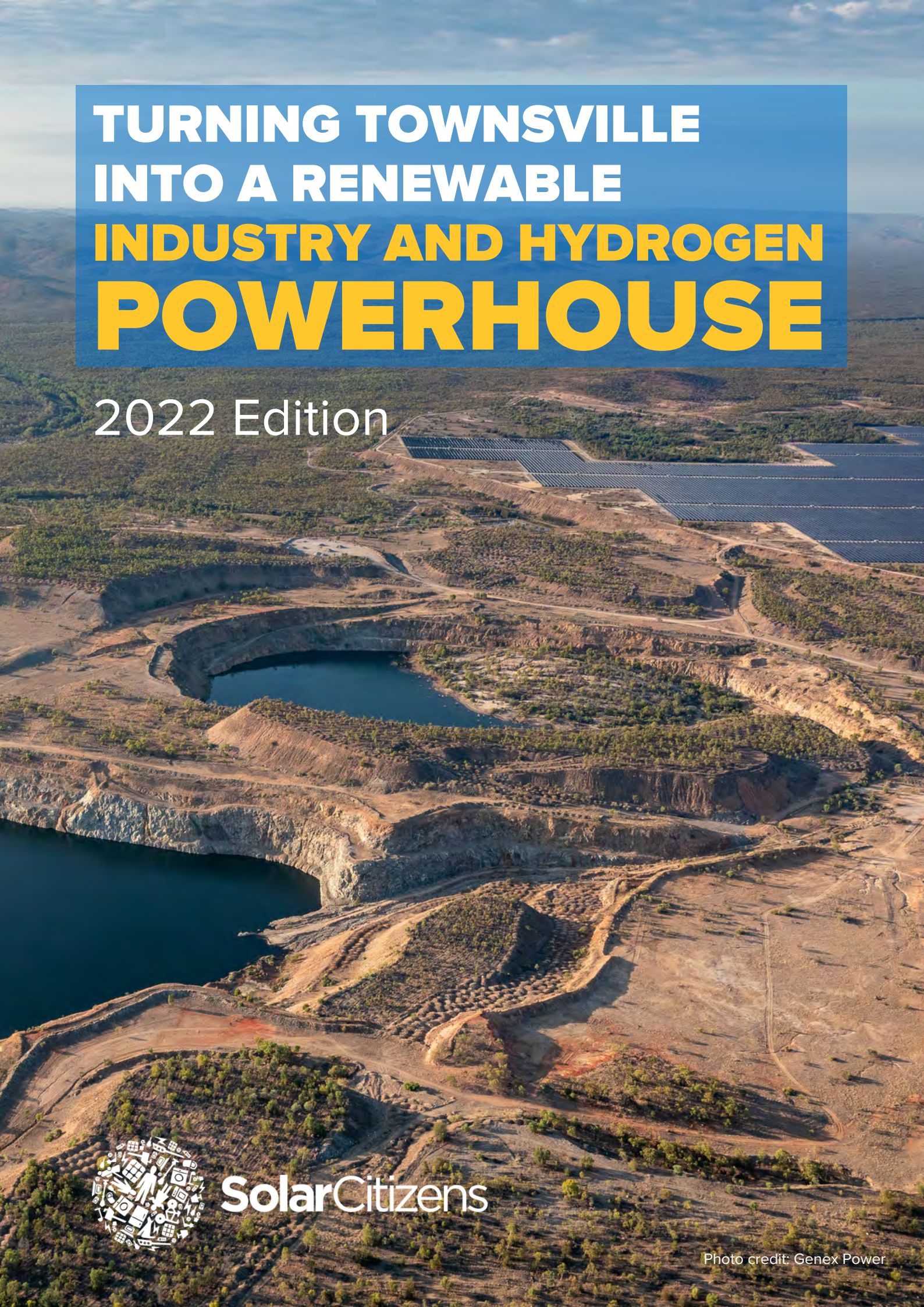
TURNING TOWNSVILLE INTO A RENEWABLE INDUSTRY AND HYDROGEN POWERHOUSE

2022 Edition



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KEY FINDINGS

Townsville can have a bright economic future producing energy, minerals and materials to power the world's transition to a low-carbon future. Solar Citizens' latest analysis found a staggering 24,950 jobs would be created by 2030 if Townsville became a Renewable Energy Industrial Precinct – a hub for advanced manufacturing and processing that's powered entirely by clean energy backed by storage and renewable hydrogen.

