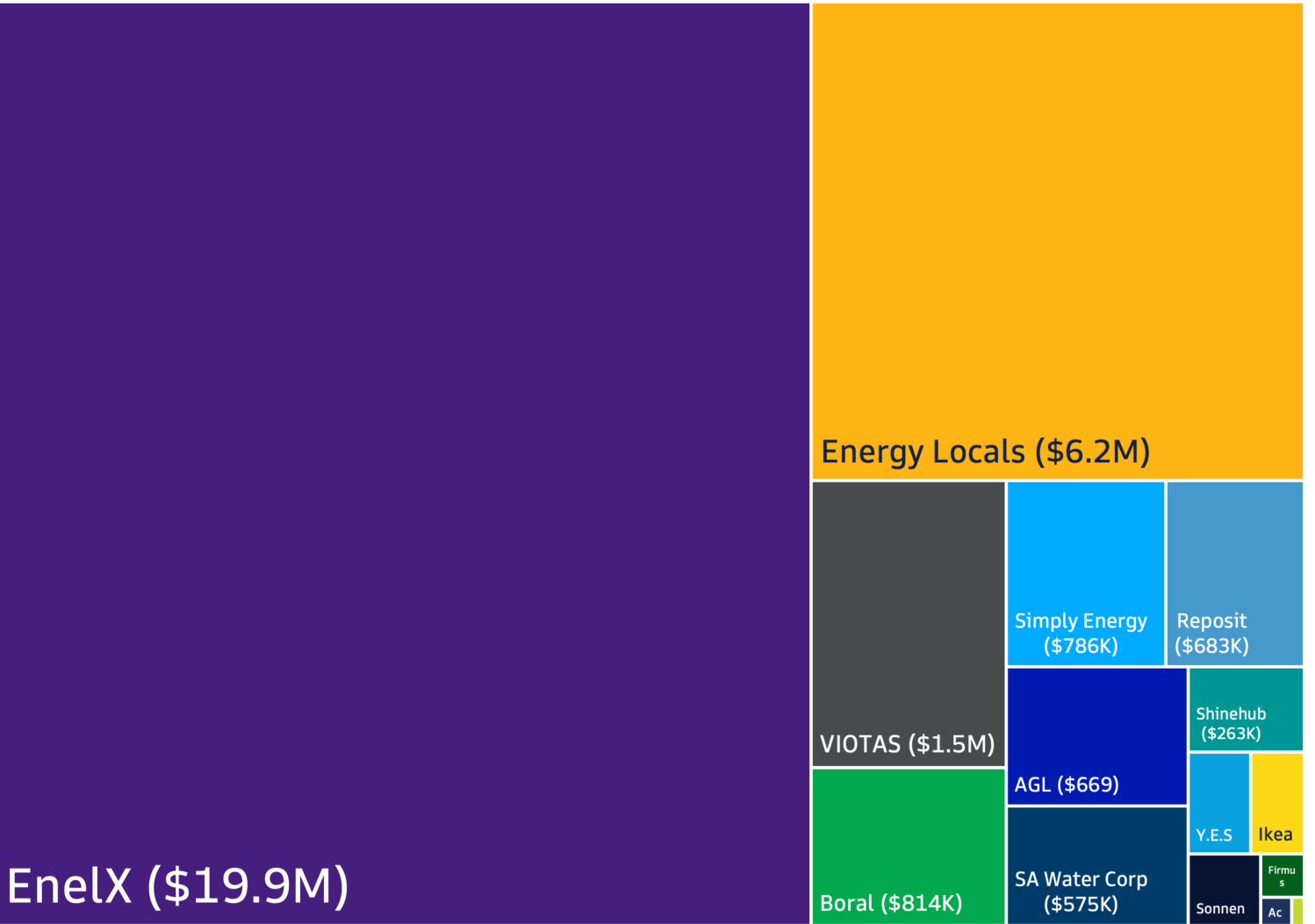
FCAS capacity:

- Residential FCAS Availability grew during the AEMO VPP trial but has stagnated over the past 12 months.
- Residential FCAS operators bid in capacity at \$0, ensuring it's enabled. This is why almost all capacity made available is enabled by the market operator. See bidding appendix at the end of the deck for more information.
- C&I FCAS availability has continued to grow over time as more capacity is signed up.
- C&I FCAS enabled capacity has increased at a much slower rate, with less available capacity being enabled over time. EnelX in particular bids at different price bands and reduced FCAS prices mean less capacity gets enabled. See bidding appendix at the end of the deck for more information.

Most DER FCAS participants earned under \$800k and majority of revenue went to EnelX & Energy Locals

DER FCAS Revenue by Participant

Total: \$32M, Oct'22-Sep'23



FCAS earnings:

\$32M earned by DER FCAS providers, with over 80% of the revenue going to EnelX and Energy Locals.

Comprised of 15 participants with 42 VPPs. Notable FCAS participants:

- **SA Water Corp** with batteries at 3 water treatment plants and the Adelaide desalination plant.
- **Boral** moving out from under an aggregator to their own direct market participation.
- **Ikea** has a microgrid at their Adelaide store with 1.2MW of solar and a 3MW/3.45MW battery.
- **Firmus** runs a data centre in Tasmania where parts of it can be interrupted to deliver FCAS services.

Healthy earnings per MW of registered capacity, with residential capacity providing more flexibility and availability

FCAS Revenue per Registered MW

October 2022 – September 2023



FCAS earnings per MW:

\$50k/MW represents:

- \$150 - \$250 per 5kW battery, or
- \$20k - \$25k per 500kW machine

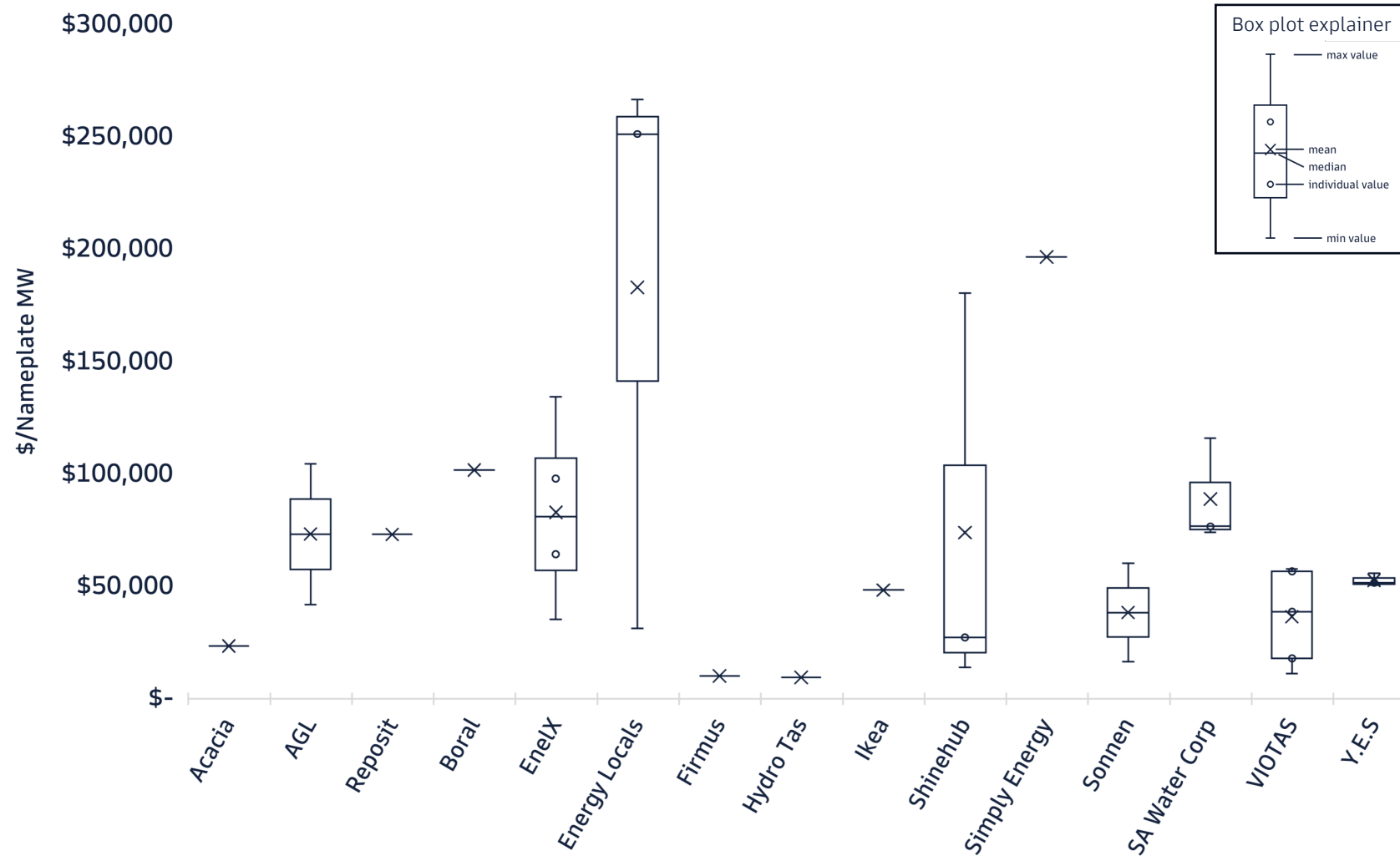
Some reasons for the different between C&I and residential earnings:

1. Residential aggregators use batteries, which can participate in raise and lower markets, while most C&I capacity comes from interruptible loads and generators that only participate in raise markets.
2. Residential battery usage is more discretionary than industrial loads, and therefore can be used more in FCAS.
3. Residential aggregators are mostly operating in South Australia which has higher FCAS prices than VIC and NSW.

Most FCAS VPPs earned around or less than \$100,000/MW, with some outliers in South Australia

FCAS Revenue per MW by VPP and participant

Oct'22 – Sep'23, Box plots for participants with multiple VPPs



FCAS earnings per MW:

By taking revenue and dividing it by average raise FCAS registered capacity, we can see how much each participants makes with each MW of registered capacity.

- Most participants earn between 40k-120k/MW over the last 12-months.
- Some newer, smaller, or more intermittent participants have earned less than that.
- Some residential VPPs in South Australia have earned over \$200k/MW over the last 12-months.

Some reasons for differences between participants:

- 1. NEM regions:** SA and QLD prices can go very high during interconnector outages or maintenance
- 2. Operational efficiency:** How a participant predicts their availability, maintains the fleet, and bids.
- 3. Technology types:** Batteries can provide 2-way FCAS services and are more discretionary in their usage than flexible loads or generators
- 4. Fleet size:** Small fleet sizes suffer disproportionality from bidding band sizes (e.g. 1.9MW of capacity can only bid 1MW)

Appendix: FCAS Revenue by DUID Oct'22-Sep'23

Aggregator	Station Name	DUID	Region	Avg Raise Nameplate (MW)	Earnings	\$/MW nameplate
Acacia	DRACAN1	DRACAN1	NSW1	1.00 \$	23,454.50	\$ 23,455
AGL	DR AES N VL1	DRAESN1	NSW1	1.00 \$	41,929.42	\$ 41,929
AGL	VPP AGLE SA 1	VSSAE1V1	SA1	6.00 \$	627,392.30	\$ 104,565
Reposit	AS AES NSW	ASNAES1	NSW1	9.33 \$	682,572.50	\$ 73,133
Boral	Boral Aggregated Load NSW1	ASNBRL1	NSW1	8.00 \$	813,806.90	\$ 101,726
EnelX	ENOC MASP NSW	ASNENC1	NSW1	114.33 \$	11,191,480.00	\$ 97,885
EnelX	ENOC MASP QLD	ASQENC1	QLD1	22.00 \$	1,414,542.00	\$ 64,297
EnelX	ENOC MASP SA	ASSENC1	SA1	20.67 \$	729,612.20	\$ 35,304
EnelX	ENOC MASP VIC	VENUS1	VIC1	49.00 \$	6,581,637.00	\$ 134,319
Energy Locals	Energy Locals SA VPP	ASSEL1	SA1	12.00 \$	3,200,392.00	\$ 266,699
Energy Locals	ASNSEL2	ASNSEL2	NSW1	1.00 \$	31,240.14	\$ 31,240
Energy Locals	VPP Energy Locals SA 1	VSSEL1V1	SA1	12.00 \$	3,015,019.00	\$ 251,252
Firmus	DR FIRM INFRA T 1	DRFIIN01	TAS1	5.00 \$	50,533.65	\$ 10,107
Hydro Tas	VPP HT QLD 1	VSQHT1V1	QLD1	1.00 \$	9,460.87	\$ 9,461
Ikea	IKEA Brooklyn Park	ASPAPM01	SA1	3.00 \$	145,026.20	\$ 48,342
Shinehub	DRSHVS01	DRSHVS01	SA1	2.50 \$	68,131.60	\$ 27,253
Shinehub	DRSHVN01	DRSHVN01	NSW1	1.00 \$	13,828.53	\$ 13,829
Shinehub	VPP ShinHub SA 1	VSSSH1S1	SA1	1.00 \$	180,578.40	\$ 180,578
Simply Energy	VPP Simply SA 1	VSSSE1V1	SA1	4.00 \$	786,192.40	\$ 196,548
Sonnen	VPP sonnen NSW 1	VSNSN1V1	NSW1	1.00 \$	16,463.09	\$ 16,463
Sonnen	AS Sonnen SA	ASSSN1	SA1	2.00 \$	120,465.50	\$ 60,233
SA Water Corp	Adelaide Desalination Plant	ADPBA1G	SA1	3.00 \$	347,563.60	\$ 115,855
SA Water Corp	Bolivar Waste Water Treatment Plant	BOWWBA1G	SA1	1.00 \$	73,944.50	\$ 73,945
SA Water Corp	Happy Valley Water Treatment Plant	HVWWBA1G	SA1	2.00 \$	153,399.12	\$ 76,700
VIOTAS	DRVIOT01	DRVIOT01	SA1	2.00 \$	22,244.22	\$ 11,122
VIOTAS	DRVIOT02	DRVIOT02	VIC1	2.00 \$	115,396.10	\$ 57,698
VIOTAS	DRVIOT03	DRVIOT03	NSW1	2.00 \$	77,508.88	\$ 38,754
VIOTAS	DRVIOT04	DRVIOT04	QLD1	20.33 \$	1,151,804.00	\$ 56,646
VIOTAS	DRVIOT05	DRVIOT05	TAS1	6.33 \$	113,722.20	\$ 17,956
Y.E.S	ASRMGE03	ASRMGE03	SA1	1.00 \$	55,804.44	\$ 55,804
Y.E.S	ASRMGE02	ASRMGE02	SA1	1.00 \$	50,571.94	\$ 50,572
Y.E.S	ASRMGE01	ASRMGE01	SA1	1.00 \$	51,535.72	\$ 51,536

C&I Aggregators and small utility BESS taking significant amounts of new Very Fast FCAS Revenue

Very Fast FCAS Revenue by Participant

Total: \$635k, 9th-19th October

Utility BESS			C&I Aggregator	
Wallgrove BESS \$164,581	Lake Bonney BESS \$87,807	Bulgana BESS \$64,234	Viotas \$60,360	EnelX \$58,436
			Small Utility BESS (≤10MW)	
	Victorian Big Battery \$47,946	Hornsdale BESS \$47,343	Queanbeyan BESS \$59,640	Y.E.S \$45,015

Very Fast FCAS Earnings:

Historically there's been three 'speeds' of FCAS responses:

