

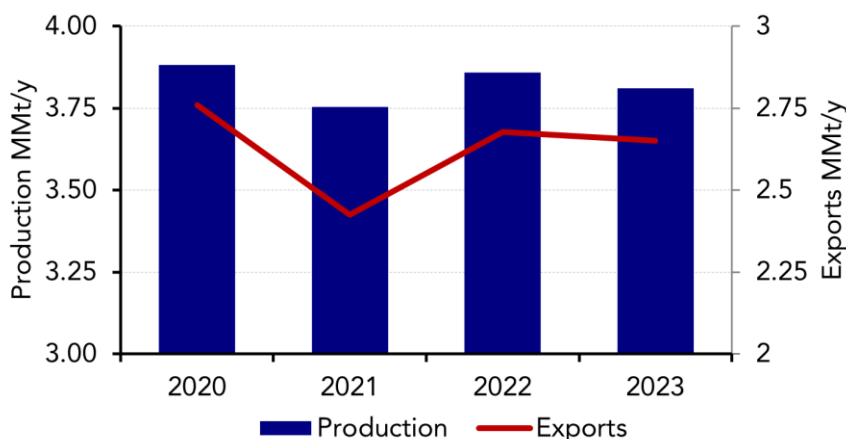


## LPG in World Markets

### LNG plant maintenance, supply issues cut Australian LPG exports

Australian LPG exports are expected to see a 12% drop in 2021 from last year mainly due to lower production from LNG plants. The majority of exported LPG in Australia comes from the various LNG plants, and monthly production can fluctuate based on LNG production and exports. LNG exports have been lower this year due to ongoing issues at several plants including Ichthys, Gorgon, Prelude, North West Shelf and Pluto LNG. As a result, LPG production is down 5% during the first half of the year.

#### Australian LPG production and exports outlook



LPG exports from January to June this year were down 23% from the same period in 2020 to roughly 1.0 MMt due to the lower production, according to government statistics and available shiptracking data. In 2020, LPG exports during the second half of the year were 1.4 MMt, 39% higher than the volume of exports during the first half of 2021 and up 7% when compared to 1H20.

Located off Darwin on the northern tip of Australia, LPG production from Ichthys LNG facility is around 1.65 MMt/y at full capacity. Gas volumes are initially processed on a semi-submersible platform before being transported to Blaydin Point via an 890 kilometre sub-sea pipeline for further treatment onshore.

A total of 14 VLGC loaded from the Ichthys terminal in the first half of current year, according to shiptracking data, compared to 17 VLGC loads during the same period in 2020. The facility reported maintenance shutdown at two of its trains for 35 days starting 14 May this year. However, market sources indicated that the facility had a delayed start due to some technical issue. Altogether Ichthys LNG facility shipped out 35 VLGC loads in calendar year 2020.

According to Australian Energy Market Operator (AEMO) and Chevron Australia, one-to-two trains of the 15.6 MMt/y Gorgon LNG located on Barrow Island was down for 49 days starting 26 Apr this year, while the 8.9 MMt/y Wheatstone LNG's one-to-two trains underwent maintenance works for 35 days starting 4 Apr. Gorgon LNG is expected to undergo another planned shutdown of 35 days in Sep-Oct, while the Wheatstone facility is expected to undergo further maintenance shutdowns for 35 days from early Sep this year.

According to AEMO, around half -to-one train of the coal seam gas-based APLNG facility in Queensland was down for around five days earlier this year and was expected to undergo planned shutdown for 35 days starting end-Jul, and for a few days in the first half of Oct. Another LNG project located on Curtis Island, a train at Queensland Curtis LNG project (12 MMt/y) underwent maintenance shutdown around mid-Jun.

Prelude FLNG has been facing technical issues since it started commercial production. Prelude restarted on January 11 but went offline once again and cancelled some LNG cargoes. The FLNG which first started operation in 2019 stayed offline for most of 2020 due to technical issues. The facility did sell a cargo in June; however, production is still not optimized. Prelude is expected to increase Australia's LPG production by 400,000 t/y once it reaches its nameplate capacity.

There are also concerns that depleting oil and gas fields could limit how much LPG can be produced from gas processing and exported in the near term until new investments increase production. Lower field production can also affect operating rates of LNG plants. The Australian government has recently lowered its expectations on LPG output and exports out to 2023 from previous estimates due to the plant issues and low upstream production.

As a result, Poten's current forecast expects LPG exports in the second half of 2021 to be lower than exports in the second half of 2020. Nonetheless, with lower expected turnarounds in the second half of 2021, Poten expects second half export volume to be higher than what was exported in the first half of the year. However, if some of the production issues at the LNG plants continues, LPG exports for the year could be lower than the current estimate of 2.4 MMt/y.

In the long term, however, there is increased focus on developing the energy sector, including several projects geared towards gas production and infrastructure development to offset the declines in production and increase the reserve base which should also increase LPG production. Earlier this year, LNG exporter Santos moved forward to expand the Barossa gas field to support production at the Darwin LNG export facility.