This report looks at several industry projects proposed across Townsville—including Ark Energy's proposed renewable hydrogen facility and the Lansdown Eco-Industrial Precinct—finding that 17,000 jobs would be created if these projects proceed. All of the proposed industrial projects analysed in some way support the global transition to a low-carbon economy.

The analysis found that over 3,600 MW of new renewable energy generation and 25 MW of new storage would likely be required to power the industrial projects analysed*. Building the renewable energy generation and storage required to power new industrial electricity demand would generate an extra 7,300 construction job years** and 450 ongoing jobs.

In total, turning Townsville into a Renewable Energy Industry Precinct would create more than 5,350 ongoing jobs and 19,600 construction job years. The ongoing roles are equivalent to 9.5% of Townsville's existing full-time workforce [1].

According to the Australian Energy Market Operator (AEMO) the region West of Townsville has the potential to host 26,600 MW solar and wind generation [2] – but the development of this region is hampered by the need for new transmission infrastructure. Government support is required to unlock this impressive renewable resource, particularly by backing the development of the CopperString 2.0 transmission line. In addition to this, the Australian Government has a key role in funding enabling infrastructure, such as road and water access, to establish new local manufacturing and minerals processing industries.

*Excluding the Solquartz silicon processing facility, Australian Mines Sconi Mine and Imperium3 Battery Plant where electricity demand data was unavailable.
**A job year is a full-time equivalent job for a year.

INTRODUCTION

As nations around the world move towards net-zero emissions, there's a growing global demand for low-carbon fuel and materials. Countries rich in renewable energy resources, like Australia, have an opportunity to benefit from the global transition by manufacturing products like renewable hydrogen and low-carbon materials for domestic and export markets.

Australia has some of the world's best solar resources and key minerals required for clean technology, including batteries for electric vehicles and household storage. We can utilise these natural advantages to generate abundant cheap electricity and reinvigorate our manufacturing sector.

Townsville, in particular, is strategically located to establish and expand clean energy manufacturing because it has an established port, skilled workforce and is in close proximity to the North West Minerals Province (NWMP), which has deposits of new economy minerals like Copper, Cobalt and Zinc.

To explore the opportunities awaiting Townsville, in this report Solar Citizens analyses the employment impact of Townsville becoming a Renewable Energy Industrial Precinct.

"Renewable Energy Industrial Precincts support a cluster of manufacturers powered by 100% renewable energy. These precincts are either located within Renewable Energy Zones or connected to renewable energy generation through high voltage transmission lines. They also have access to clean heat and renewable hydrogen production and infrastructure." – WWF Australia and Beyond Zero Emissions [3].

This report identifies several proposed advanced manufacturing, technology and processing projects within the broader Townsville region that would support the global transition to a low-carbon economy. We calculated the total number of construction and ongoing jobs these projects would create as well as the number of jobs that would be created in the renewable energy sector if all of this new electricity demand was met with clean energy.

Townsville is already positioning itself as an advanced manufacturing hub of new-economy products. But now there's an opportunity for all levels of government to work together to ensure future-proof industries are established in Townsville. Government also has a role to play in ensuring that abundant cheap renewable energy is unlocked in the region to power new and existing industry proposals.

PROJECT SPOTLIGHT

Lansdown Eco-Industrial Precinct

The Lansdown Eco-Industrial Precinct is currently being developed by Townsville City Council and has been dubbed 'Northern Australia's first environmentally sustainable advanced manufacturing, technology and processing hub'. The precinct is being developed on a greenfield site owned by Council and will be in part powered by a nearby solar farm as well as rooftop PV arrays.