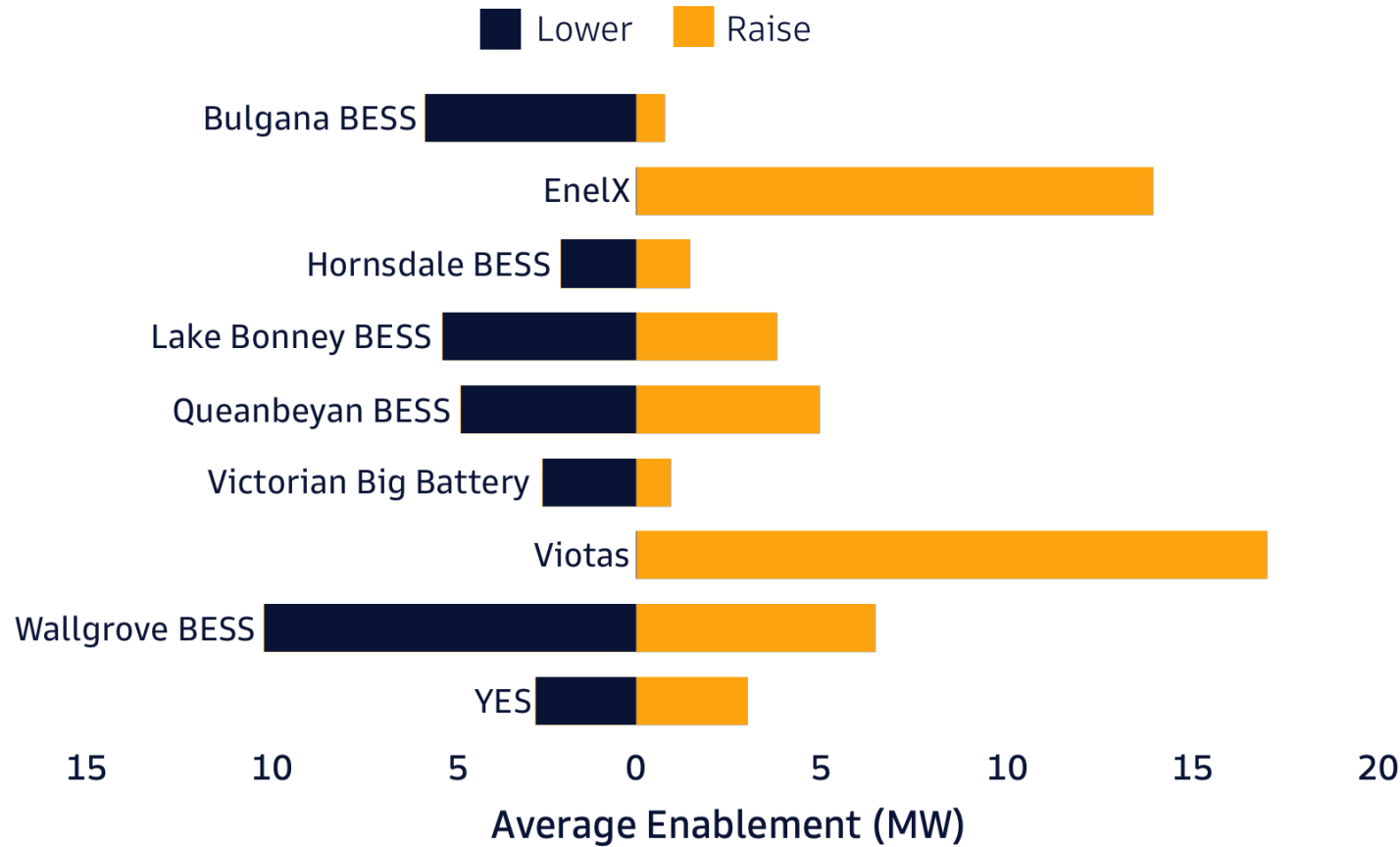
- **Fast:** assets respond to a frequency deviation and ramp in a couple of seconds.
- **Slow:** assets ramp over a sixty second period.
- **Delayed:** assets ramp over a five-minute period.

On the 9th of October a new market started, very fast FCAS, which requires responses to frequency deviations in about a second.

Over the first 11 days of operations, C&I aggregators EnelX and VIOTAS have earned around 20% of revenues from the market, and Y.E.S Energy with their three 1MW batteries are earning on par with much, much larger batteries.

C&I Aggregators reduce prices in the Very Fast FCAS Raise market

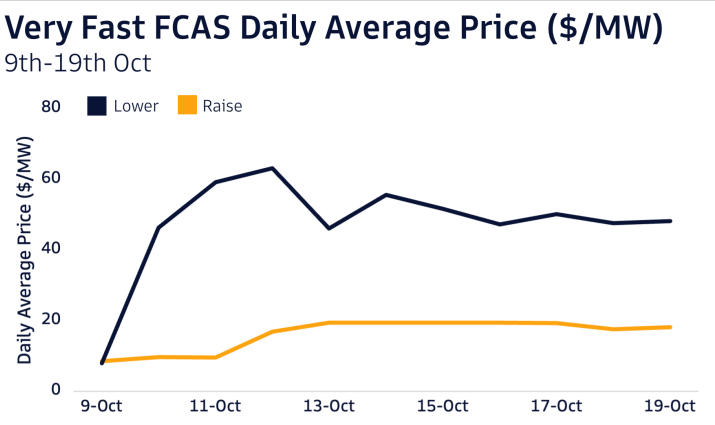
Very Fast FCAS Average Enablement
9th-19th October



Very Fast FCAS Earnings:

In the first 11 days of operation, C&I aggregators comprised ~60% of Raise capacity by bidding in at low prices which reduced the raise price and undercut utility batteries in the dispatch stack.

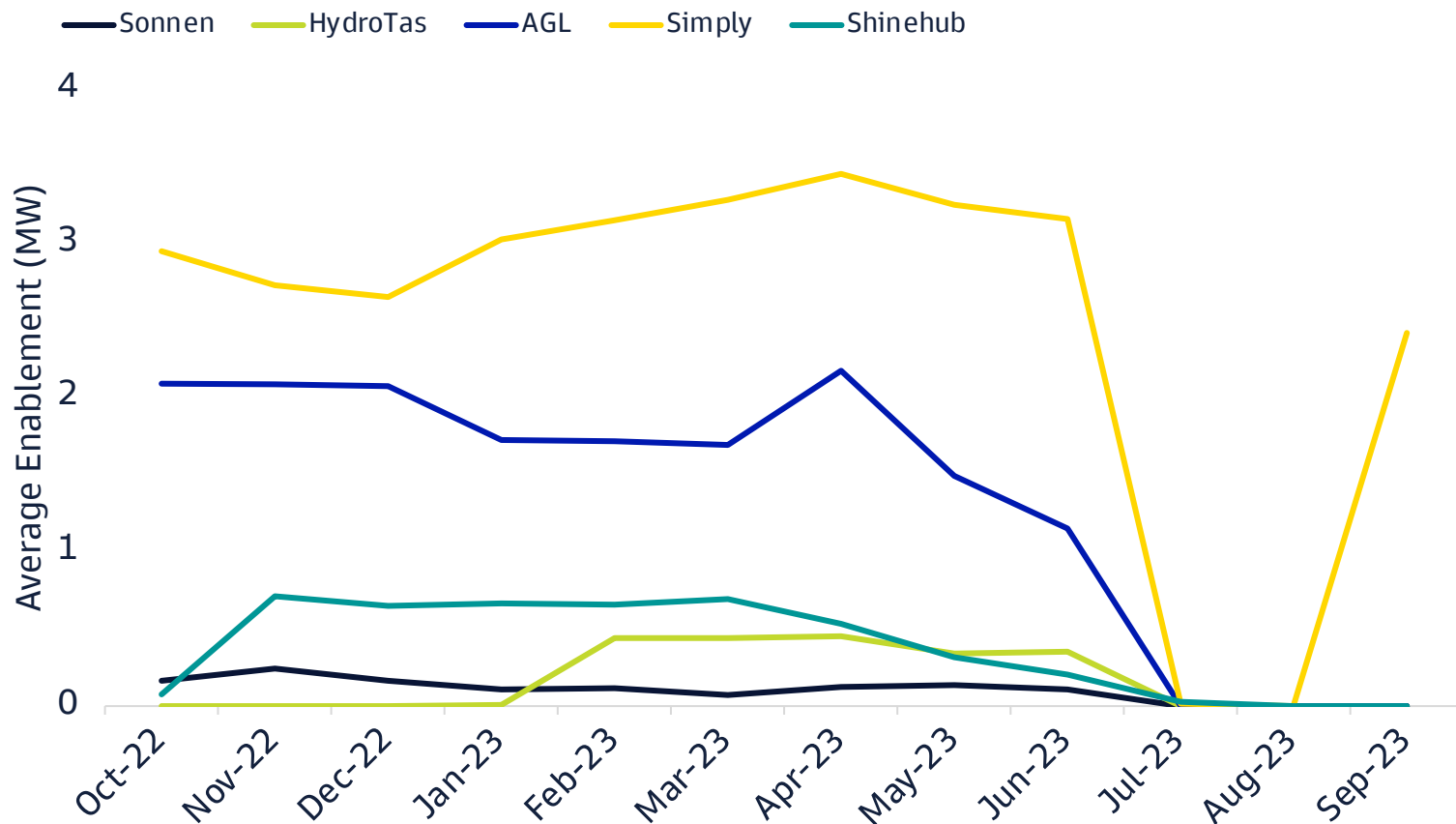
This dramatically reduced Raise prices relative to the Lower markets which the C&I aggregators don't participate in.



This provides a small and pointed example of how DER can reduce energy system costs.

Some VPP trial participants lose fast FCAS capacity as trial settings sunset

Fast FCAS Raise Enablement (MW)



Effects of VPP trial sunseting:

Earlier in the year **Grids** posted about [the AEMO VPP trial sunseting](#) which in July meant trial participants now had to comply with metering requirements in the Market Ancillary Service Specification (MASS). The MASS requires faster meters for 6 second (fast) FCAS than the VPP trial required.

While Energy Locals with their fleet of Tesla Powerwalls were able to meet the faster requirement, all other trial participants withdrew 6 second in July, presumably as they could not meet the MASS requirement, or they were still validating their metering with the market operator.

Since then, we've had one of these VPP trial participants recommence operating in the 6 second market: Simply Energy.

Low uptake in the Wholesale Demand Response Mechanism

Wholesale Demand Response allow commercial and industrial operators to “jump in” to the market at specific points to provide demand response. They’re given a baseline based on historical usage and are paid the spot price for reducing their usage below that baseline.

1

market participant

67MW

registered capacity

From October 2022 – September 2023:

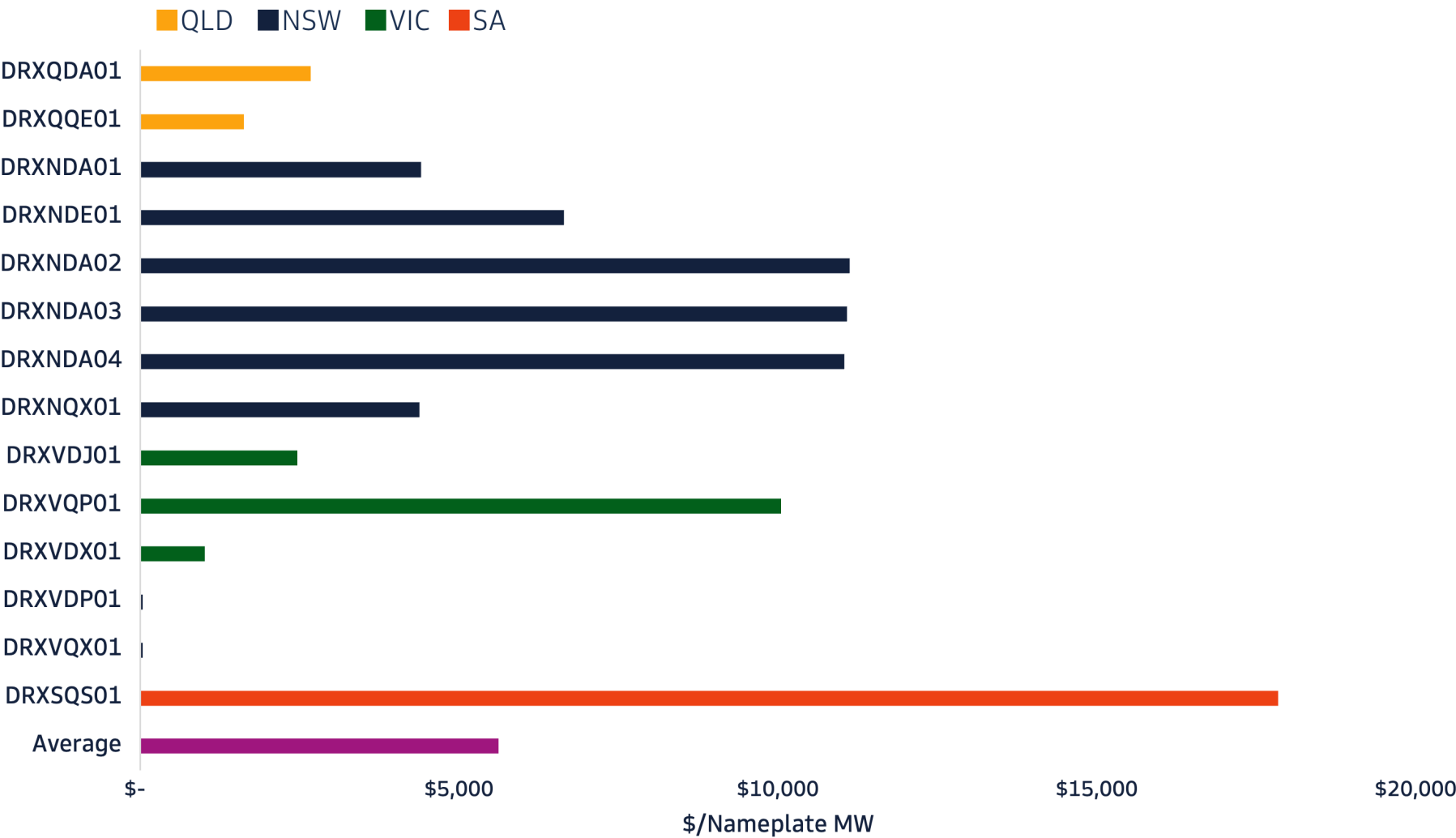
Revenue	\$367k
Energy dispatched	205MWh
Average price	\$1,833/MWh

Participant	Facility Name (WDRU Name)	Region	Max Response (MW)
Enel X Australia Pty Ltd	DR ENELX Q50	QLD1	4
	DR ENELX Q54	QLD1	1
	DR ENELX N1	NSW1	10
	DR ENELX N3	NSW1	2
	DR ENELX N31	NSW1	6
	DR ENELX N32	NSW1	6
	DR ENELX N34	NSW1	6
	DR ENELX N36	NSW1	3
	DR ENELX V1	VIC1	6
	DR ENELX V2	VIC1	4
	DR ENELX V17	VIC1	10
	DR ENELX V12	VIC1	3
	DR ENELX V24	VIC1	4
	DR ENELX S2	SA1	2
	Total		67

