Quarterly Energy Dynamics Q1 2021 Preliminary Observations

WA Market Operations

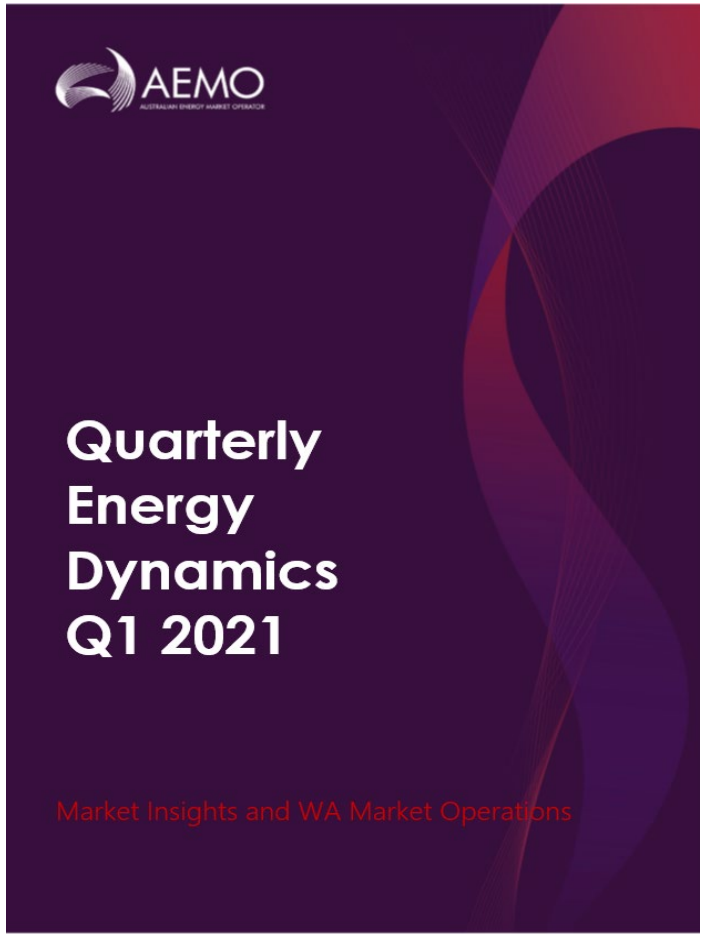
Executive Summary

Q1 2021 saw a continuation of recent electricity market trends:

- Increased distributed PV contributing to lower operational demand resulting in record minimum demand.
- Increased grid-scale renewable generation and decline in thermal generation.
- Reduction in LFAS costs driven by changing requirements and increased competition.
- Downward pressure on Balancing Prices due to Non-Scheduled Generation.
- Increases in negative price events and occurrences of maximum price events.

Other impacts:

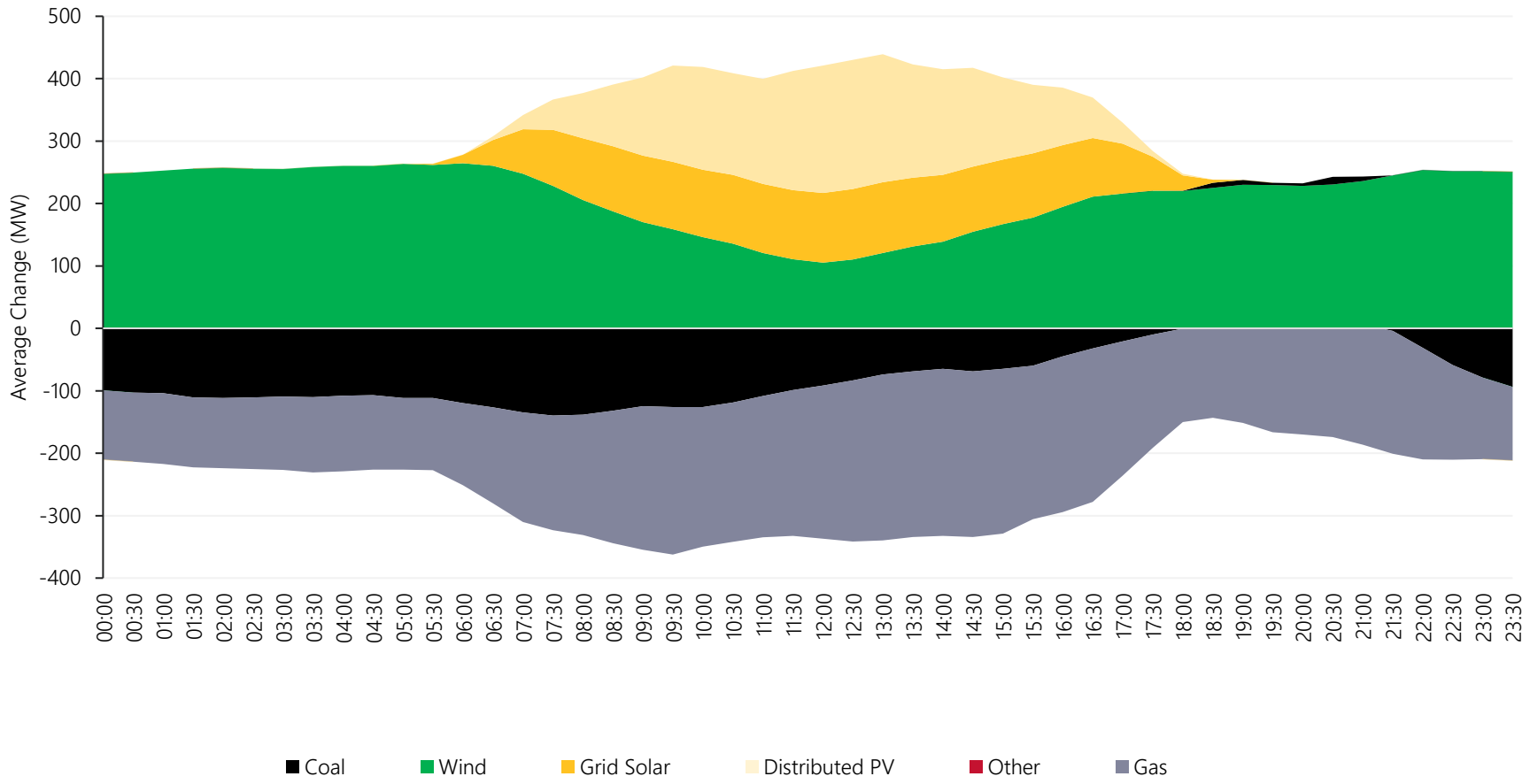
- Stable gas production in WA with a shift in producers.



Available at https://aemo.com.au/energy-systems/major-publications/quarterly-energy-dynamics-qed

Uptake in rooftop PV continuing. Growth in Non-Scheduled Generation and decline in coal and gas generation

Change in supply by time of day by fuel type – Q1 2021 versus Q1 2020



Wind generation increased on average by 211 MW (+81%)