Lansdown—which includes plans to manufacture solar panels, renewable hydrogen and materials for electric vehicle batteries—is an exciting example of how future-proof economic activity and jobs can be stimulated across Australia's regions.

The precinct does not entirely meet the definition of a Renewable Energy Industrial Precinct [3] because it will not be powered entirely by renewable energy. Lansdown will be powered by a mixture of solar, renewable hydrogen, storage batteries and electricity sourced from the grid, while heat required for industrial applications will be sourced from waste gas from the Bowen Basin. However, as the cost of renewable hydrogen comes down, it will be possible to meet the precinct's entire electricity and heat requirements with renewable sources.

There has been significant interest from companies wanting to be involved in Lansdown. The following projects are proposed at the site.

Townsville Emerging Chemicals Hub (TECH) – Queensland Pacific Metals (QPM)

QPM's Townsville Emerging Chemicals Hub (TECH) Project will produce critical chemicals for the emerging lithium-ion battery and electric vehicle sector through a world-leading process that will produce almost zero waste products.

The project will process high grade ore imported from New Caledonia to produce nickel sulphate, cobalt sulphate and high purity alumina and other by-products. QPM have highlighted that management and staff are to be recruited from a readily available pool within Queensland and Townsville, with corporate management regionally focused. It is anticipated the project will create 800 construction jobs and an estimated 1,700 jobs once operational, including 300 highly-skilled advanced manufacturing jobs at the facility and 1,400 jobs in support industries.

In early 2021, QPM announced it will increase the scale of the TECH Project to at least two times the Pre-Feasibility Study project size. The project has since been declared a prescribed project by the Queensland Government and is likely to begin production at the end of 2023 or beginning of 2024.

Solar Panel Manufacturing Facility – RTE Energy

RTE Energy plans to develop a photovoltaic (PV) manufacturing facility, where 3D solar cells will be developed and then assembled into a complete solar panel. Manufacturing is set to start in 2023, with full production beginning in March 2024. The project will be powered by on-site solar and battery storage.

Construction is expected to add around $59 million to Townsville's gross regional product, while the total project budget is expected to add around $290 million. RTE Energy is aiming to use local content where possible when developing the facility.

Renewable Hydrogen Hub – Origin Energy

Origin Energy has plans to develop a 300 MW export-scale liquid hydrogen plant. Origin is collaborating with Japan's Kawasaki Heavy Industries Ltd (KHI) and the Port of Townsville to develop the facility that will produce 36,500 tonnes per annum of renewable liquid hydrogen using renewable energy and sustainable water.

In April 2021, Origin signed a Memorandum of Understanding with the Port of Townsville to collaborate on the potential expansion of the port, as well as the development of a liquefaction facility, new berth and associated infrastructure.

Subject to project feasibility, construction of the renewable hydrogen plant could start in 2026, with production beginning in 2028. The project is expected to create 2,500 construction jobs as well as 700 ongoing jobs.

Sally and Steve, SJ & SC Reddie, Hughenden

Renewable Hydrogen and Solar Power Station – Edify Energy

Edify Energy plans on developing the Majors Creek Solar Power Station, including a 200 MW solar farm alongside battery storage, to provide clean electricity to the Lansdown Eco-Industrial Precinct. The solar farm has the potential to be expanded to 800 MW. Memorandum of Understandings are in place to supply renewable energy from the Majors Creek Solar Power Station to the nearby QPM and Imperium3 projects.

Alongside the Major Creek Solar Power Station, Edify Energy will develop a renewable hydrogen facility. The project will initially consist of a 10 MW electrolyser pilot plant which has the capacity to produce up to 1,350 tonnes of renewable hydrogen. The project is intended to prove the technology and scale up to commercial production with a 1,000 MW plant by 2030.