Less volatile wholesale prices leading to soft revenues for WDRM units

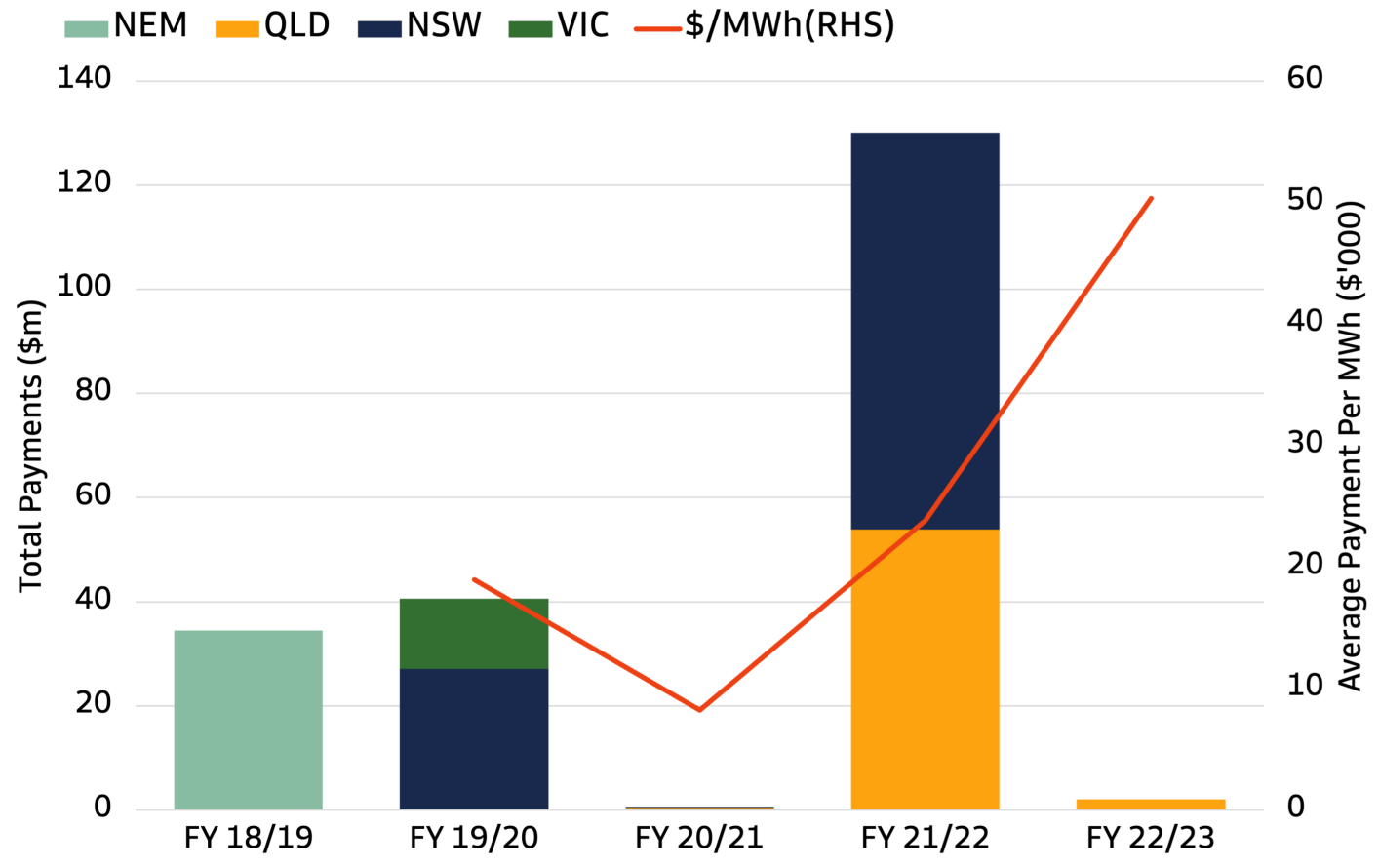
WDRM Revenue Per Nameplate MW

Oct'22 – Sep'23



RERT can provide high amounts of revenue, but is infrequent and unpredictable

Annual RERT Payments



Note: These are the numbers from [AEMO's RERT reporting](#), No \$/MWh values were published for FY 18/19

Reliability & Emergency Reserve Trader:

RERT is an energy provider of last resort that allows demand response participation. Operators of non-price responsive loads and generators (i.e. loads and generators which don't actively respond to the wholesale energy price) negotiate pre-agreed terms for providing demand response that the market operator can request when there is a potential shortfall in required generation in the energy system.

They're given a baseline based on historical usage and are paid the pre-agreed price for reducing their usage below that baseline. Some providers are also paid to "get ready".

RERT by the numbers:

- Providers can offer capacity above the market cap price.
- In FY22/23 average payments to providers was \$50k/MWh, with the majority of that going to pre-activation costs.
- In other years average payments have been between \$8.2k-\$24k/MWh.
- While these values are large, RERT dispatches are rare.






A wide range of RERT participant types that can earn large amounts when called upon

Example estimates of RERT payments

2-hour response at \$20,000/MWh

Type of response	Estimated customers participating	Total revenue for a 2-hour response at \$20,000/MWh	Revenue per customer
5MW Residential VPP	2000	\$200,000	\$100
30MW Network Voltage Management	100000	\$1,200,000	\$12
50MW Commercial VPP	20	\$2,000,000	\$100,000
Portland Aluminium Smelter (440MW)	1	\$17,600,000	\$17,600,000

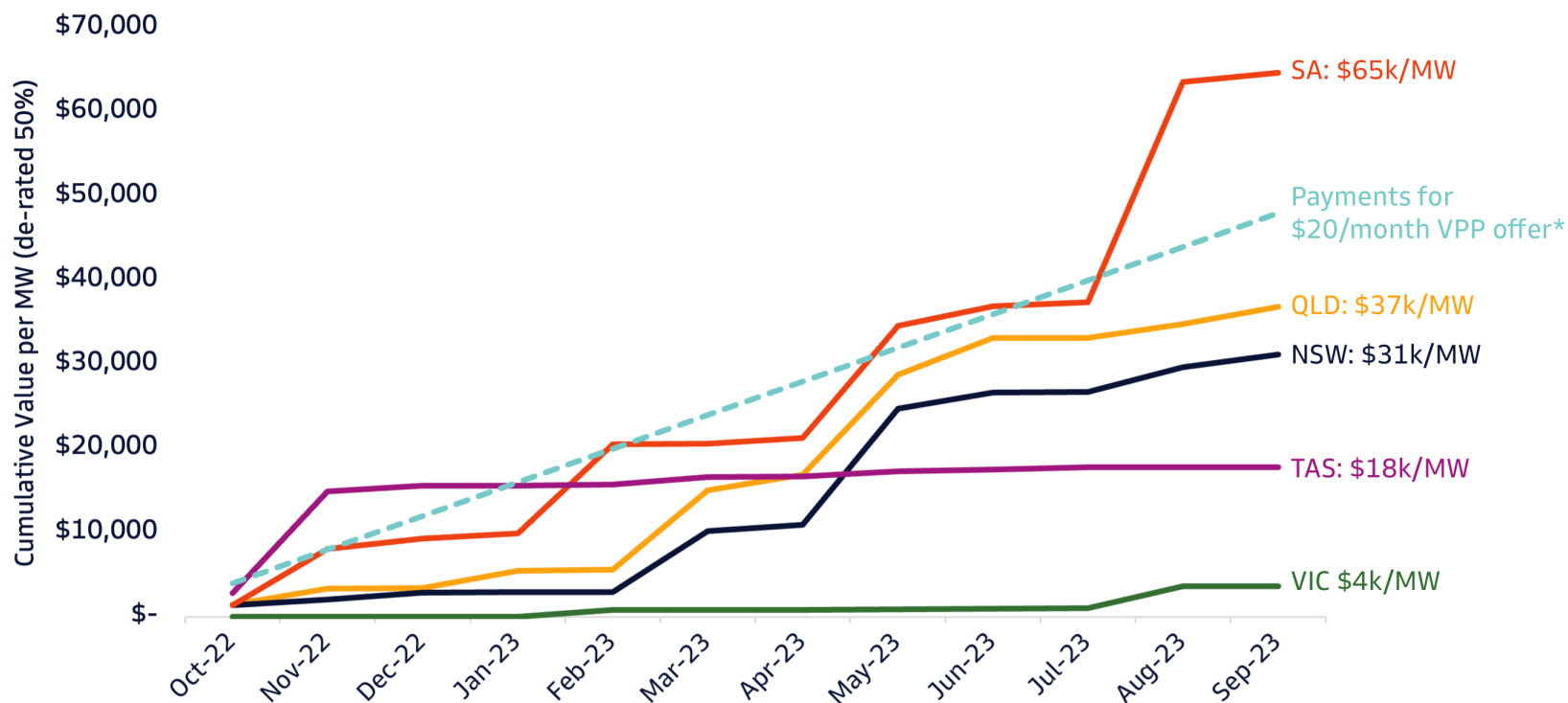
Examples of RERT participants:

-  Behavioural demand response (ARENA trial)
-  Residential battery VPPs
-  Distribution networks using voltage management ([More details](#))
-  Commercial & industrial operators
-  Smelters such as Portland and Tomago

The last 12-months has had low wholesale volatility resulting in less value to unscheduled demand response

Cumulative Value per MW Responding to Wholesale Energy Prices over \$1000/MWh

MW values de-rated 50%, Oct'22-Sep'23



*Note: \$20/month VPP offer assumes average customer participates with 5kW (i.e. 200 customers per MW)

The graph above represents the cumulative amount 1MW of demand response would earn if it was able to respond with 50% of its capacity to all wholesale prices above \$1000/MWh. The 50% de-rating is to represent some capacity that doesn't respond, such as operators/customers opting out, low state of charge in batteries, or high prices at times where there's low demand flexibility. In light blue we've included the cost to a VPP operator paying out \$20/month to residential customers, showing that many of these plans under these assumptions would have paid out more to residential customers this year than they earned from the market.

Unscheduled Demand Response:

"Unscheduled Demand Response" is where DER and consumers change energy consumption in response to an external trigger such as a high spot price or VPP dispatch.

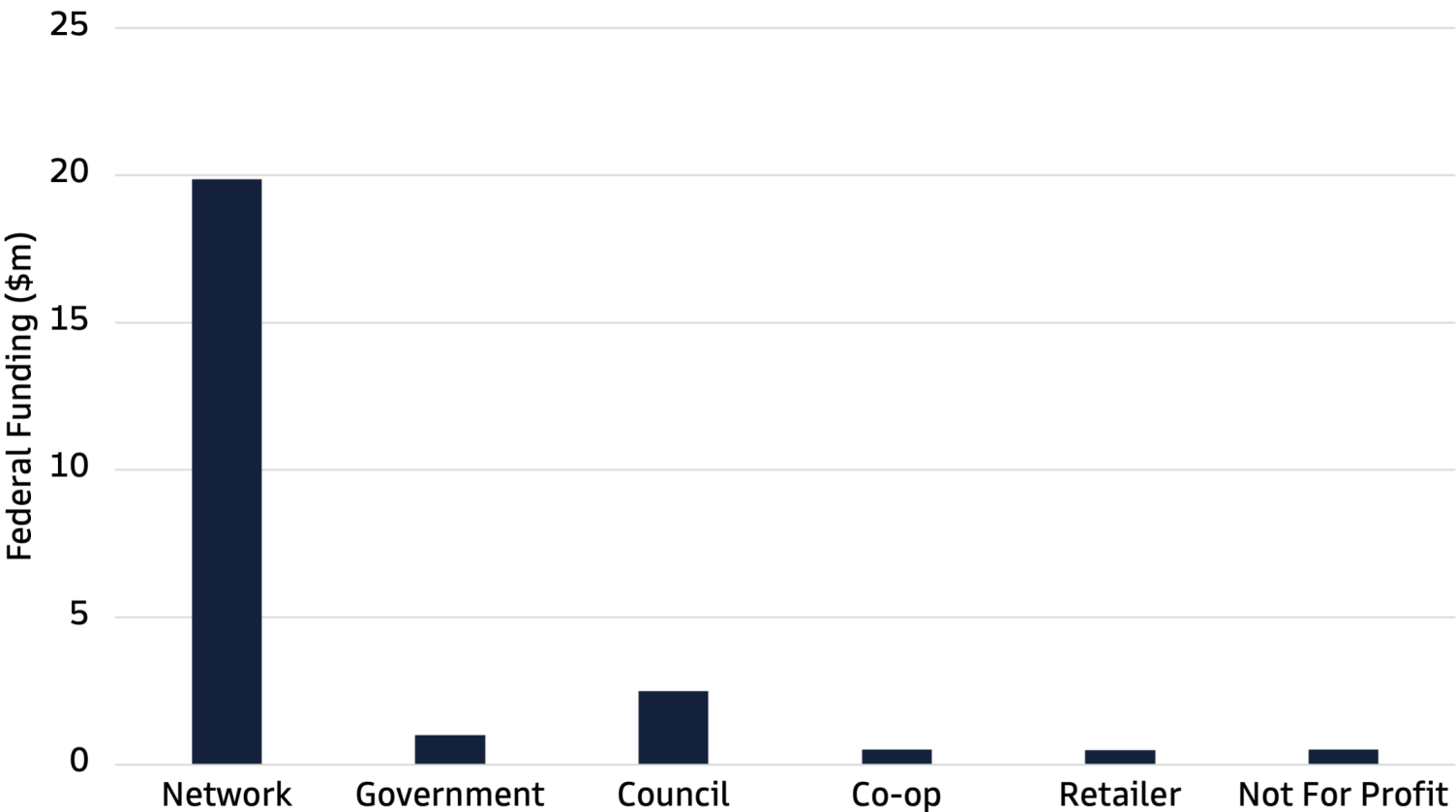
This type of operation likely represents most of the value earned in the market by DER (i.e. more than total FCAS, RERT and WDRM revenue combined) but due to its unscheduled nature not a lot of data is available on how this is operating in the NEM.

A 2021 study by Energy Synapse examining the "Demand Side Participation Information (DSPI) portal" found that there was over 4GW of recorded demand response capacity from a range of sources, which trigger at a wide range of prices. This estimate was based on information provided to AEMO through the DSPI portal by market participants. However, it is unclear how much of this 4GW is active in the wholesale market. In addition, it is unclear how much active demand response has not been captured by this estimate.

Majority of current federal community battery funding to networks, but these will be leased to operators

Current Federal Community Battery Funding by Applicant Type

Total: \$25.3M, Capacity: 19.3MW



Community Batteries:

There are current state and federal schemes subsidising the rollout of hundreds of community batteries.

These community batteries will participate in the energy market to earn revenue, while also responding to local incentives (such as community battery network tariffs) and providing benefits back to the community.

The first round of funding, [run through business.gov.au](#), awarded majority of the funding to distribution network businesses.

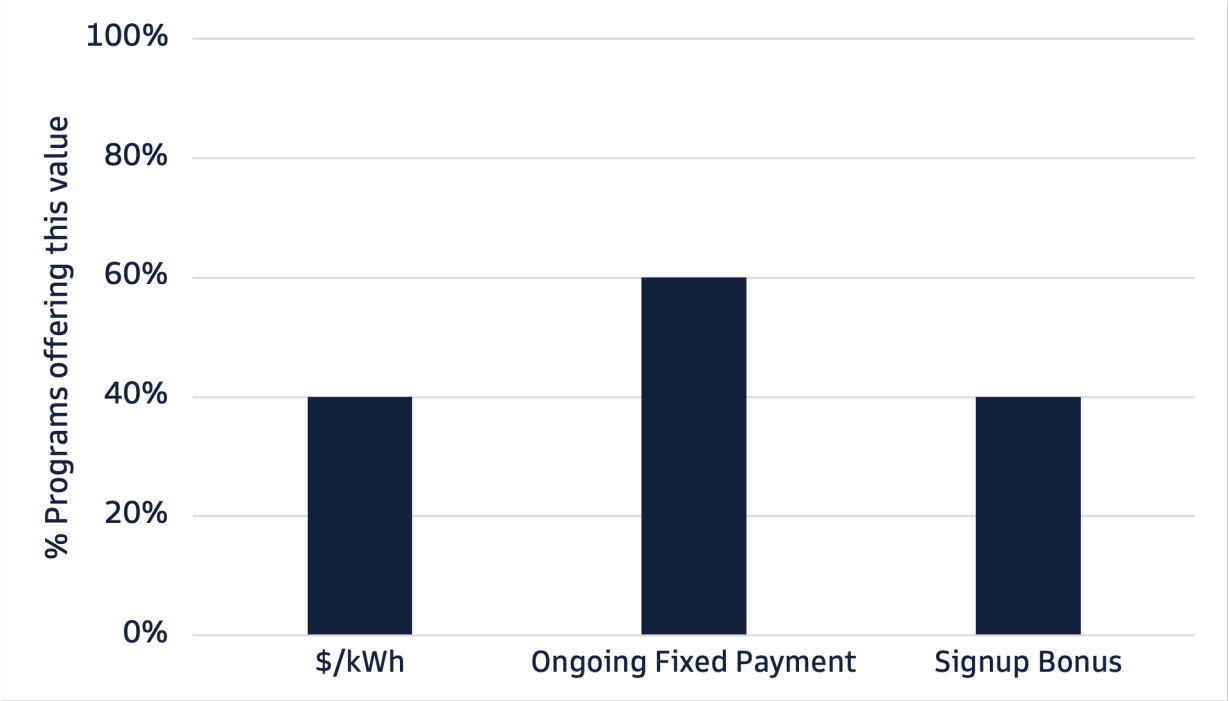
These community batteries owned by the networks will be leased out to companies and groups to operate, earn market revenue, and provide benefits to the communities.