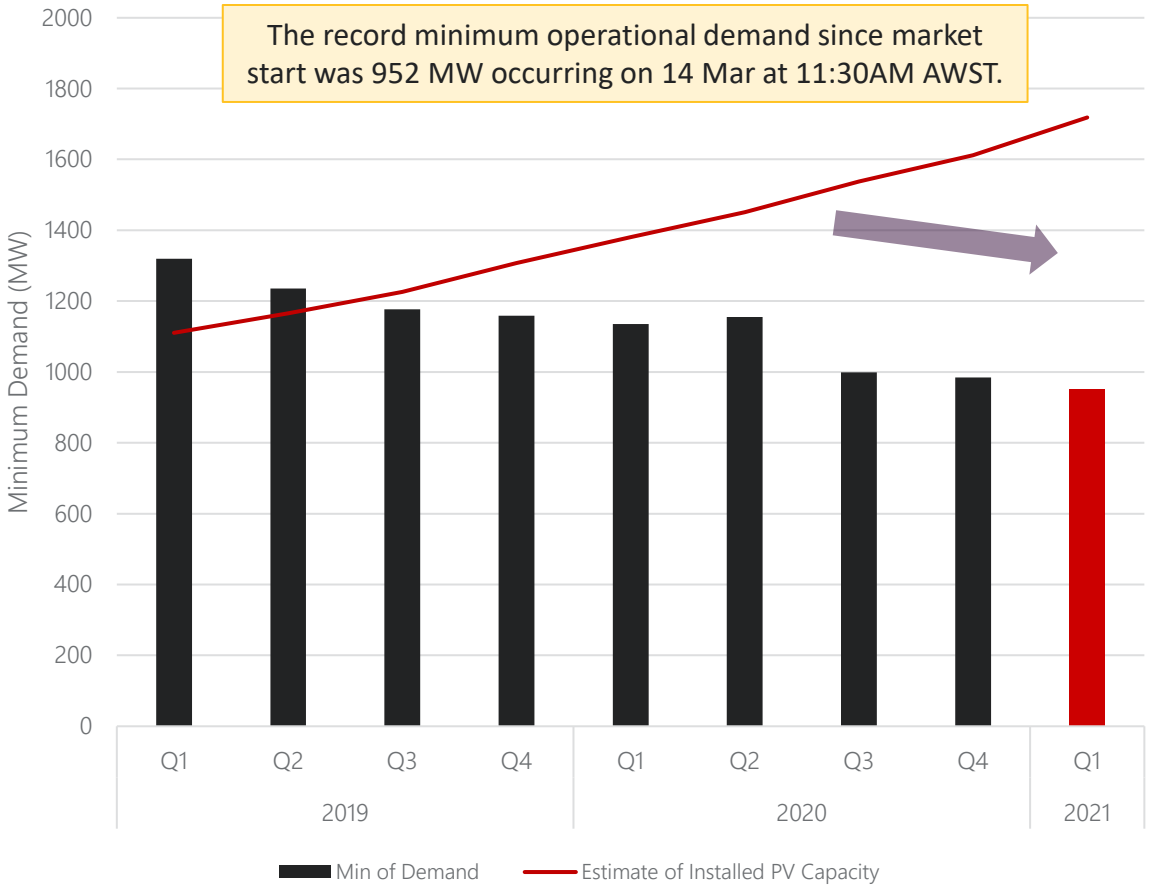
Grid solar generation increased on average by 48 MW (860%) from 5.5 MW to 53.4 MW.

Estimated Rooftop PV generation increased on average by 58 MW (+25%)

Coal-fired generation decreased by 76 MW and gas generation by 181 MW.

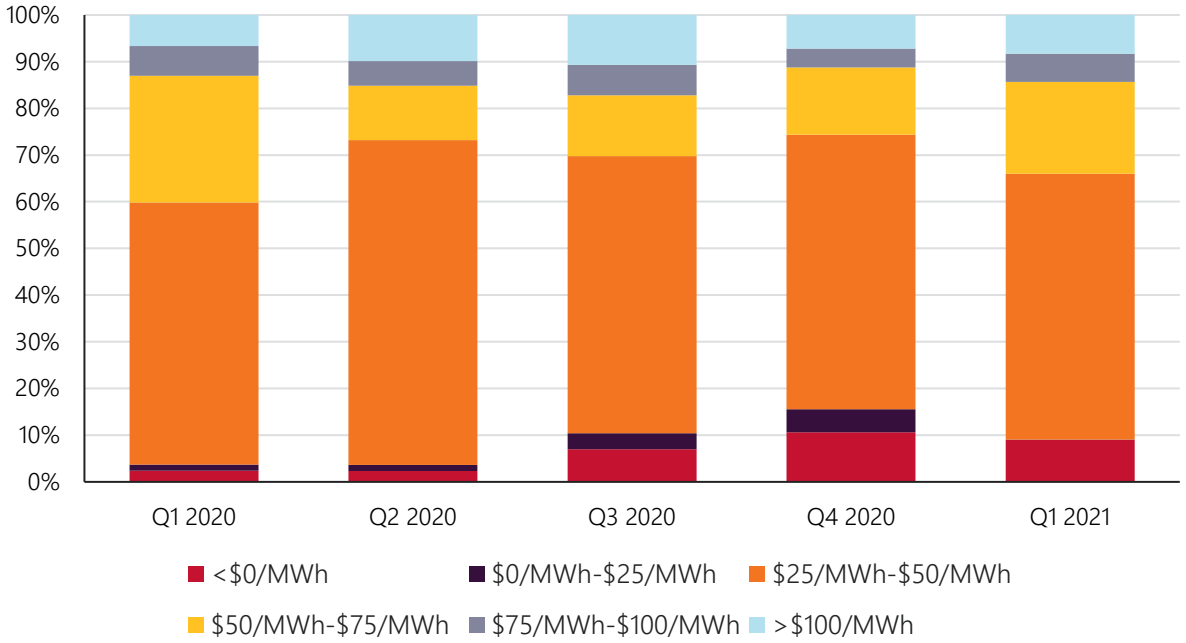
Record minimum demand and negative price events continue

Operational Demand & Estimated Rooftop PV Capacity



This was the third minimum quarterly operational demand record in a row.

