An aluminium-led energy and industry **renewal for Central Queensland**

It's time to invest in the future of Gladstone, with green aluminium at the centre.

- COVID-19 has focused attention on the need to invest in economic recovery, with security of supply chains a key theme.
- Australia has several foundational industries that could fail or prosper, depending on their economic viability, and aluminium is central among these.
- The Queensland Government has committed to invest in renewable energy zones, creating an opportunity to repower key heavy industries for the future.

Above. Haughton Solar Farm. Photo: Ross budd Photography.

AUSTRALIAN CONSERVATION FOUNDATION

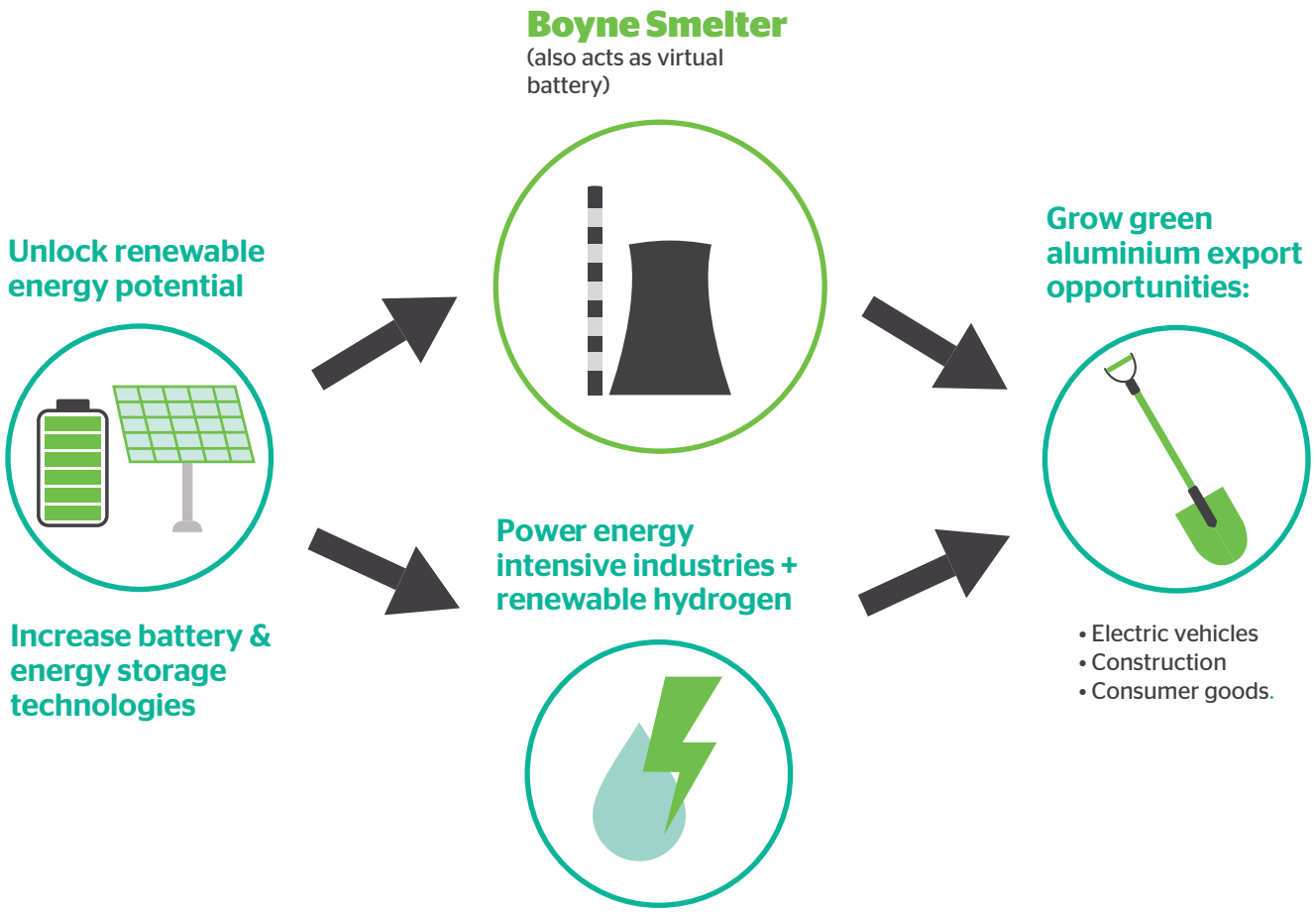
Gladstone renewable energy and industry precinct

A report by the Institute for Energy Economics and Financial Analysis (IEEFA) outlines how Gladstone can build on its success as a heavy industry and export hub to become a renewable energy powered, heavy industry precinct producing low emissions aluminium, cement, renewable hydrogen and ammonia (Figure 1).

Gladstone's competitive advantages include its existing heavy industry base, its access to high quality renewable energy resources, its world class deep water industrial port and an existing export industry.

Low cost, reliable, aluminium smelting powered by renewable energy is a key element of this plan.

Figure 1: Gladstone energy and industry precinct – a possible future



Australia's aluminium industry is a key employer, currently facing high electricity costs

There are four aluminium smelters in Australia – in Queensland, New South Wales, Victoria and Tasmania.

Aluminium smelting is a major user of electricity (10% of Australia's electricity) and a significant source of greenhouse gas emissions (6.5% of annual emissions).

