



GLADSTONE'S FUTURE: Jobs Based on Renewable Energy

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Introduction

The future of Gladstone's jobs depends on its industries switching to renewable energy soon. A detailed report¹ by Clark Butler, IEEFA², explains how Central Queensland can become a world-class Energy and Industry Precinct. These are areas selected by governments to establish, through coordination, large renewable energy projects near large energy users. This provides confidence to large suppliers that there will be a reliable market for their power and to large users that there will be reliable supplies. It also enables peak electricity during day time to be used and energy otherwise wasted as heat to be traded.

The Gladstone Regional Council, businesses and citizen groups can help speed-up this change by lobbying, by participating in consultations and by initiating local renewable energy projects.

Developing Gladstone as part of such a precinct would:

- protect 4,500 jobs currently vulnerable in Gladstone's heavy industries;
- be the starting point for a green hydrogen and ammonia industry; and
- encourage the cement industry to reduce its carbon footprint.

Current heavy industries in Gladstone and their owners

The Gladstone Power Station supplies electricity to local industries and to the national grid. It is owned by Rio Tinto (42.125%, NRG Energy (37.5%) and three minor investors. It is near the end of its life, within five to ten years, and is the third least reliable coal-fired power station in Australia³.

Its large electricity consumers include:

- Queensland Alumina Limited – owned by Rio Tinto (80%), Rusal (20%). Refines alumina (Al_2O_3) out of bauxite.
- Rio Tinto Yarwun – owned by Rio Tinto. Refines alumina (Al_2O_3) out of bauxite.
- Boyne Smelters Limited – owned by Rio Tinto Alcan 59.4%, balance held by a Japanese consortium. Reduces alumina to aluminium (Al).
- Orica Yarwun – owned by Orica Pty Ltd, produces explosives and services for mining⁴.
- Cement Australia – a joint venture between Heidelberg Cement and Lafarge Holcim.

The aluminium companies are currently not competitive on the world market due to the high cost of electricity from coal. Unless the cost of power becomes internationally competitive soon, they can and may well shift their investments overseas, even at the cost of large capital write-downs.

The three LNG exporters in Queensland convert Coal Seam Gas to Liquid Natural Gas through cleaning, compressing, cooling, storing and loading into cooled bulk tankers. They use their own gas to generate their electricity. This represents about 20% of the Australian gas consumption⁵ and can be replaced by electricity from renewables. All are overseas owned⁶. All are losing money.

Price of electricity needed

For the Aluminium Industry to stay in Australia, electricity needs to cost A\$40 – 50 / MWh¹. The Boyne smelters would require 2-3 GW of solar/wind capacity. Replacing LNG by renewable electricity would also need 2-3 GW. This scale of required renewable energy would create significant surplus electricity to compensate for the variability in supplies. This surplus could attract users with different energy-use patterns who can vary their demand and soak up the excess. One is producing green hydrogen, that is hydrogen made with renewable energy, not gas.

¹ https://ieefa.org/wp-content/uploads/2020/09/Aluminium-Led-Energy-Renewal-for-Central-Queensland_September-2020-.pdf, page 3.

² Institute for Energy Economics and Financial Analysis - <https://ieefa.org/>.

³ <https://www.tai.org.au/sites/default/files/P844%20Fossil%20fails%20in%20the%20Smart%20State%20WEB.pdf>

⁴ Orica imports 500,000 tonnes of ammonium nitrate per year because of the very high local gas prices.

⁵ https://www.energy.gov.au/sites/default/files/australian_energy_statistics_2019_energy_update_report_september.pdf

⁶ They are Curtis LGN (Shell 73.75%, Global Infrastructure partners 26.25%), Gladstone LNG (Santos 30%, Petronas 27.5%, Total 27.5%, KOGAS 15%) and Australia Pacific LNG (Origin 37.5%, Conoco Phillips (37.5%), Sinopec (25%).