Silicon Smelter – SolQuartz

SolQuartz is planning to develop a silicon smelter to supply silicon to the solar PV and battery manufacturing industries. Construction is forecast to support around 860 direct and indirect jobs, while operation of the smelter is expected to support around 240 jobs. The first phase of the smelter construction is forecast to start in 2023, with phase two to start in 2025.

Construction is expected to add around $111 million to Townsville's GRP, while the operational phase is expected to add around $94 million. SolQuartz advertises that they will be powered by renewable energy.

Lithium battery plant – Imperium3

The Imperium3 Gigafactory is anticipated to have a production capacity of 18 GWh of lithium-ion batteries that could be used for a range of applications; including, residential energy storage, utility-scale renewable energy storage and electric vehicles and other electromobility products.

The Imperium3 Gigafactory is expected to create 2,500 jobs during construction and 1,000 ongoing jobs over the three-stage development with a capital investment of $3 billion.

ADDITIONAL PROPOSED PROJECTS IN THE GREATER TOWNSVILLE AREA

Renewable Hydrogen Plant – Ark Energy

Ark Energy, a subsidiary of Korea Zinc, has progressive plans to develop a 3,500 MW renewable hydrogen facility in Townsville by 2040. In 2030, they are aiming to have established a 900 MW electrolyser, which will require up to 2,200 MW of renewable energy generation to run.

Ark Energy's sister company Sun Metals owns and operates Townsville's zinc refinery. In 2018, Sun Metals commissioned a 124 MW solar farm to help reduce the running costs of the refinery. Ark Energy is now working towards building a pilot renewable hydrogen facility at the site.

Ark Energy's mission is to become the safest and most competitive producer of green hydrogen in the world. They're well on the way to establishing the pilot hydrogen facility, having received funding from the Queensland Government, Australian Renewable Energy Agency (ARENA) and Clean Energy Finance Corporation (CEFC).

The first stage of the project includes the deployment of a 1 MW electrolyser with storage and refuelling infrastructure to power five new fuel-cell electric trucks. According to ARENA, the five zero emission trucks will replace equivalent diesel-powered trucks and avoid 1,300 tonnes of CO2 emissions each year.

Townsville Battery Refinery – Pure Battery Technologies (PBT)

With headquarters in Brisbane, Pure Battery Technologies aims to produce environmentally superior materials for lithium-ion batteries for use in electric vehicles. The leaching processes utilised by PBT were originally discovered at the University of Queensland and they produce high-quality, more affordable nickel and cobalt battery materials with a lower environmental footprint.

PBT has earmarked land at the Townsville Port for a large-scale refinery which is expected to create 100 jobs for the North Queensland region and have a capital expenditure of $100M.

Sconi Cobalt and Nickel Project – Australian Mines

The Sconi Cobalt and Nickel mine and processing facility at Greenvale will supply high-quality battery-grade nickel and cobalt materials to LG Energy Solution, the world's largest producer of advanced batteries for the electric vehicle industry.

The project is anticipated to create 500 jobs during the construction phase and 300 ongoing jobs during its operation. The project is expected to generate total revenues of $13.3 billion and increase the Gross Regional Product by $2.2 billion over the 30-year life of the mine.

Notably, Australian Mines is the first minerals research company to be certified a Carbon Neutral Organisation under the Australian Government's Climate Action Program in August 2020. They have also established an emissions reduction strategy that includes developing a roadmap for a transition to 100% green energy supply, including annual targets for increases in the use of energy from renewable sources. The Sconi project is expected to come online in 2024.

CopperString 2.0 Transmission Line – CuString

Currently burdened by some of the highest electricity prices in the world, the North West Minerals Province (NWMP) has the potential to unlock the largest deposits of minerals that will support the development of several technologies needed to decarbonise the global economy.

Advanced technologies such as electric vehicles, smart devices and batteries require minerals including Lead, Zinc, Copper, Gold, Phosphate, Cobalt and Vanadium. The NWMP is estimated to hold $680 billion worth of these minerals that could be used to drive the economy of the future.