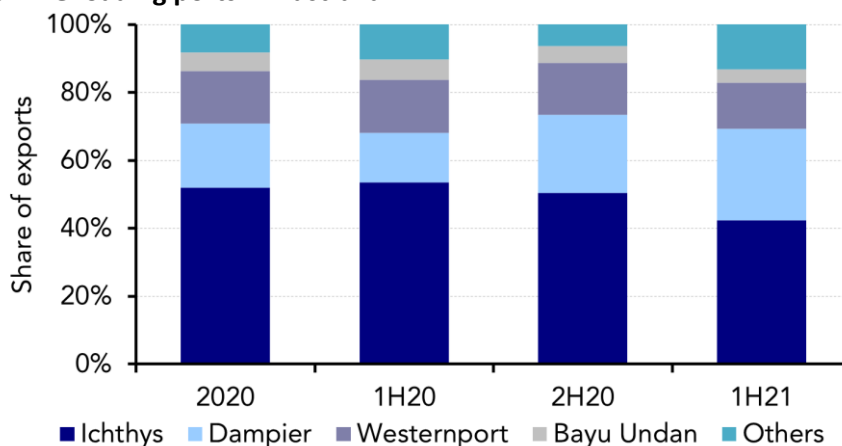
Stakeholders at Gorgon LNG are also planning to develop upstream projects to offset declining gas supply. North West Shelf and Pluto LNG are also planning to invest in upstream projects in the Browse and Scarborough reserves to support LNG production.

Moreover, crude throughput was also down by from around 69k bbl in 2020 to 57k bbl in 2021. Weak refinery margins and obsolete technology led BP Australia to convert the 152k bpd Kwinana refinery in Western Australia into an import terminal. Similarly, ExxonMobil Australia also decided to convert the 90k bpd Altona refinery near Melbourne into an import terminal.

LPG production from refinery operations was down 4% y-o-y to around 223kt in the first half of current year. Poten has revised the outlook for both production and exports through 2023 lower from previous outlook due to the ongoing maintenance and as the results of new investments will be felt after 2023.

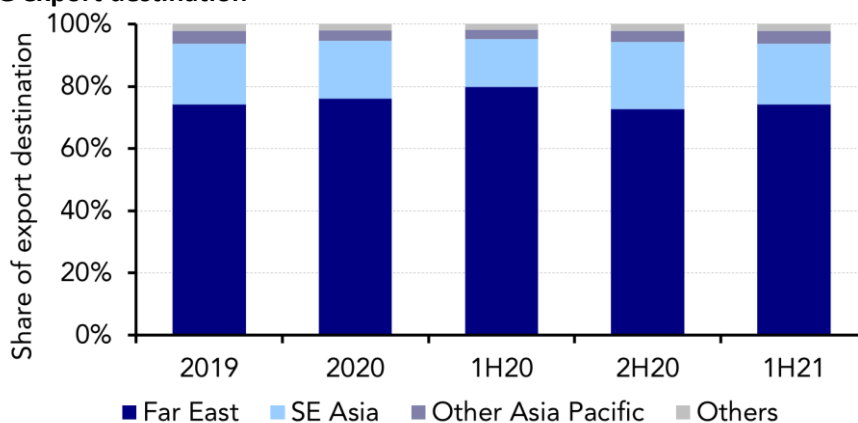
Exports in 2021 will be roughly 2.4 MMt/y which is more than 15% lower than the previous outlook when exports were expected to see an increase in 2021 with ramp up of Prelude FLNG. Exports should recover in 2022 with expectation of higher LNG plant operation but is expected to remain flat y-o-y in 2023.

### Share of major LPG loading ports in Australia



In terms of major ports exporting LPG, Ichthys with a share of 42% in 1H21 in total exports from the country remained the leading port. Share of Ichthys in total LPG export from Australia was 54% in 1H20 and 50% in 2H20. Dampier shipped out 19% of total LPG exports from Australia in 2020 – 15% in 1H20 and 23% in 2H20. Dampier’s share in the first half of current year increased to 27%. Westernport’s share was 14% of total Australian LPG exports in 1H21, down from 16% in 1H20 and 15% in 2H20.

### Australian LPG export destination



In terms of export destination, with its proximity to major importers in the Far East and Southeast (SE) Asia, a major share of LPG exported by Australia finds its home in these countries. In 2020, around 76% of total LPG exports by Australia were shipped to countries in the Far East. Share of SE Asian countries in total Australian LPG exports was 19% in 2020, while share of other countries in Asia Pacific, including Indian subcontinent, was 3%.

In the first half of current year, around 74% of Australian LPG found home in the Far East, down from 80% in 1H20. Share of SE Asia in total LPG exports from Australia was 15% in 1H20 which increased to 19% in 1H21, as exports to Indonesia declined 31% y-o-y, from around three and half VLGC-sized cargoes in the first half of previous year to less than two VLGC-sized cargoes during the same period this year.