



FIVE WAYS TO IMPROVE QUEENSLAND'S ENERGY AND JOBS PLAN

Queensland's rich renewable energy resources can drive down our electricity bills, underpin new local manufacturing industries, and slash the State's emissions – but only with the right government policy.



SolarCitizens



Queensland
Conservation
Council

Introduction

Queensland's Energy and Jobs Plan is an exciting 10-year vision that represents a major increase in renewable energy ambition for the Sunshine State.

The plan commits to:

- Repower state-owned coal plants to renewable energy hubs by 2035;
- Legislate a 70% Renewable Energy Target by 2032, and a 80% target by 2035;
- Spend an extra \$2.5 billion on building publicly-owned renewables, taking the State's total Renewable Energy and Hydrogen Jobs fund to \$4.5 billion;
- Establish a new Queensland Energy System Advisory Board to review the Energy Plan every two years from 2025;
- Implement a Job Security Guarantee for workers at publicly-owned coal stations.

The Queensland Government should be congratulated for their visionary plan. However, the Energy and Jobs Plan is not a one-stop-shop to manage Queensland's energy transition and there are significant areas of work that require more detailed planning and government investment. Key opportunities were overlooked in the energy plan that the State Government could seize to reduce electricity bills and improve grid reliability for Queenslanders.

This report looks at five key elements that are missing or inadequate in Queensland's Energy and Jobs Plan, and the policies that the State Government can implement to underpin an affordable energy system that delivers for all Queenslanders.

The findings of this report demonstrate that implementing policies to bring online more renewable energy in the near-term, while ensuring clean household technology is available to all, will create 27,200 jobs and drastically reduce inflated electricity bills for consumers.

In fact, our modelling found that large-scale solar, wind and storage projects across the Sunshine State brought wholesale power costs down by \$25/MWh in 2022, equivalent to nearly \$100 per household.

1.

Rollout more renewable energy and storage by 2025 to bring down power prices and improve reliability.

Right now Australians are facing a cost of living crisis. Wholesale electricity prices are spiralling, largely due to high global fossil fuel prices and breakdowns at ageing coal power stations, and Queensland households and businesses are struggling to manage this extra cost burden. Recently polling¹ commissioned by Solar Citizens and conducted by research group uComms found that 70% of Queensland households are worried about paying their next electricity bill.

Where wholesale electricity prices in 2020 averaged at \$44/MWh, last year they averaged \$205/MWh. At the moment the only wholesale price relief we're seeing is in the middle of the day when Queensland's 900,000 solar homes and businesses, and the State's 30-plus large-scale solar plants, are operating. Bringing online more renewable energy and storage, which have fixed low operational costs, is vital to bring down inflated wholesale electricity prices.

Modelling completed for this report demonstrates that without Queensland's existing large-scale clean energy capacity, Queensland's wholesale electricity prices would have been \$25/MWh higher in 2022. Across the year, this would have added up to more than \$1.3 billion extra going to fossil fuel generators in the wholesale market. That's about \$100 per Queensland household.

To bring prices under control, the Queensland Government should urgently bring online more publicly-owned renewable energy and storage as soon as possible.

At the moment there are approximately 4,000 MW of large-scale solar and wind projects likely to come online in Queensland by 2025. We're calling on the State Government to deliver another 2,000 MW during this time alongside an additional 500 MW of storage to reduce bill stress for Queenslanders and ensure there's enough clean energy generation to keep the lights on.

Building these renewable energy assets will reduce wholesale power prices dramatically by limiting the frequency of expensive fossil fuels generators setting wholesale prices. If the extra 2,000 MW, on top of the 4,000 MW currently in the pipeline, had been generating in Queensland in 2022, average wholesale power prices would have been more than halved. The savings to Queensland households would have been more than \$500 per year.

As the State's coal-fired power stations age they are more prone to breakdowns. According to the Australian Energy Market Operator, the reliability of coal and gas plants stayed at historically poor levels in 2021-22. On average, more than one quarter of Queensland's coal fired generation capacity was broken down at any time in 2022. This is more than 2,000 MW capacity unavailable.

Allocating the Queensland Government's \$4.5 billion Renewable Energy and Hydrogen Jobs Fund and delivering another 2,500 MW of clean capacity and storage would create 4,000 jobs² and provide certainty for Queenslanders.