Balancing Price distribution



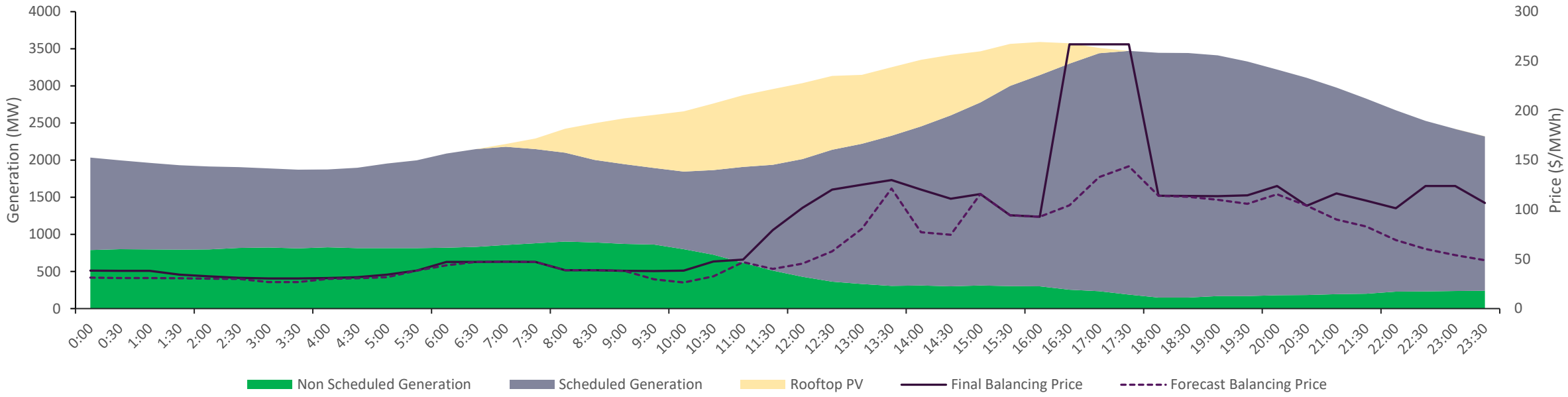
Q1 2021 average Balancing Price increased by $3.52/MWh relative to Q4 2020 (lowest average since Q2 2015) but was $8.49MWh lower than Q1 2020.

4 times more negatively priced intervals in Q1 2021 than in Q1 2020, with over 9% of total intervals being negatively priced.

Lowering Balancing Prices are likely driven by the increase in Non-Scheduled Generation capacity in the WEM over 2020.

Maximum Balancing Price Events
9 March 2021

Generation Output by Generator Type and Final Balancing Price for 9 March 2021



On the 9 March 2021 the Balancing Price reached the Maximum STEM Price (non-liquid generation price cap) for three consecutive intervals starting at 4:30pm.