Community batteries represent hundreds of MW of distribution level capacity to be installed in the next few years that will be sophisticated and flexible in their operations and services they can provide.

**Productising This Value
To Consumers**

Residential VPP programs offer value through fixed payments or variable per kWh payments, often with safeguards

Types of Value in VPP Programs Reviewed



VPP Programs Analysed	
Origin Loop	Discover VPP
Amber for batteries	Simply Energy
Reposit No Bill	Shinehub VPP
AGL VPP	Sonnen Connect
ArcstreamVPP	Powershop VPP

VPP Programs:

10 residential VPP programs were analysed.

- **6** offered ongoing fixed payments ranging from \$15-\$40/month.
- The remaining **4** offered payments based on how many kWh were dispatched. Some included a fixed rate per kWh (\$1 or \$0.55), one had a 50% profit share arrangement, the other was based on the wholesale rate.
- **4** offered sign up bonuses.

Some had limits and safeguards, such as an annual kWh cap on VPP dispatches or limits to bill increases.

Majority of the programs were from retailers primarily doing unscheduled demand response and sometimes FCAS. There were a few non-retailer programs which made revenue from FCAS and network trials.

Fixed payments programs offer generous amounts relative to this year's market revenues for demand response

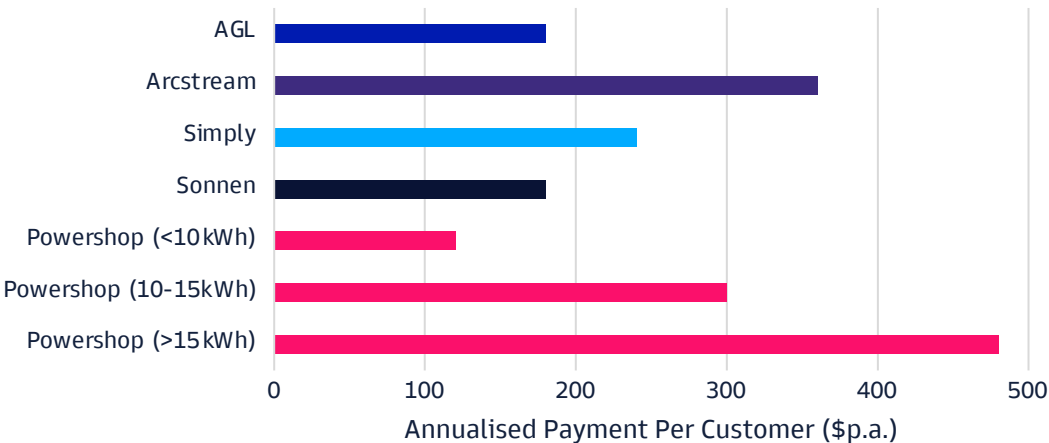
\$120-\$480/customer p.a.
of fixed payments

Only one one program (Powershop) varied payments based on battery size.

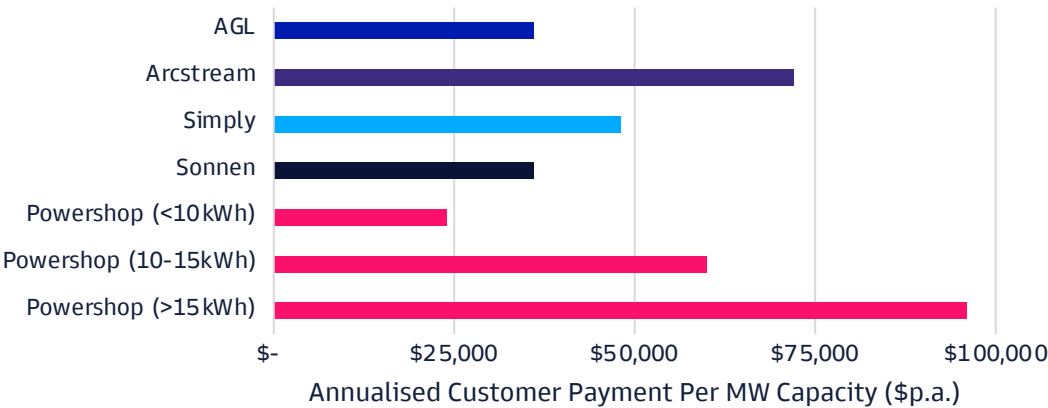
\$24k-\$96k/MW p.a.
of fixed payments

Assuming 200 customers per MW
(i.e. 5kW average system size)

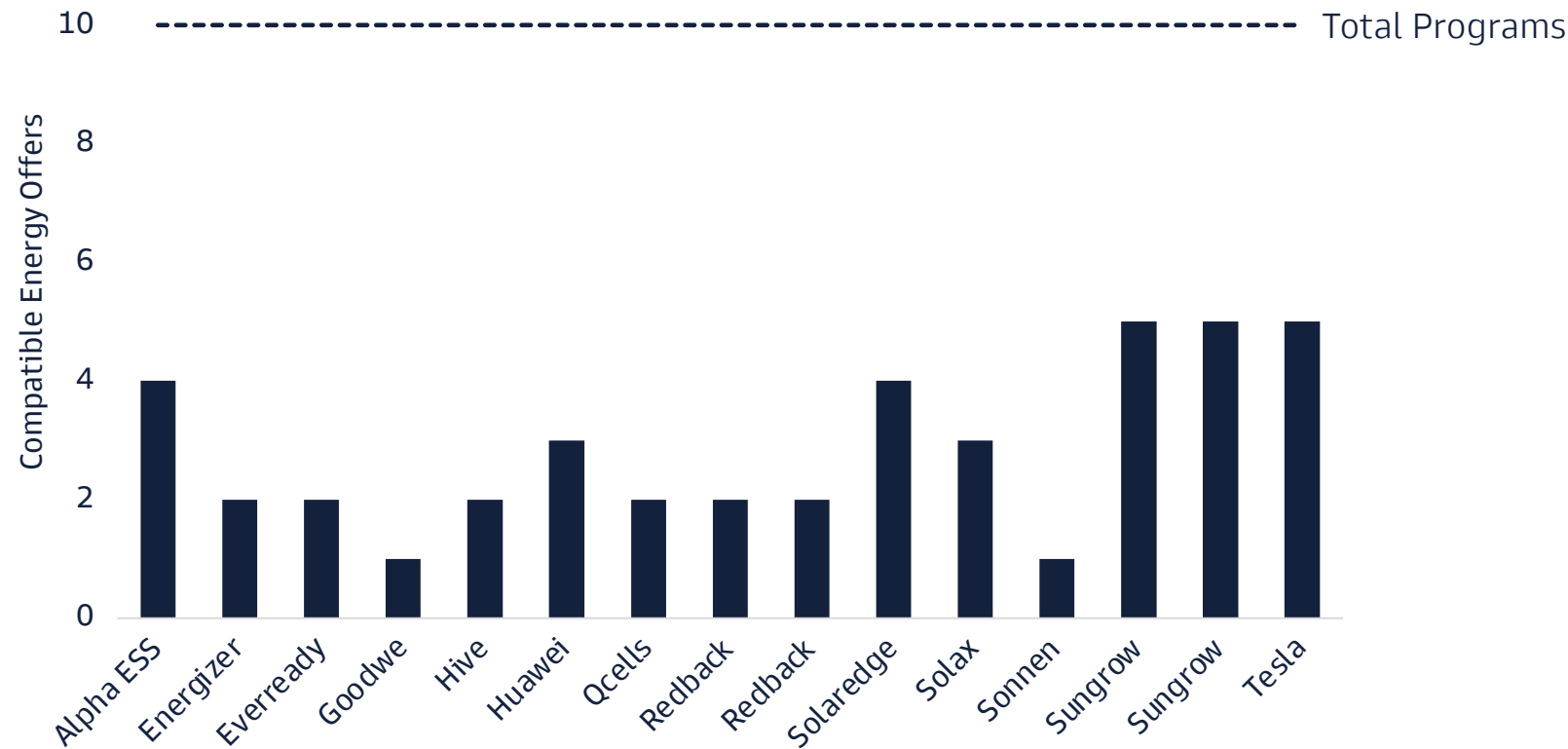
Annualised Customer Payments



Annualised Customer Payments Per MW Capacity



The average battery brand was only compatible with 2.9/10 VPP programs



VPP Program Compatibility:

Imagine if you phone was only compatible with a single carrier, or even 29% of carriers. This is the current state of DER/retailer compatibility.

While customers can freely switch to any retailer that they want, if they'd also like to be involved in a VPP program their options are quite limited.

Currently there are no standards for retailers and aggregators to communicate with CER, but this area is drawing more focus.

It's not all about standards though, often retailers will integrate against a subset of brands to manage complexity as they test these programs.

As the industry matures it's expected to see compatibility and standardisation increase, giving customers more choice in new energy programs.

Capacity Schemes create more revenue certainty for VPP programs, but many current schemes are difficult or impossible for DER to participate in

One way to smooth out the volatility of the energy market, allowing retailers to more confidently offer more reliable VPP offers to consumers, is to participate in capacity schemes. In these schemes operators receive regular payments for their availability. Unfortunately, many of the large capacity schemes in the NEM are hard for DER to participate in, but this may improve over time. One example on a capacity scheme eligible to DER is the South Australia [Retailer Energy Productivity Scheme](#).

Federal Capacity Scheme

DER eligible: **not currently**

The federal capacity investment scheme does not currently include the ability for DER to participate.

Stakeholders, [such as ECA](#), have brought up the value of allowing DER to receive capacity payments through some mechanism where they can provide value.

NSW Peak Demand Reduction Scheme

DER eligible: **soon (consultation)**

The PDRS is a certificate scheme that gives incentives for consumers to reduce peak demand.

Energy efficiency upgrades was the first available way to participate, but now the [government is consulting on](#) including residential demand reductions and response from home batteries and air conditioners, and industrial demand response.

At current certificate prices and methodologies, a medium residential battery may earn \$100-\$200/year in certificates.

NSW Long-Term Energy Service Agreements

DER eligible: **partial (WDRM only)**

Demand response can bid on NSW government long-term energy agreement, but there are certain requirements:

- Must be scheduled through the WDRM
- Must respond to LOR1, 2 and 3 with a defined min bid (with exceptions)

As there is little current WDRM participation, and only some large loads can participate, most DER would be ineligible for this capacity scheme.

VPP Programs

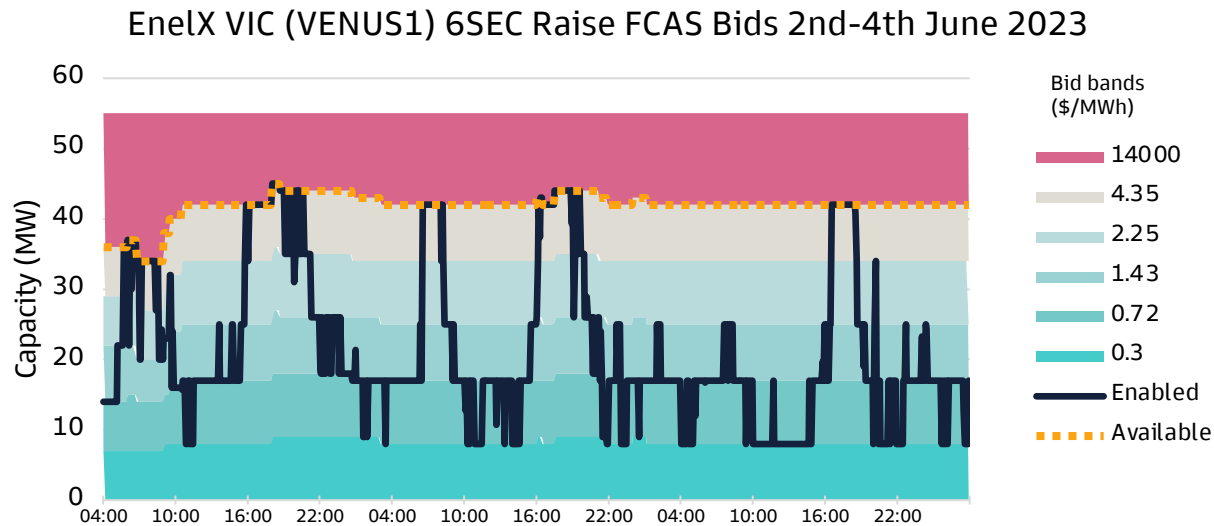
Appendix

Name	Batteries	Value	Value Type	Safeguards/Limits
Origin Loop	Tesla, Sungrow	\$400 sign up bonus \$1/kWh when dispatched	\$/kWh, Signup Bonus	200kWh p.a. cap on exports
Amber for batteries	Tesla, Solaredge, Alpha ESS, Hive, Sungrow, Energizer, Eveready, Hive, Huawei, Redback, Solax	Wholesale price	\$/kWh	Won't pay more than DMO over 12 month period
Reposit No Bill	Solax	No electricity bill	Ongoing Fixed Payment	Fair use clause where customers can use up to 20% more power than before joining the plan
AGL VPP	Tesla, Sungrow, Solaredge	\$1000 sign up bonus (if you buy battery from them) \$45/3months	Ongoing Fixed Payment, Signup Bonus	Energy bill won't increase more than \$50 p.a.
ArcstreamVPP	Qcells	\$30/month	Ongoing Fixed Payment	
Discover VPP	Huawei, Goodwe, Sungrow, Alpha ESS, Solaredge, Qcells	50% profit share of VPP revenues	\$/kWh	
Simply Energy	Tesla	\$800 sign up bonus \$20/month credits	Ongoing Fixed Payment, Signup Bonus	Max inverter size of 10kW 405kWh p.a. cap on exports
Shinehub VPP	Alpha ESS	\$0.55/kWh when dispatched	\$/kWh	
Sonnen Connect	Sonnen	\$100 sign up bonus up to \$15/month	Ongoing Fixed Payment, Signup Bonus	
Powershop VPP	Alpha ESS, Energizer, Eveready, Hive, Huawei, Redback, Solaredge, Solax, Sungrow, Tesla	\$10-\$40/month depending on battery size	Ongoing Fixed Payment	

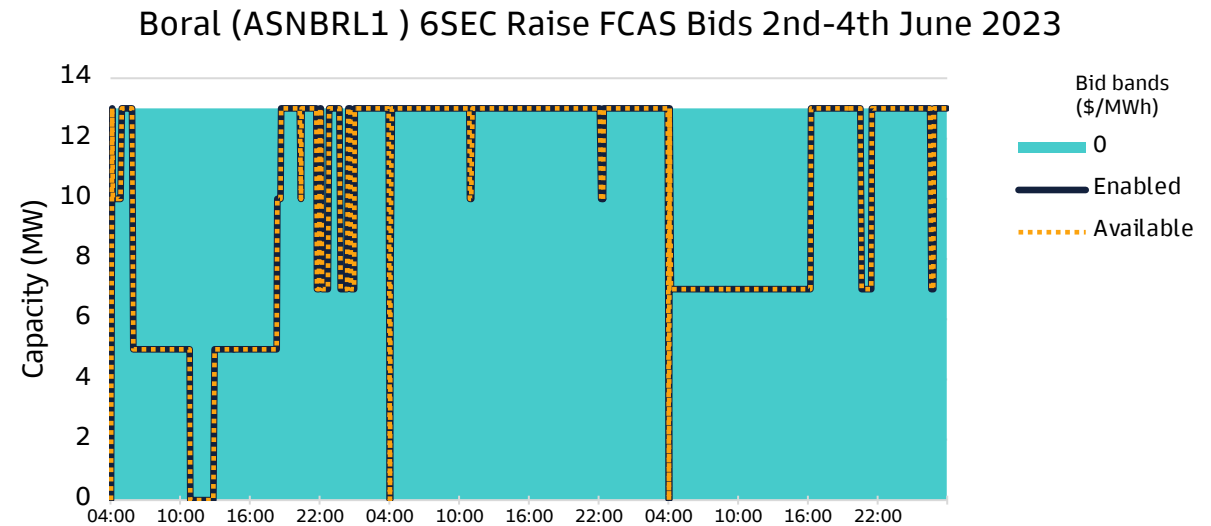
FCAS Bidding Appendix

This appendix shows 3 days of bidding data (2-4th June 2023) for many DER FCAS participants. “Available” is the total capacity offered to the market, and “Enabled” is what was accepted.