2. Provide support for everyone to access cheap solar energy.

As electricity prices have sky-rocketed around the country, renters, social housing tenants and people living in apartments are more exposed to rising electricity prices because they face barriers to accessing the cheapest form of electricity generation available: rooftop solar.

The Queensland Government can tackle this electricity inequality and help low-income households manage their electricity bills by immediately implementing schemes to support the rollout of solar and storage on rental properties and social homes for those that need it the most. Options for assisting everyone access solar include:

1. Assist the most vulnerable social housing tenants slash their power bills by rolling out a Virtual Power Plant (VPP) on an initial 10,000 dwellings.

A Virtual Power Plant is a network of smart batteries that can be coordinated to act together as a larger power plant and provide electricity to the grid when it's needed.

In South Australia the State Government is in the process of working with Tesla to roll out Australia's largest Virtual Power Plant, including on an initial 4,100 social housing dwellings. In the SA model, solar, storage or both are being installed in social housing dwellings at no upfront cost to the tenants and in exchange the tenants are offered the cheapest electricity in the market.

The positives of VPPs include that they improve energy system reliability by providing grid services when needed, and they allow more households to access cheaper electricity even if their roof is not suitable for solar. In the South Australian example, tenants are estimated to save \$423 per year by being part of the VPP.



2. Expand Queensland's Solar for Renters trial and provide support for at least an additional 10,000 private rental properties to install solar.

In 2019, the Queensland Government started running a trial program to increase the uptake of rooftop solar on rental properties. Rebates of up to \$3,500 were offered to landlords to take part in the trial and install a solar system on their rental properties in the Gladstone, Bundaberg and Townsville Local Government Areas.

Overall, 670 properties had solar installed during the trial, and the results demonstrate that tenants were on average \$600 a year better off after the was solar installed. This small trial should be expanded for the whole of the State to participate and should include a well-funded communication and engagement strategy to let landlords know about the opportunity.

Implementing these policy solutions would create 300 jobs and bring online at least 80 MW of solar and 50 MW/135 MWh of storage capacity³.



Case study

Townsville social housing provider Yumba-Meta participated in the Solar for Rentals program, providing tenants with solar at no upfront cost to them.

Kara is one of the participating tenants and she said getting the solar has been a blessing. After moving into an all-electric home with solar she says her bills have come down from around \$550 per quarter for gas and electricity to now \$230.

“This is a major drop for me. I’m finding it a blessing because I can manage my bill now,” said Kara.

“In my last house we were really worried about our electricity and gas bills because they were our biggest bills aside from rent. Even though we were really diligent in turning everything off after we finished using it, prices started going up and we were struggling.

“It was hard to fit the electricity and gas bill into a single income. At times it felt like we had to choose between cooking food and using electricity. We even bought new electric appliances to rely less on gas because it was so expensive.

“Since moving into this house I’m not worried about the electricity we use. I’m happy. The solar has been a helping hand in my pocket. Now I don’t have to rob Peter to pay for Paul, so to speak.

“I think landlords should help tenants get solar because it makes it easier for them to pay rent. There have been times before where I had to ask for a rent extension because an electricity bill was due. Now that doesn’t happen.”





3. Fast-track measures to help everyone save with household electrification.

Providing support for Queenslanders to electrify their households and power them with rooftop solar and battery storage is a key solution for helping consumers manage high electricity and gas prices. In addition to solar, clean technology such as household battery storage, solar hot water or hot water heat pumps, electric heating systems, electric stove tops, and electric vehicles and charging infrastructure, can be a smart hip-pocket investment for consumers.

A recent report from the Climate Council found that households that switch from gas to fully electric in Brisbane can save up to \$1,424 on their annual bills. Consumers report that the biggest barrier to accessing electric appliances is the upfront cost of making the switch, which the State Government can address by implementing no-interest loans.

That's why, we're calling on the State Government to introduce targeted financial support, including interest-free loans, for the rollout of household clean technology, such as small-scale solar and storage, energy efficiency upgrades and electric appliances to replace gas.

A successful example of this working is the Sustainable Household Scheme implemented by the ACT Government; in this well-subscribed scheme no-interest loans of up to \$15,000 are available for clean technology. In just over a year, the scheme has delivered more than \$98 million worth of loans and 5% of all eligible households have participated.