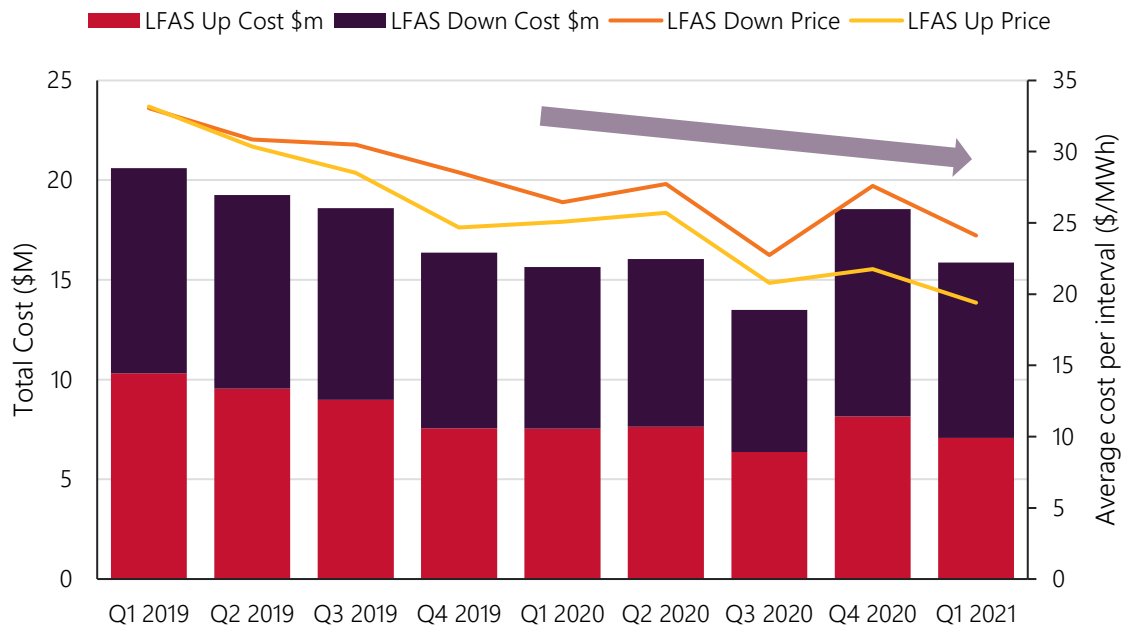
Scheduled Generation experienced a large change from the morning low to the evening peak. There was a total changed by 2,262 MW from between 9:30am and maximum demand at 6pm. This was the largest ever total change in Scheduled Generation output in a calendar day. The highest interval-on-interval increase in SG happened between 3pm and 3:30pm (231.7 MW increase)

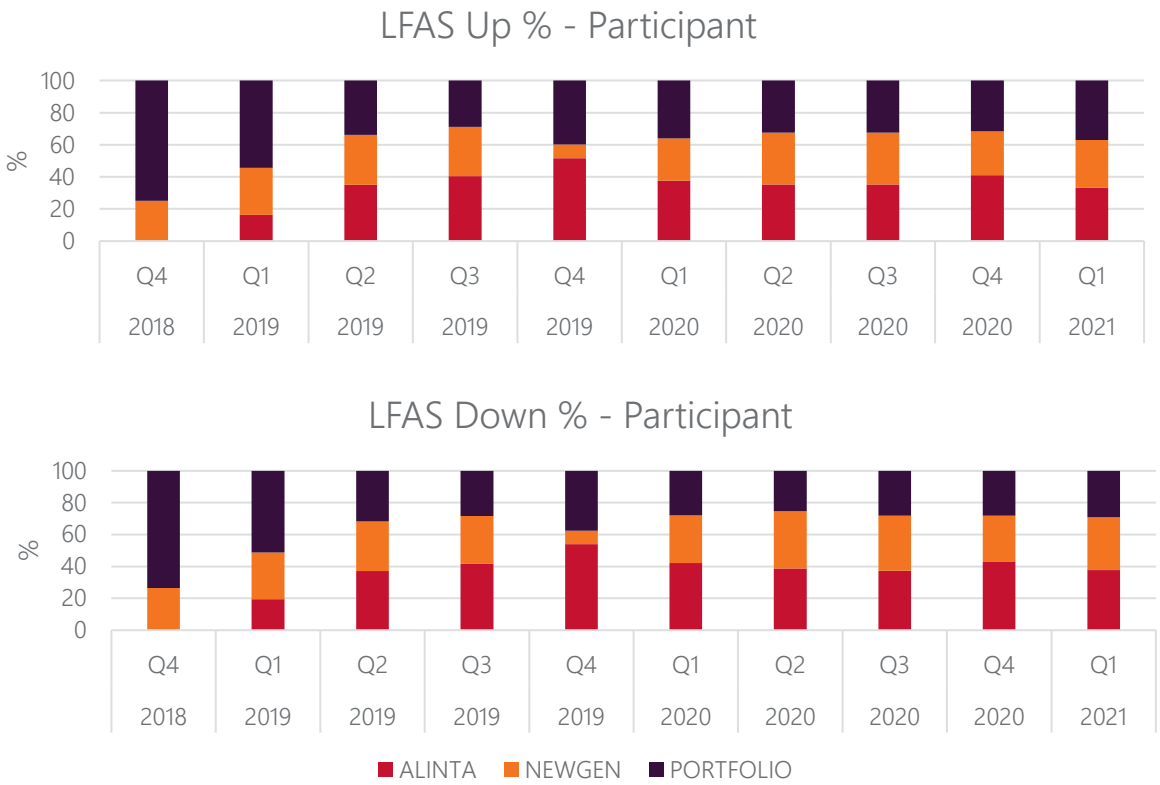
Facility outages and variations in Forecast and Final Balancing Price may have contributed to the maximum price event. For the 4:30pm interval