Some participants bid in price bands and are dispatched at higher capacities when the FCAS price rises.

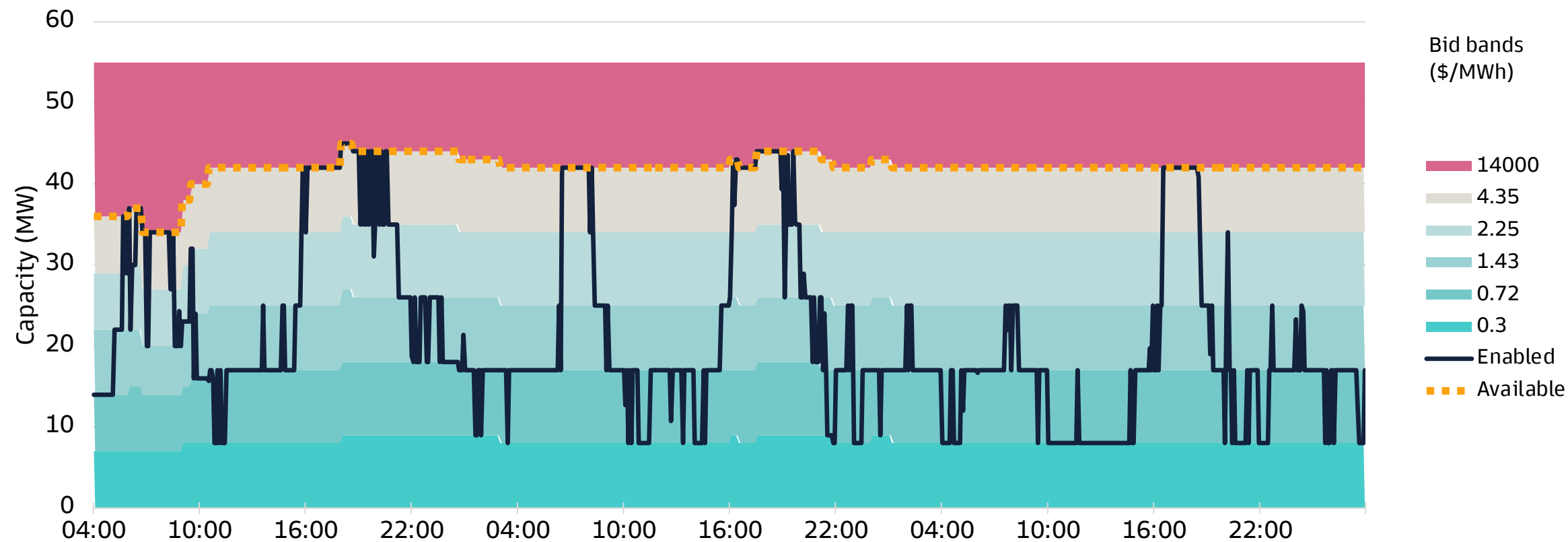


Other participants calculate how much capacity they have available and bid that in at \$0 to ensure they're dispatched regardless of the FCAS price.