Costs of renewable electricity are coming down fast

Fortunately, rapidly increasing scale of renewables means large projects are leading to much reduced cost per MWh. The Macintyre windfarm to be built SW of Warwick will produce at around \$50/MWh⁷. A large 1 GW windfarm has been approved for the pine forests between Gympie and Maryborough⁸. In the USA wind was below A\$30/MWh⁹ in 2018. 2 GW of Renewable Energy projects are proposed for the Fitzroy Renewable Energy Zone¹⁰. The International Energy Agency stated in 2020 that solar has been delivered at A\$18/MWh the Middle East¹¹, far below new coal, \$130/MWh¹¹, old coal \$40/MWh¹² or gas \$35/MWh.

Advantages of Gladstone

Gladstone has many advantages over most, but not all, locations worldwide, see below:

- Central Queensland has world class solar energy, good wind energy, and large areas of cleared land of limited use for agriculture but suitable for large solar and wind farms.
- All electricity producers and buyers are located within one jurisdiction, thus avoiding having to deal with multiple legislations, technical standards and application processes.
- The state government is establishing three Renewable Energy Zones, located in Southern, Central and northern Queensland. The Gladstone Regional Council is supportive.
- Gladstone is a mature town with a highly skilled labour force and a deep-water port.
- The power station and the smelter are on a private grid which can be expanded to include other industries. This enlarged grid can export excess power to the national grid.³

Current developments

- Established aluminium smelters can be re-fitted to allow them to reduce their demand for electricity when prices are high and increase it when low. This can earn them extra money by becoming a stabiliser for Australia's National Electricity Market.
- The London Metals Exchange will start a market for low-carbon aluminium in 2021, expected to fetch a premium price due to demand from Europe for green products.
- Hydrogen is a way to store, export and use renewable energy. (It can be in the form of ammonia which is cheaper and safer to transport and handle). It already powers trucks, trains and ships. It can be used to 'soak up' electricity when supply exceeds demand.
- Gladstone has all the infrastructure needed for a hydrogen – ammonia export centre¹³.
- Cement production causes 8% of the world's greenhouse gas emissions: 40% from electricity, 60% from turning limestone into lime. Companies are researching an alternative product made from fly-ash and red mud, both stored in large quantities in Gladstone.

Bringing the parties together – and what we can do

Bringing together parties with sometimes conflicting interests needs 'honest brokers' with technical and legal expertise, such as CleanCo or the Clean Energy Finance Corporation. Finance is plenty. NSW calls for expressions of interest received nine-fold oversubscriptions¹⁴.

Gladstone's future can be bright, but we need to pressure all parties to enable this transition to happen before the Gladstone Power Station closes. We need to lobby hard before international competitors lure away our industries because we are too slow.

In Dubai, a solar park has started to power aluminium production in Jan 2021, providing 560,000 megawatt hours of power each year, enough to produce 40,000 tonnes of aluminium. The solar park's currently capacity of 1,031 MW is planned to grow to 5 GW by 2030.¹⁵

⁷ <https://reneweconomy.com.au/australias-newest-and-biggest-wind-farm-sets-benchmark-for-lowest-price-94301/>

⁸ <https://www.forestwind.com.au/about>

⁹ <https://arstechnica.com/science/2019/08/wind-power-prices-now-lower-than-the-cost-of-natural-gas>

¹⁰ <https://www.pv-magazine-australia.com/2020/05/19/2-gw-and-renewable-energy-and-a-just-transition-headed-to-central-queensland>

¹¹ <https://reneweconomy.com.au/solar-power-is-now-cheapest-electricity-in-history-says-iea-39195/>

¹² <https://www.energymatters.com.au/renewable-news/debate-cost-renewables-versus-coal/>

¹³ <http://repowergladstone.com.au/wp-content/uploads/2019/10/Gladstone-hydrogen-ammonia-centre.pdf>

¹⁴ <https://ieefa.org/spains-elecnor-tapped-to-build-australias-largest-solar-plus-storage-project/>

¹⁵ <https://reneweconomy.com.au/dubai-solar-park-says-it-has-started-powering-aluminium-production/>