A recent national survey¹ commissioned by Solar Citizens found that 47% of Queenslanders would be interested in installing solar and storage with the help of no-interest loans, and 27% of people would be interested in using no-interest finance for electrifying their home.

Based on the success of the ACT scheme⁴, providing no-interest loans in Queensland could result in 55 MW of new small-scale solar being installed around the state, which would create 85 jobs.

4. Establish Renewable Energy Industrial Precincts in Townsville and Gladstone.

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 such as batteries for electric vehicles and household storage. We can utilise these natural advantages to generate abundant cheap electricity and reinvigorate our manufacturing sector.

A Renewable Energy Industrial Precinct (REIP) is a hub for advanced manufacturing and processing that's powered entirely by renewable energy backed by storage and renewable hydrogen.

Key benefits of establishing REIPs include:

- Attracting new local investment and industries to secure long-term good jobs and economic prosperity;
- Providing cheaper shared infrastructure and renewable energy access to participating industry;
- Encouraging more onshore manufacturing and minerals processing to reduce global supply chain issues.

In Queensland there are two main regions that stand out as the best candidates for establishing the state's first REIPs: Townsville and Gladstone.





Due to the leadership of local councils, industry and key local stakeholders, these regions are well-positioned to be some of Australia's first Renewable Energy Industrial Precincts and demonstrate to the rest of the country how the transition to a clean economy can power good, long-term employment and economic prosperity.

Both Townsville and Gladstone have access to exceptional renewable energy resources, good port facilities and a skilled local workforce.

Solar Citizens' latest analysis found that turning the Townsville region into a Renewable Energy Industry Precinct would create more than 5,350 ongoing jobs and 19,600 construction job years by 2030. This analysis details many of the existing manufacturing and minerals processing proposals in the region.

According to research by Beyond Zero Emissions, a Gladstone REIP would create 10,719 jobs in Gladstone and a further 2,588 jobs throughout the rest of the State, and generate an additional \$2 billion in revenue for the region by 2032.

5. Improve Energy Efficiency in Queensland's Rentals.

Improving energy efficiency in existing rental properties has positive hip-pocket and health benefits for tenants, and is a key action for bringing down Queensland's residential emissions. More than 30% of Queenslanders live in private rental properties or social housing, and these community members have limited access and control for ensuring their homes are comfortable and efficient.

During the summer and winter months, the energy stress felt by many renters and social housing tenants is exacerbated and many vulnerable households attempt to minimise their usage of heating or cooling to keep energy bills manageable. Extreme heat or cold already poses a health threat for Australians living in inefficient housing, and this will only be made worse as climate change drives more extreme weather events.

Work is currently underway between the Federal Government and other Australian states and territories to deliver a National Framework for Minimum Energy Efficiency Rental Requirements. At the moment in Queensland, there is no requirement for rental properties to meet a minimum energy efficiency standard – meaning many homes are needlessly energy intensive.

To appropriately address energy inequality and minimise energy stress for renters, it's imperative that the Queensland Government ensure mandatory minimum energy efficiency rental standards are implemented as soon as possible. Mandatory disclosure of rental energy efficiency ratings should also be implemented to ensure compliance.

Landlords currently have very little financial incentive for upgrading their rental properties, so it's up to governments across the country to introduce regulation to ensure that the efficiency standard of rental properties improves. This is especially important in the context that globally high fossil fuel prices are resulting in significantly higher electricity bills – a trend that is set to continue over the next few years.

According to an AlphaBeta report commissioned by the Climate Council, supporting the retrofit of residential buildings to improve energy efficiency would create 7,000 jobs across the country. Given 20% of the country's residential buildings are in Queensland, we can assume improving energy efficiency of residential properties would create more than 1,400 jobs.

Methodology

Job calculations

Unless otherwise stated, Institute of Sustainable Futures' renewable job factors were used to determine the level of renewable energy employment these policy initiatives would stimulate in Queensland.

Electricity Price calculations

Cost Savings of Existing Large-scale Wind and Solar

If Queensland's existing large-scale wind and solar plants were not generating, this energy would have to be met by fossil fuel generators. With gas and coal prices at their elevated levels in 2022, this would have been many times more expensive than the wind and solar.