The CopperString 2.0 project aims to deliver low-cost renewable energy to the NWMP through a 1,100km long, high-voltage transmission line that will generate 750 direct construction jobs, 30 ongoing jobs and 3,500 indirect jobs on top of supporting the existing 10,000 already within the NWMP.

The project is estimated to increase national income by $45 billion and will provide access to some of the best renewable resources across Queensland. It is estimated the project will unlock 1000 MW of renewable capacity within the region [4].

CopperString 2.0 will stretch from Mount Isa to Townsville, unlocking renewable energy generation capacity along the way. The Australian Energy Market Operator (AEMO) has identified that the North Queensland Clean Energy Hub, a proposed Renewable Energy Zone in North West Queensland, has the potential to host 18,600 MW of wind and 8,000 MW of solar generation [2].

METHODOLOGY

Solar Citizens conducted desktop research to determine the relevant manufacturing, mining and hydrogen project proposals in the Townsville region and how many jobs they would create. Where job data was unavailable for renewable hydrogen projects, hydrogen job factors from Accenture were utilised.

To determine the amount of new renewable energy generation and storage that is required to power these projects, the electricity demand of each project was either provided by project proponents, assumed where possible, or excluded from the calculations if the information was unavailable. The projected electricity demand for the Solquartz silicon processing facility, Australian Mines' Sconi Mine and Imperium3 Battery Plant were unable to be obtained and therefore excluded.

Solar Citizens considered the Australian Energy Market Operator's (AEMO) annual average renewable traces for the proposed North Queensland Clean Energy Hub Renewable Energy Zone, as well as solar and wind average capacity factors [5] when determining the appropriate amount of new solar, wind and storage generation required to meet emerging industrial demand. It was assumed that the proposed renewable hydrogen facilities would be operated in a flexible manner that doesn't require a 24/7 firmed energy supply.

These large-scale solar, wind and battery storage projections were used alongside Institute of Sustainable Futures' renewable job factors [6] to determine the level of renewable energy employment that this would stimulate in Queensland. It was assumed that large-scale solar and wind renewable job factors decline every year in line with falling technology costs as sourced from AEMO [5].

KEY RECOMMENDATIONS

Townsville has an exciting opportunity to become a job-rich renewable energy manufacturing and minerals processing industrial powerhouse. But these opportunities won't be fully realised unless the Australian Government takes action to invest in developing industries while ensuring new and existing manufacturers have access to abundant renewable energy.

The Australian Government should invest in North Queensland's renewable manufacturing potential by:

- **Investing a further $22 million to develop the Lansdown Eco-Industrial Precinct.**
- **Allocating at least $70 million to establish Townsville as a renewable hydrogen hub.**
- **Supporting the CopperString 2.0 transmission line via the Northern Australia Infrastructure Facility (NAIF).**

BUILDING A SUSTAINABLE FUTURE FOR ALL

While the world's transition towards a low-carbon future presents exciting economic opportunities for North Queensland, it is vital that each proposed industrial and renewable energy project is rigorously assessed before proceeding to construction. Protecting the health of local communities and the environment, and safeguarding cultural heritage is of the utmost importance. In addition, the benefits from new projects should be shared with the local community and no projects should proceed without informed consent from Traditional Owners. Solar Citizens encourages project proponents and governments to support efficient mining and processing methods, ongoing environmental monitoring, and the adoption of 100% renewable energy generation.

It should be noted that the Lansdown Eco-Industrial Precinct development plans include new gas pipelines that connect waste methane emissions from the Bowen Basin to the Lansdown site. Gas is a fossil fuel that drives global climate change. Solar Citizens encourages manufacturing proponents and governments to support the phase out of gas use in industrial processes by 2030, either by replacing with electrical heat or renewable hydrogen, to ensure Australia is doing its part to limit global heating to 1.5 degrees.

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