- Actual demand was 3417 MW, compared to 2985 MW four hours beforehand.
- Non-scheduled generation was 248 MW compared to 332 MW half an hour before hand.
- 478 MW of Scheduled Generation was on planner or forced outage.

LFAS costs decrease Q1 2021 versus Q4 2020

LFAS Costs and LFAS Prices





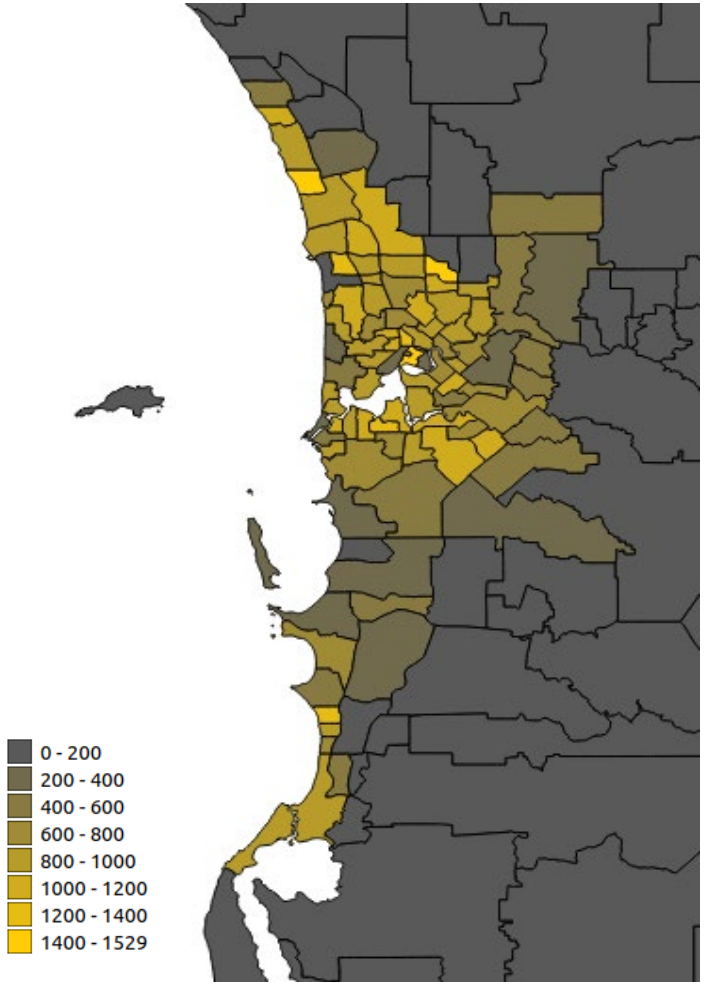
Total LFAS costs decreased in Q1 2021 for both LFAS Up and LFAS Down by $1.1 million and $1.6 million respectively compared to Q4 2020. This was driven by the falling LFAS Prices. This continues the ongoing trend of decreasing LFAS Up Prices and LFAS Down Prices since Q1 2019

The sculpted LFAS Requirements were increased for Q4 2020 due to the connection of new wind and solar generators. Accordingly, LFAS costs and prices increased between Q3 and Q4 2020. Total costs were similar to costs prior to the introduction of sculpted LFAS (Q3 2019), when the LFAS requirement was lower on average. This was likely due to the greater participation in LFAS through 2020.