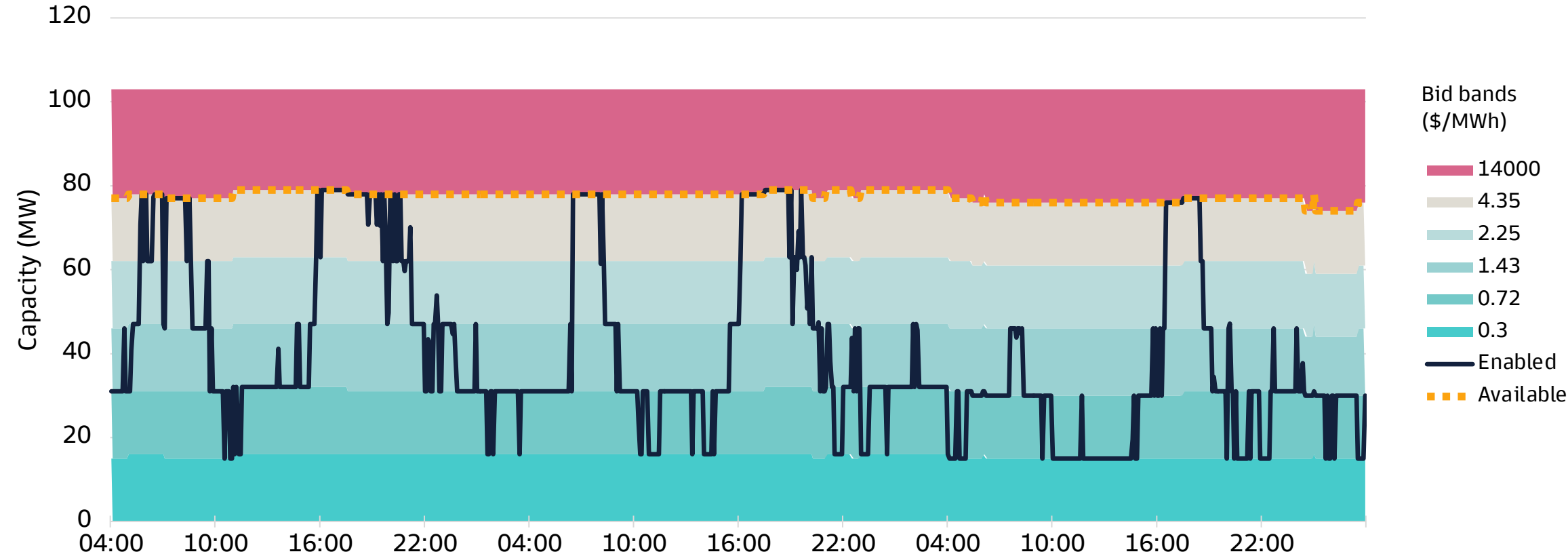
FCAS Bidding Appendix

EnelX VIC (VENUS1) 6SEC Raise FCAS Bids 2nd-4th June 2023



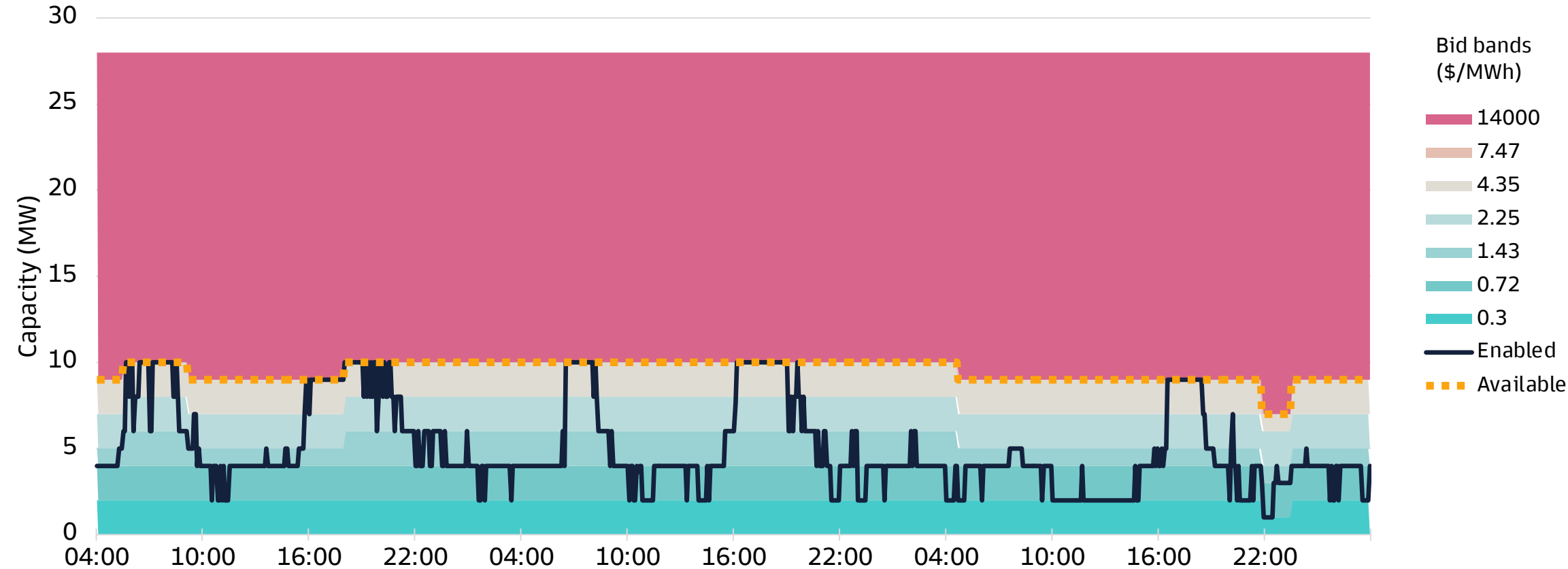
FCAS Bidding Appendix

EnelX NSW (ASNENC1) 6SEC Raise FCAS Bids 2nd-4th June 2023



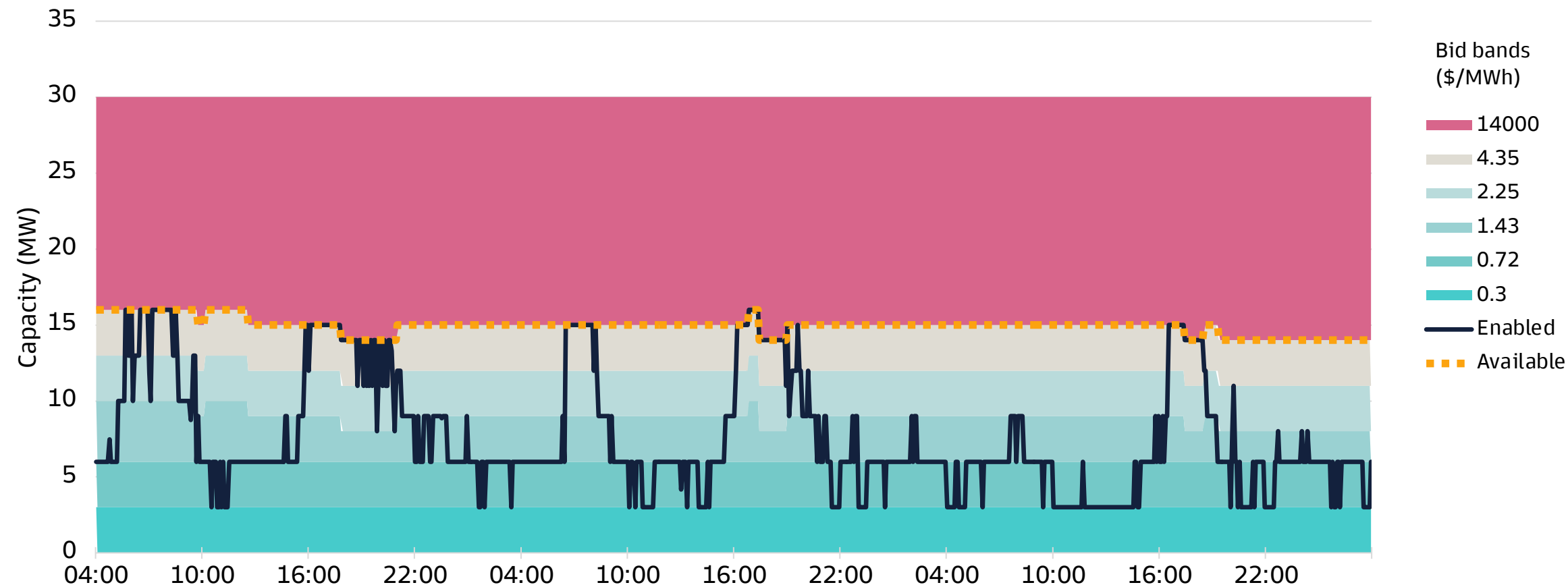
FCAS Bidding Appendix

EnelX SA (ASSENC1) 6SEC Raise FCAS Bids 2nd-4th June 2023



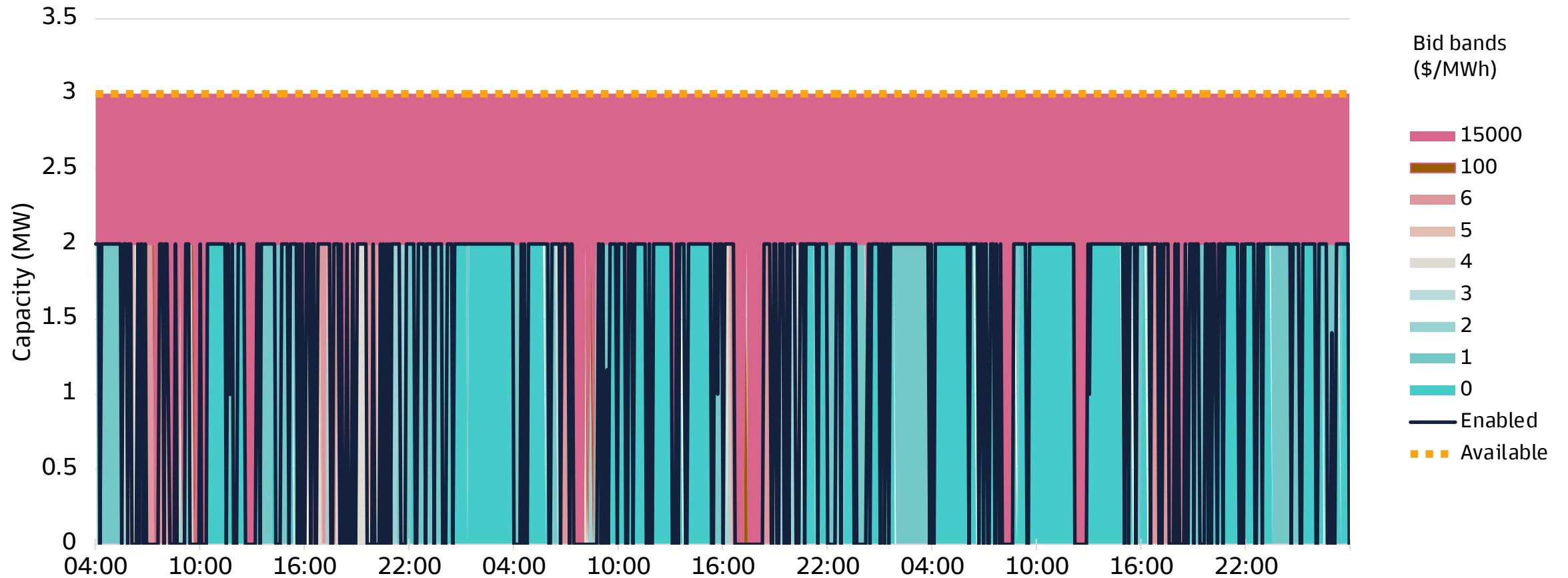
FCAS Bidding Appendix

EnelX QLD (ASQENC1) 6SEC Raise FCAS Bids 2nd-4th June 2023



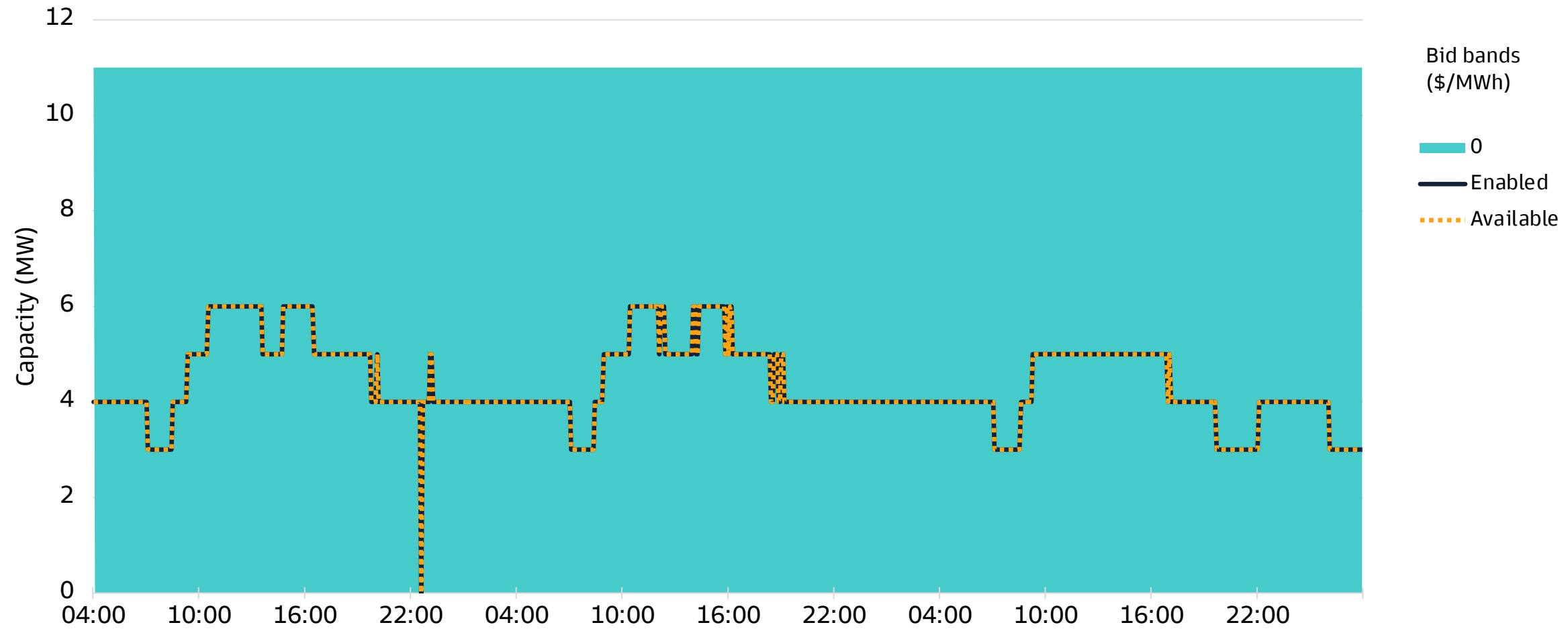
FCAS Bidding Appendix

Adelaide Desalination (ADPBA1G) 6SEC Raise FCAS Bids 2nd-4th June 2023



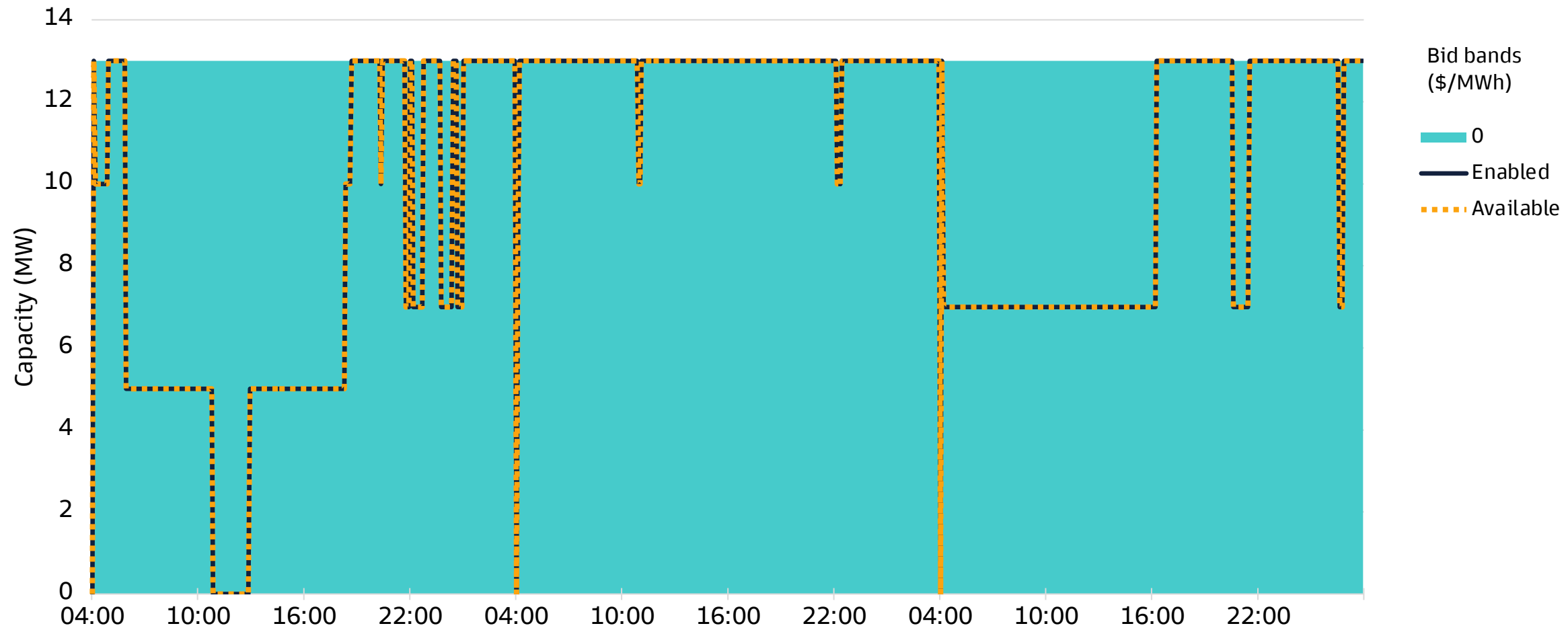
FCAS Bidding Appendix

Reposit (ASNAES1) 6SEC Raise FCAS Bids 2nd-4th June 2023



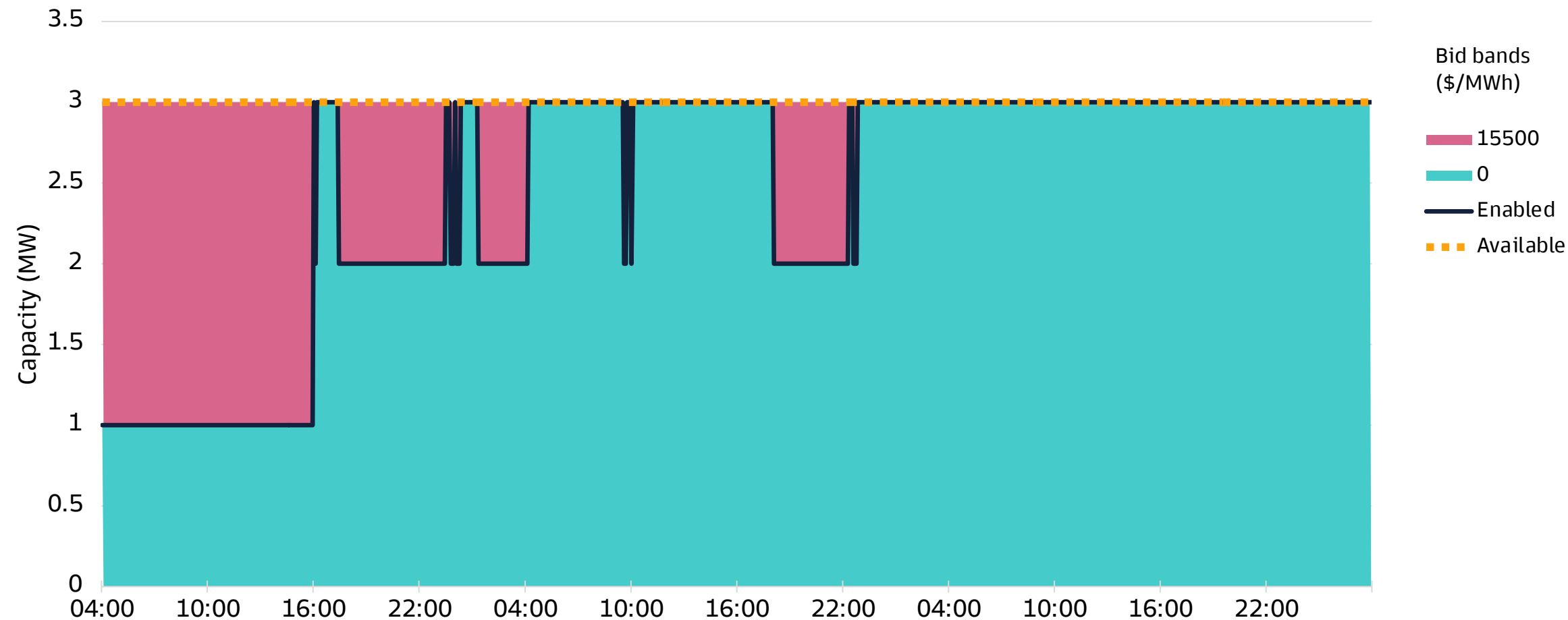
FCAS Bidding Appendix