Boyne Smelters Limited (BSL), just outside Gladstone, is the largest electricity user in Queensland, consuming around 10% of the state's electricity. As an interruptible demand load, the smelter also provides a valuable grid stability function.

Smelter owners say Australia's four aluminium smelters contribute around $4 billion per annum to the Australian economy, in addition to exports. This contribution includes direct employment and contracting of over 3,500 workers, supply contracts and the multiplier effect of investment and expenditure in regional communities.

In Gladstone, heavy industry is a key employer and contributor to the economy. Manufacturing provides a significant share of jobs in the region, estimated at 4,500 direct and indirect jobs – more than the mining sector.

According to BSL, the aluminium smelting operations in Gladstone directly employ about 1,000 people and indirectly support around 6,700 jobs nationally (including indirectly supporting 3,000 jobs in the Gladstone region).

BSL estimates the Gladstone's aluminium smelter contributes more than $1.4 billion annually to Australia's Gross Domestic Product.

Australia's aluminium industry faces significant economic headwinds

Australia's aluminium industry is struggling, due in part to high electricity prices.

Pacific Aluminium (now Rio Tinto Aluminium) reported an EBITDA loss of $22 million in 2019 while the Alcoa smelter in Portland made a loss despite a $200 million support package (which expires in 2021) from the Victorian Government. Alcoa has described its smelter as being in "one of the highest energy price markets on the planet".

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Green aluminium, powered by renewable energy, has a positive outlook

Rio Tinto has made a public commitment to reach net zero emissions across its operations by 2050.

The transition to low cost renewable energy provides a valuable opportunity to modernise and reposition Australia's aluminium smelting sector.

Green aluminium, produced using renewable electricity, has a good long-term outlook. It will be priced separately by the London Metals Exchange from next year. This will make the commodity less volatile and likely to attract a premium price compared to other aluminium over time.

Demand drivers for green aluminium include:

- Transport – increased use of aluminium as part of light-weighting and to counteract the weight of batteries in electric vehicles
- Construction – the sector is increasingly concerned with embedded emissions which will drive demand for low carbon metals
- Consumer packaged goods and electronics – companies such as Nespresso and Apple are insisting on green aluminium.

Given the age and reliability issues of many of Queensland's coal-fired power stations, investing in low cost, reliable, renewable power can provide a strong future for Gladstone's heavy industry, particularly its aluminium smelter. Gladstone's heavy industry offers enough scale to justify major investment in central and north Queensland transmission capacity.

Cheap, reliable, renewable power can provide a positive future for aluminium in Gladstone

Low cost renewable energy presents an opportunity to secure the long-term future competitiveness of Gladstone's aluminium industry.

Electricity costs are the main factor in the competitiveness of aluminium smelting. If electricity can be generated and delivered to Gladstone at A$40–50/MWh, Gladstone can be a low-cost energy hub, centred on BSL's demand. This will support increased export competitiveness and jobs growth across all of Gladstone's heavy industry sectors – including alumina, cement and the development of a green hydrogen industry.

With continually falling solar, wind and storage costs, this renewable energy price target is within reach. Battery storage and other means of electricity firming are now financially viable options to provide the level of reliability required by an aluminium smelter.

There are excellent solar and wind resources around Gladstone, sufficient to provide renewable generation to meet the needs of the region's heavy industry. These solar and wind resources can be combined with complementary technologies like pumped hydro and large batteries to provide 'firmed' 24/7 clean power to the Boyne Smelter.

The Queensland Government has recently announced it will invest $145 million to establish three renewable energy zones in the state, with the goal of strengthening the state's industries. Central Queensland (including the Fitzroy and Wide Bay renewable energy zones identified by the Australian Energy Market Operator) has been identified as a priority zone with combined 4.2GW potential.

Renewable energy underpins the future of Gladstone's aluminium smelter

The IEEFA report estimates 2–3GW of solar and wind generation would be needed to supply Boyne Smelter's demand, at a capital cost in the range of $4–5 billion.

Unlocking this renewable energy potential requires investment in transmission capacity – and a business case for demand.

Investment in technology to increase BSL's ability to provide demand side response services would benefit the National Electricity Market (NEM). The Boyne Smelter could act as a giant virtual battery providing valuable grid stability services, and offering revenue generation potential for BSL.

The scale of renewable energy required will create significant surplus electricity which can be used to produce renewable hydrogen. This can provide critical grid balancing, along with the smelter's demand side response, and can be used in the precinct to support transformation of industrial processes to create more competitive, lower emissions, heavy industry exports.

In combination, large-scale renewable energy supply, smelter-provided demand side response and renewable hydrogen production will create a world class energy and industry precinct in Gladstone that will protect the thousands of jobs in the region and generate growth for years to come.

IEEFA recommends a detailed feasibility study to assess the investment case for this concept.

Gladstone is superbly placed to be a globally leading renewable energy industry precinct

Gladstone is poised to become a globally leading renewable energy and industry precinct for existing and new industries – aluminium, silicon, steel, biomass, cement, alumina, ammonia and hydrogen. The potential benefits of this investment and a broader renewable powered industry plan can reach well beyond the smelter.

As detailed by Ross Garnaut in his book Superpower, with abundant low-cost renewable energy sources and a comparative advantage in the production of renewable hydrogen, Australia could become a significant economic power in a zero emissions world.

Gladstone has the potential to build a bright renewable-powered future on its heavy industry foundations.

To take the next step requires more detailed analysis, investment in infrastructure and support for an industry plan backed by the Queensland and Federal Governments.

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