Increased participation in the LFAS market has been seen since Q4 2018. This is reflected in a reduction in portfolio's market share and growth from both Alinta and NewGen

DER Register

Installed PV by postcode (kVA/km2)



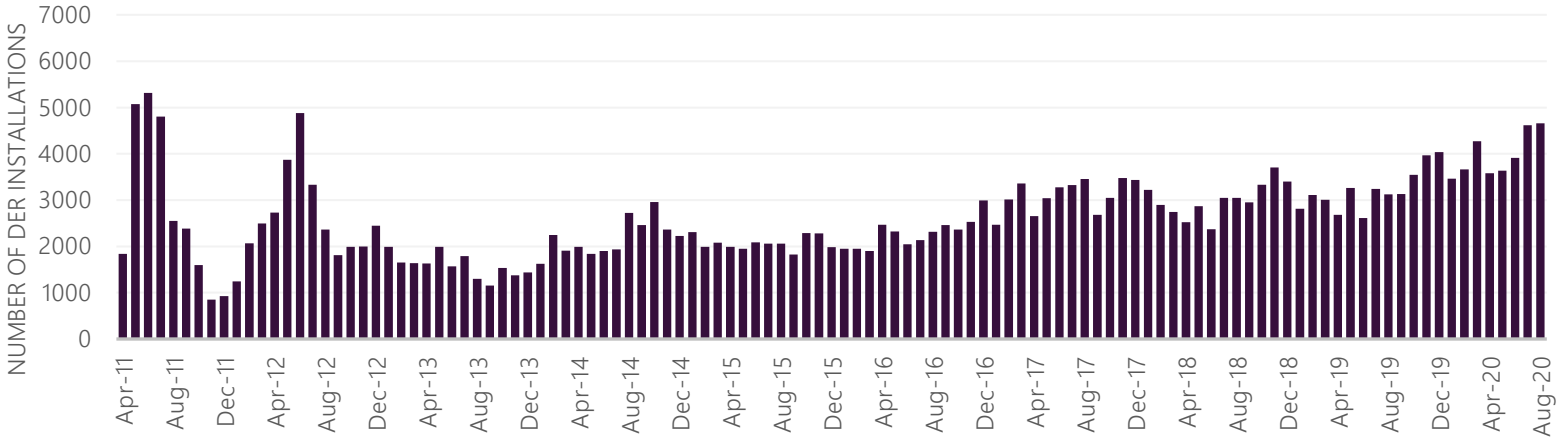
The WA DER (distributed energy resources) Register was launched in Q1 2021. The DER Register provides insights into the growing installation of rooftop PV, the average capacity of devices and the amount of storage. Under the WEM Rules Western Power is required to provide AEMO with the data for the DER Register. Electrical contractors will be requested to confirm the as-installed DER devices and provide this information to Western Power.

Based on the DER Register there is 1.72 kVA* of behind the meter PV installed in the SWIS, 79% of which is in the Perth metropolitan area (with postcodes between 6000 and 6199). A high density of rooftop PV is commonly seen in newly built suburbs such as Burns Beach and Iluka in north west or Canning Vale in the South East of Perth.

	Solar PV	Storage	Other
Total Devices	294,520	1,798	488

	Solar PV (kVA)	Storage (kVA)	Storage (kWh)	Other (kVA)
Installed DER Capacity	1,720,860	7,302	12,849	12,517
Average Capacity of DER	5.84	4.06	7.15	25.65