Boral (ASNBRL1) 6SEC Raise FCAS Bids 2nd-4th June 2023



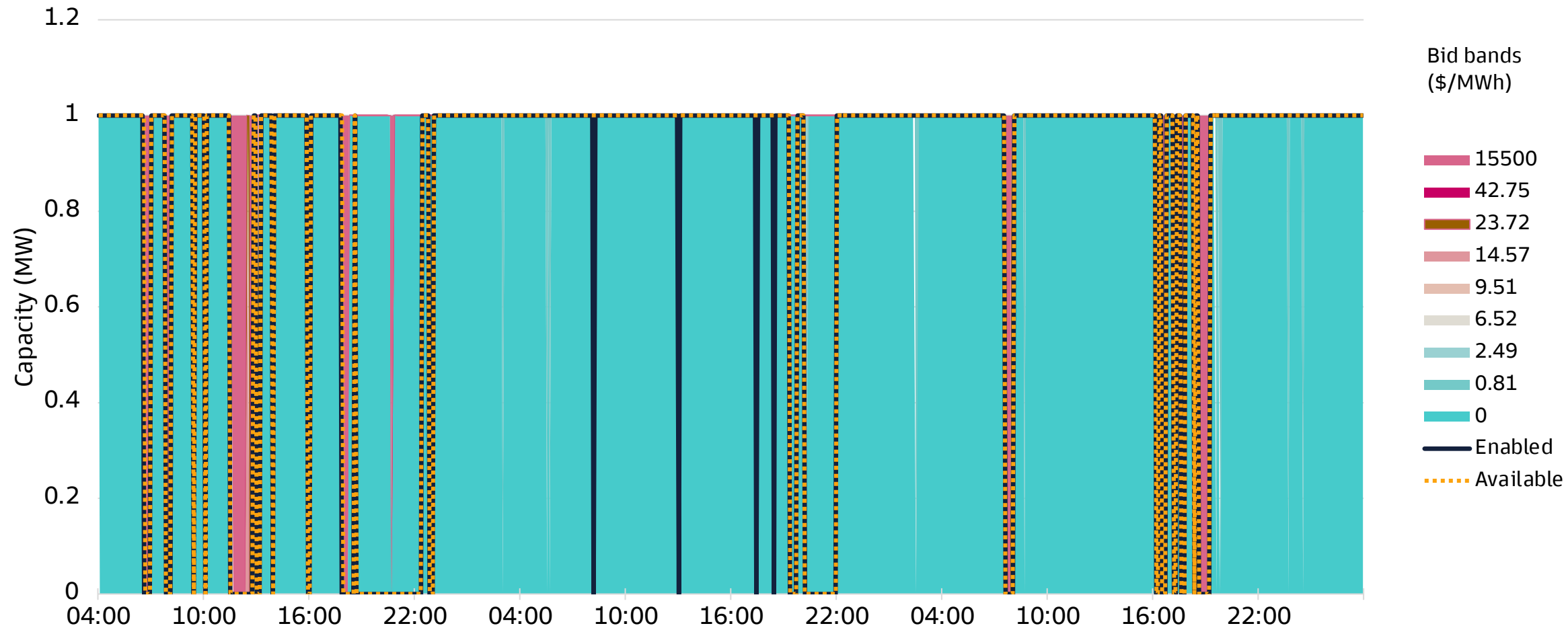
FCAS Bidding Appendix

Ikea Microgrid (ASPAPM01) 6SEC Raise FCAS Bids 2nd-4th June 2023



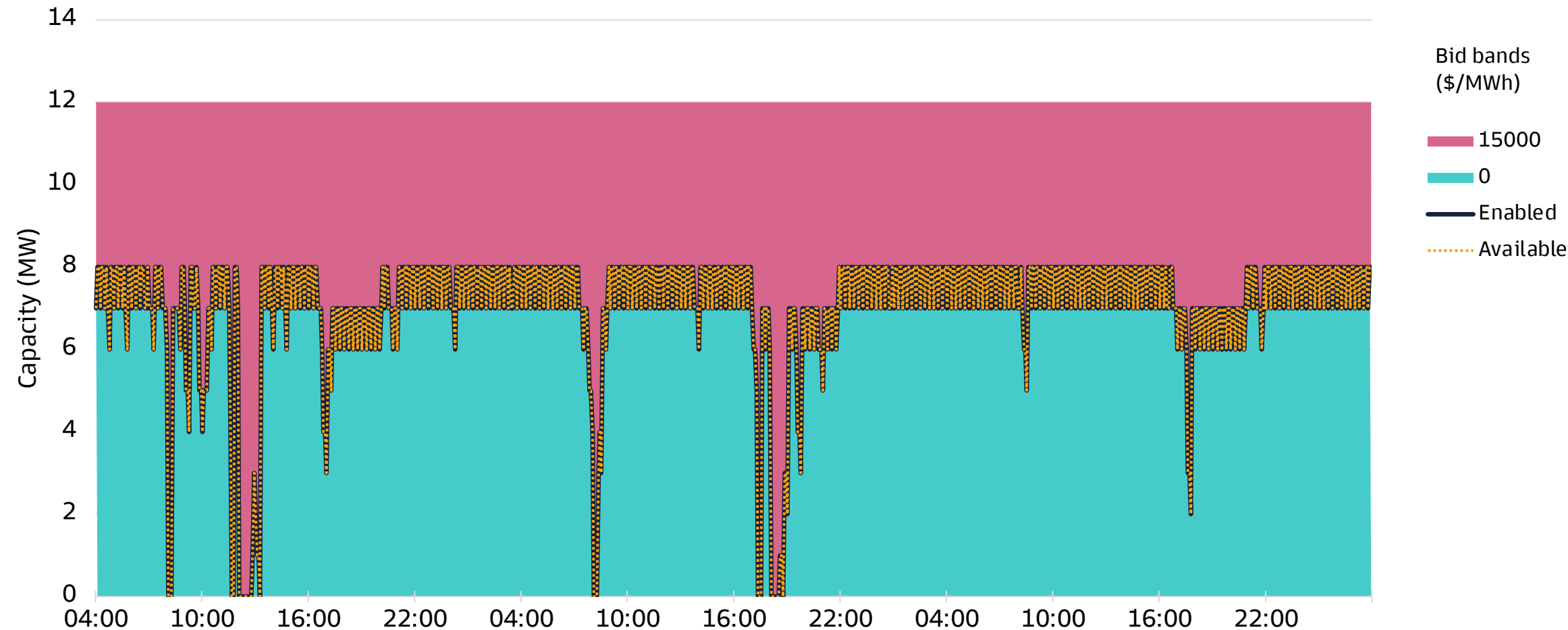
FCAS Bidding Appendix

YES Energy 3 (ASRMGE03) 6SEC Raise FCAS Bids 2nd-4th June 2023



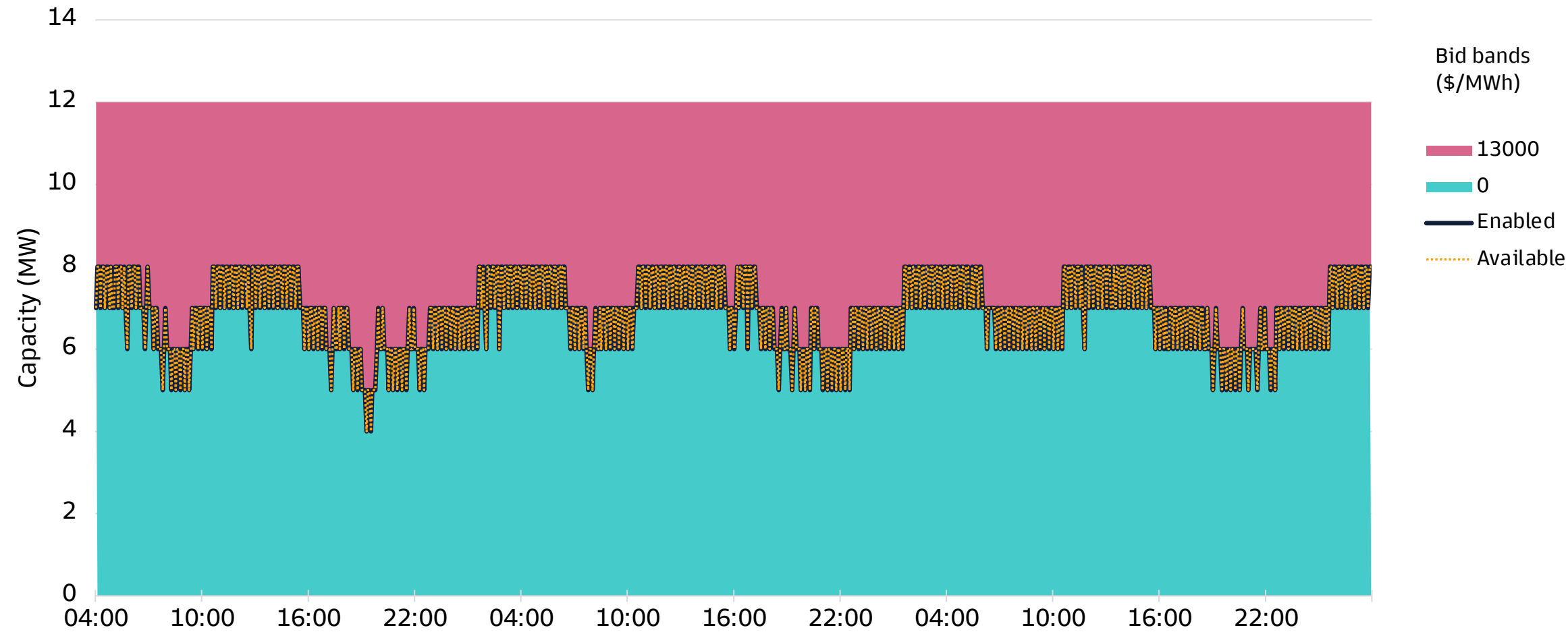
FCAS Bidding Appendix

EnergyLocals SA (ASSEL1) 6SEC Raise FCAS Bids 2nd-4th June 2023



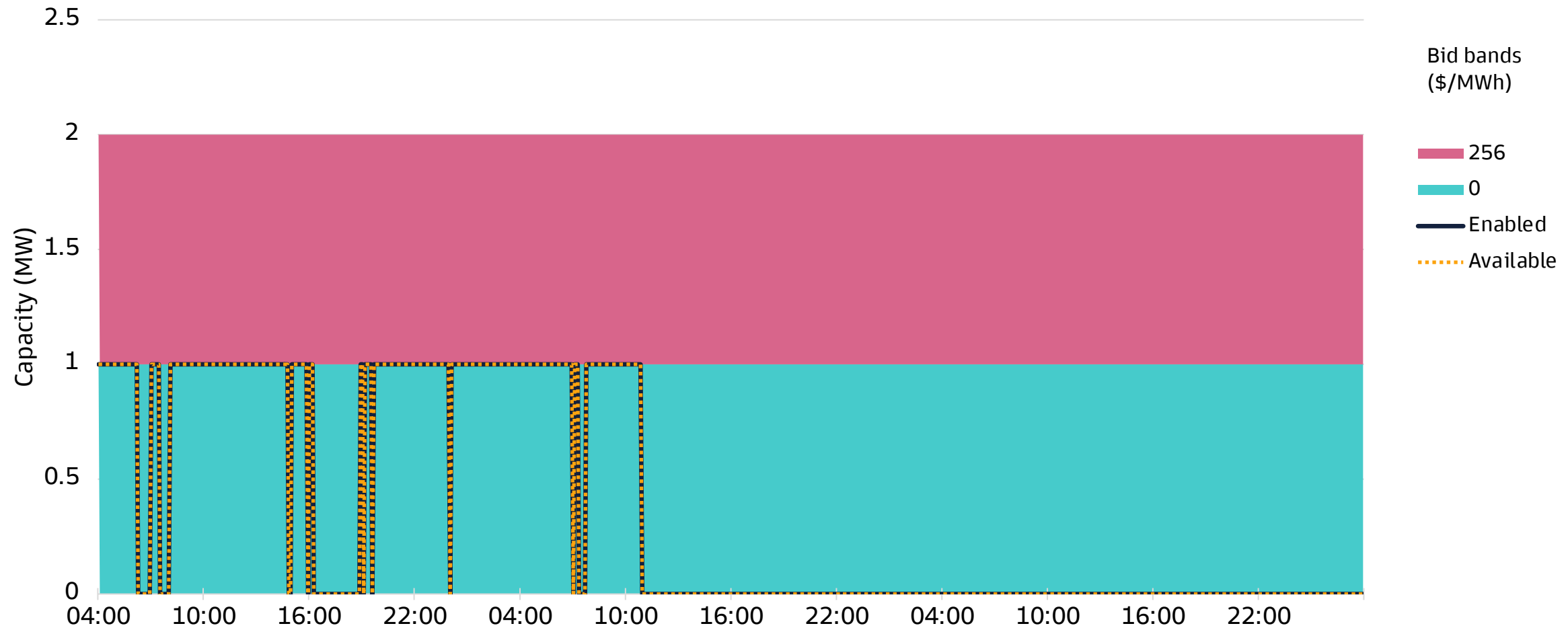
FCAS Bidding Appendix

EnergyLocals SA1 (VSSEL1V1) 6SEC Raise FCAS Bids 2nd-4th June 2023



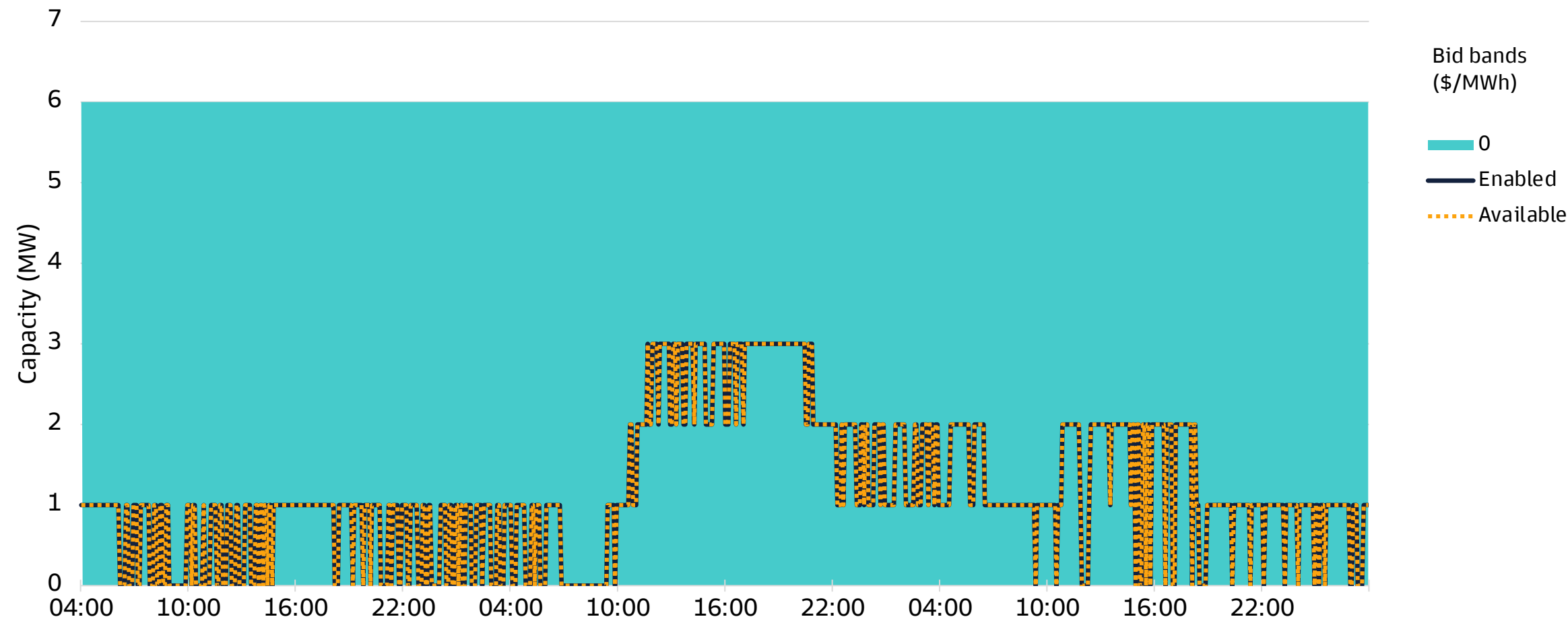
FCAS Bidding Appendix

AGL Commercial (DRAESN1) 6SEC Raise FCAS Bids 2nd-4th June 2023



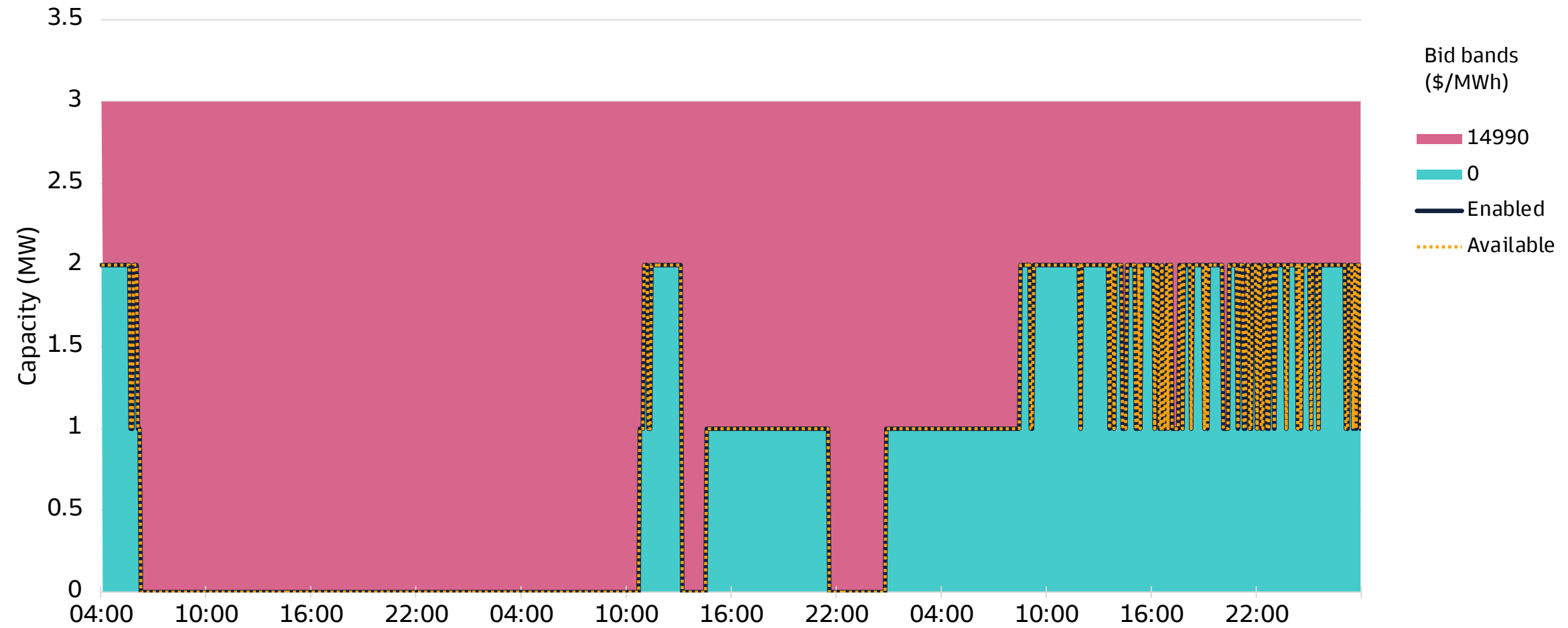
FCAS Bidding Appendix

AGL SA VPP (VSSAE1V1) 6SEC Raise FCAS Bids 2nd-4th June 2023



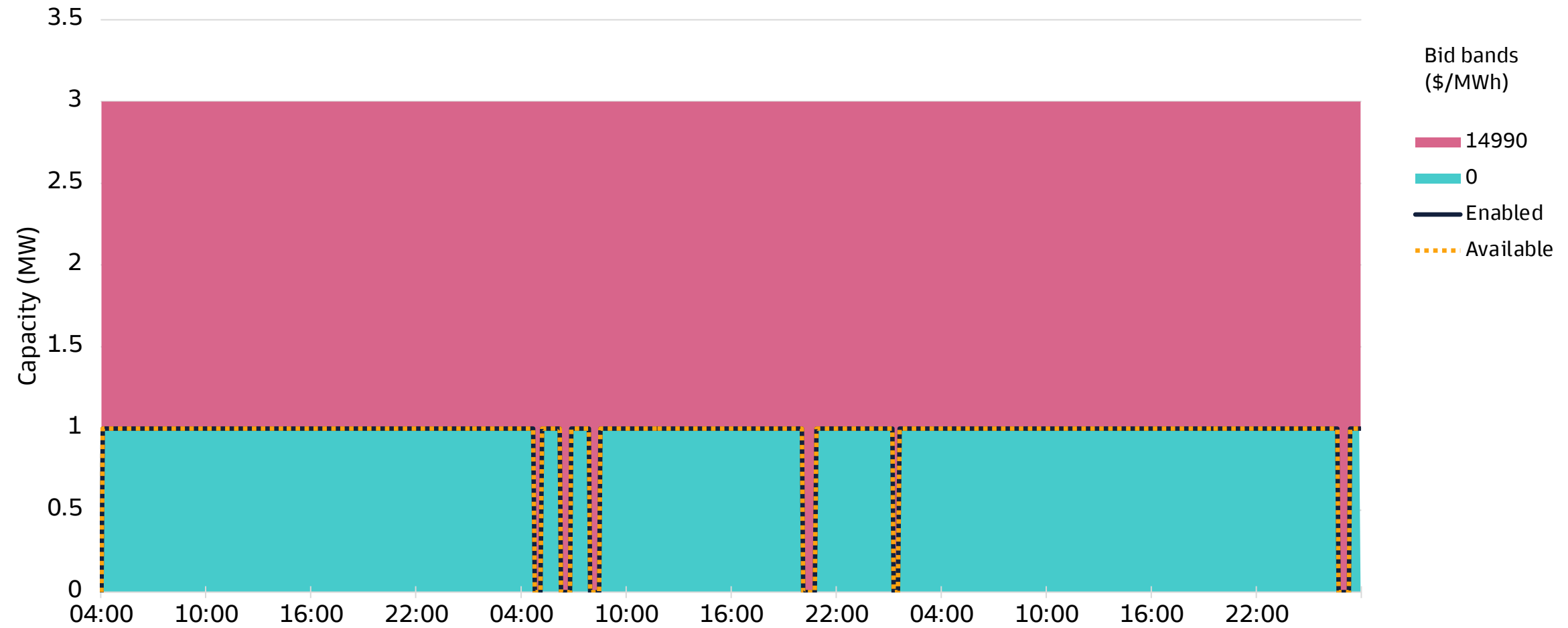
FCAS Bidding Appendix

Viotas VIC (DRVIOT02) 6SEC Raise FCAS Bids 2nd-4th June 2023



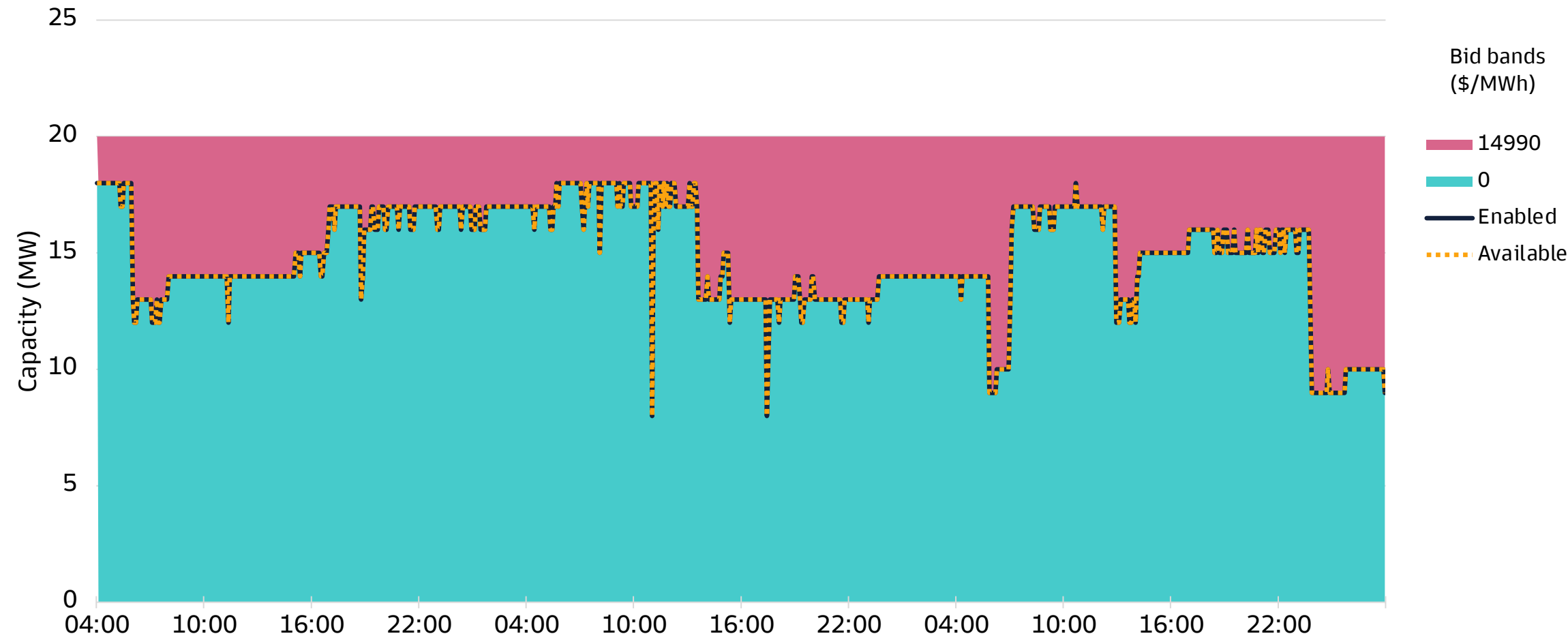
FCAS Bidding Appendix

Viotas NSW (DRVIOT03) 6SEC Raise FCAS Bids 2nd-4th June 2023



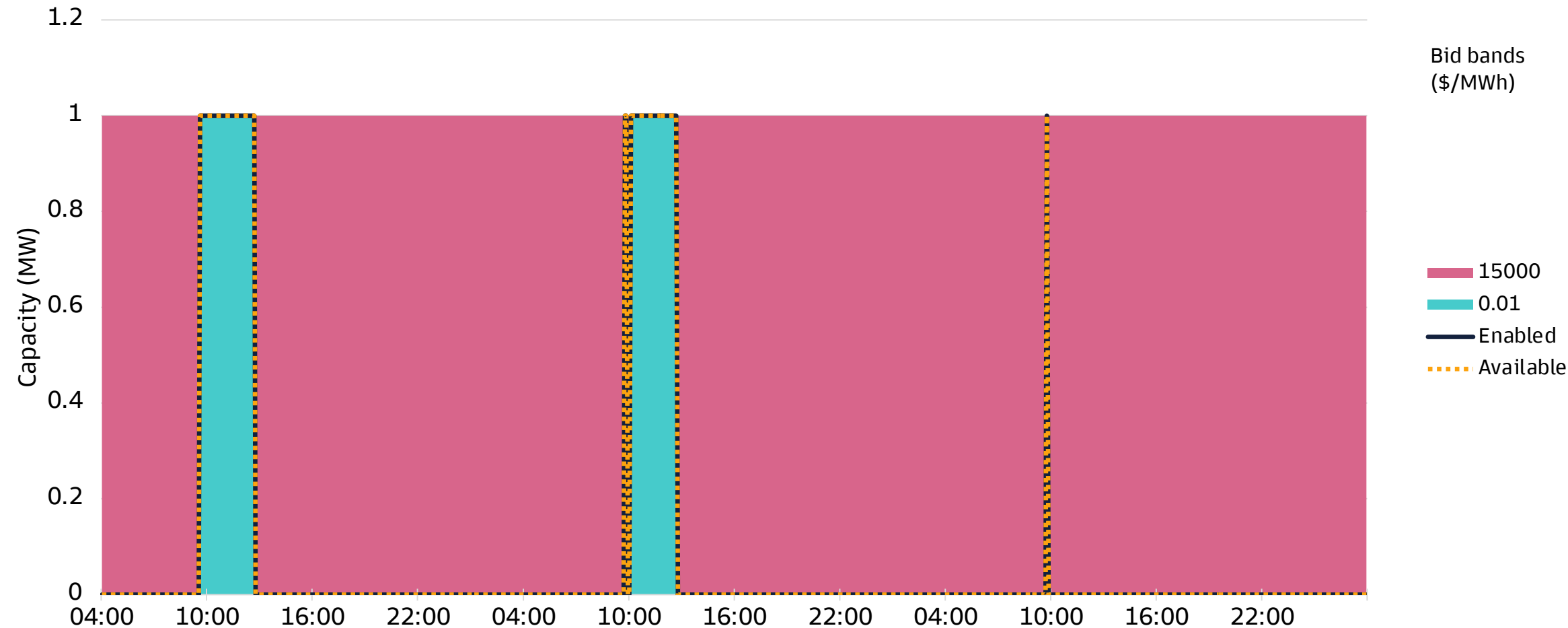
FCAS Bidding Appendix

Viotas QLD (DRVIOT04) 6SEC Raise FCAS Bids 2nd-4th June 2023



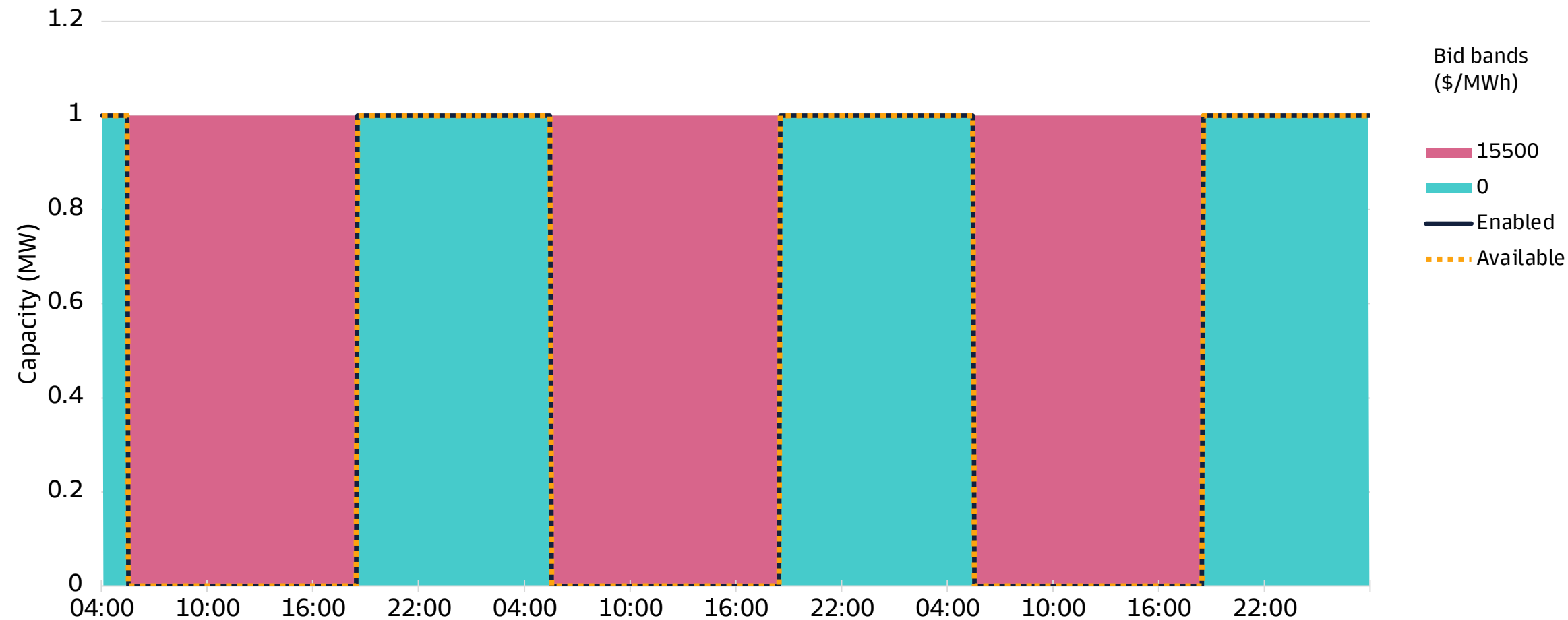
FCAS Bidding Appendix

Sonnen NSW (VSNSN1V1) 6SEC Raise FCAS Bids 2nd-4th June 2023



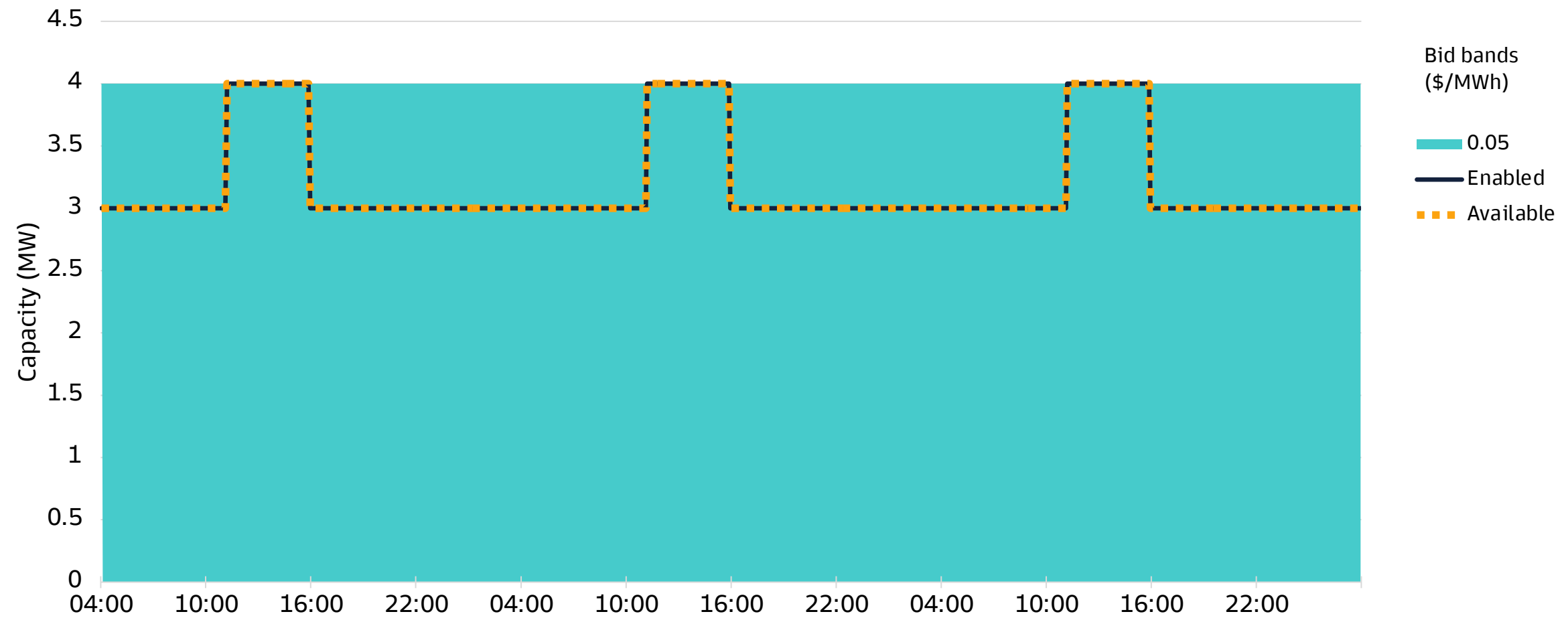
FCAS Bidding Appendix

Hydro Tas QLD (VSQHT1V1) 6SEC Raise FCAS Bids 2nd-4th June 2023



FCAS Bidding Appendix

Simply VPP SA (VSSSE1V1) 6SEC Raise FCAS Bids 2nd-4th June 2023



FCAS Bidding Appendix

Shinehub SA (VSSSH1S1) 6SEC Raise FCAS Bids 2nd-4th June 2023