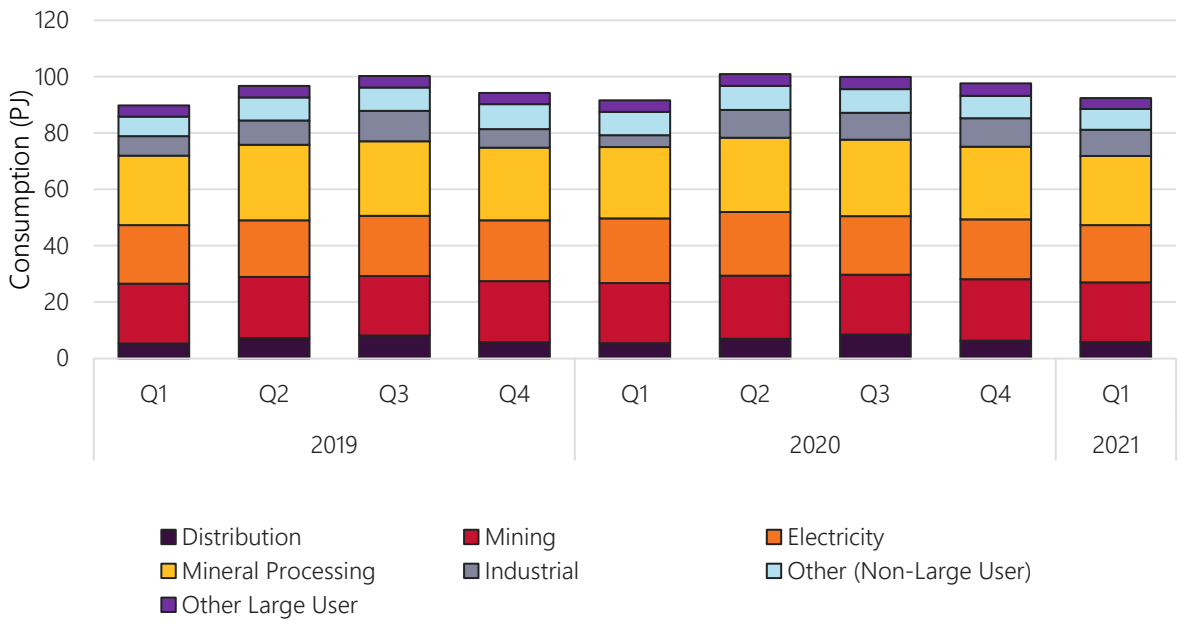
Number of DER Installations by Month



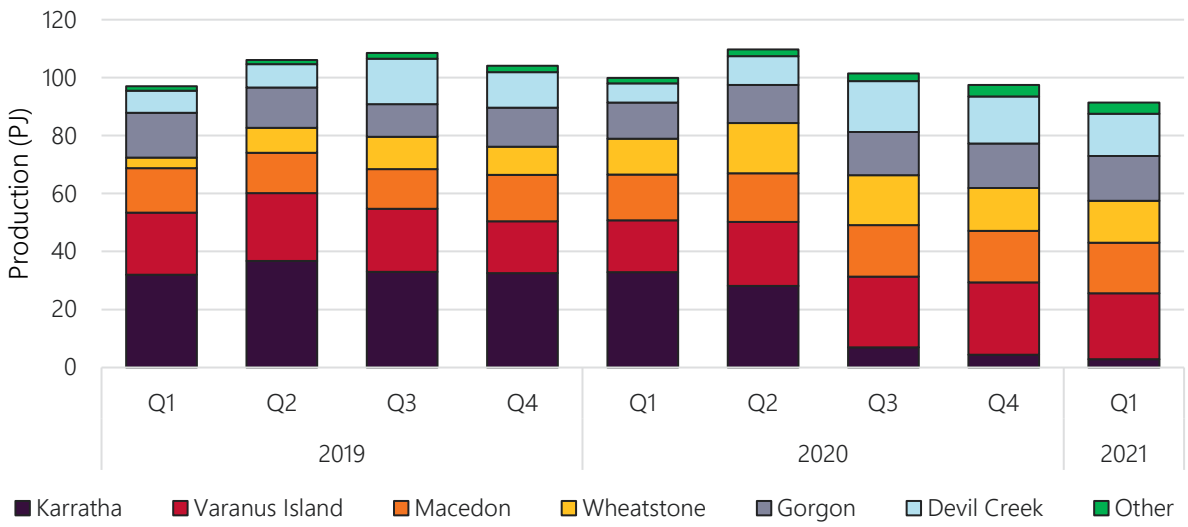
* The DER Register under the WEM Rules reports on installed capacity in VA rather than W.

Consistent gas production in WA with a shift in producers

WA quarterly gas consumption by industry



WA quarterly gas production by facility



In Q1 2021, total gas consumption was only slightly higher (0.8%) than Q1 2020. A 5PJ increase in industrial consumption (119%) was offset by a decrease of 2.6PJ in electricity consumption, 0.8 PJ in mineral processing (-3%) and 0.95 PJ from other large users (-11.5%) .

In Q1 2021, total gas supply decreased by 8.5% relative to Q1 2020 levels. Karratha Gas Plant production continues to decline, while all other facilities increased. The largest increase was for Devil Creek which increased by 7.9 TJ (+118%).

Questions and Feedback

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