To quantify this, the following market data was used:

- Half hourly generation by fossil fuel power station
- Half hourly generation by renewable fuel type
- Half hourly availability, as submitted to the Australian Energy Market Operator (AEMO), by fossil fuel power stations
- Half hourly wholesale power price for Queensland

Revenue on a half hourly basis was then calculated for each power station. The actual running cost of fossil fuel generators cannot be known because it depends on their fuel contracts, both the price at which coal or gas has been procured, and the amount covered by the contract.

The average revenue received by month is used as a proxy for the running cost of each gas generator. The coal generators are assumed to have a marginal cost of their likely cost of coal. Export exposed generators (Stanwell, Gladstone and Callide B and C) are assumed to be subject to published Newcastle coal prices, while coal costs remain constant at levels assumed by AEMO's Inputs and Assumptions workbook for the non-export exposed generators. AEMO's Inputs and Assumptions workbook also publishes heat rates and variable operation and maintenance costs that are used to calculate marginal costs per MWh.

The spare capacity for each unit is calculated from availability and generation data. For each half hour then, the energy contributed by large-scale wind and solar is allocated to the next most expensive generator. Where this means that another, more expensive generator is brought online, that generator becomes the marginal generator and sets the wholesale price.

This assumes that any capacity submitted to AEMO as “available” could be dispatched at the marginal cost for that generator. This has not been the case in 2022, where higher cost gas generation has been dispatched despite there being enough coal availability to meet demand around 75% of the time.

This also assumes that generators would not change their bidding strategy if supply was more constrained due to lack of large-scale renewables.

The new half hourly price is then multiplied by Queensland demand to calculate the increased costs in the wholesale market without large-scale renewables. Queensland households use around 18% of electricity in Queensland according to [AEMO’s Electricity Statement of Opportunities 2022](#). 18% of the cost savings are then divided by the roughly 2 million households in Queensland to determine the average cost savings due to renewable energy per domestic bill.

Note on rooftop PV

This analysis has not calculated the savings due to existing rooftop PV, or those that would be possible with more rooftop PV. Together, rooftop PV and large-scale renewable energy are so integral to the electricity system, providing 20% of Queensland’s electricity, that this methodology cannot be applied to large-scale energy and rooftop PV at the same time, because there will not be enough spare capacity to meet demand. This methodology would return prices sitting at the highest marginal cost generator for large portions of the year, but even this would not supply enough electricity for significant portions of time.

Cost savings of more renewable energy

The same methodology can be applied, in reverse, to quantify savings of more renewable energy entering the system.

The following projects which have been either allocated funding or approved could provide an extra 6,000 MW of renewable capacity:

Project	Region	MW	Representative Project
Bluegrass Solar Farm*	SQ	148	Darling Downs Solar Farm (DDSF)
Columboola Solar Farm*	SQ	217	DDSF
Aramara Solar Farm	SQ	101	DDSF
Edenvale Solar Farm^	SQ	146	DDSF
Munna Creek Solar Farm	SQ	143	DDSF
Western Downs Solar Farm^	SQ	400	DDSF
Wandoan Solar Farm	SQ	160	DDSF
Moura Solar Farm*	CQ	99	Susan River Solar Farm (SRSF)
Aldoga Solar Farm	CQ	600	SRSF

Karara Wind Farm^	SQ	100	Coopers Gap Wind Farm
MacIntyre Wind Farm^	SQ	923	Coopers Gap
Dulacca Wind Farm	SQ	180	Coopers Gap
Wambo Wind Farm	SQ	550	Coopers Gap
Tarong West Wind Farm	SQ	500	Coopers Gap
Clarke Creek Wind Farm^	CQ	850	Coopers Gap
Lotus Creek Wind Farm	CQ	340	Coopers Gap
Kaban Wind Farm*	NQ	157	Mt Emerald Wind Farm
Kennedy Wind Farm*	NQ	43	Mt Emerald Wind Farm

* projects marked with a * have been constructed but were not connected to the grid for most of 2022

^ projects marked with a ^ are under construction

The extra generation from these projects is calculated by multiplying the achieved generation of the representative projects listed by the MW of new projects. When built, these projects will have much higher diversity and generate electricity at different times which will be even better for the grid.

For each half hour, generation is removed from the most expensive generators first. Where this leaves a different generator the most expensive, that sets the price at its assumed marginal cost.

There is no minimum load enforced for gas generators, but minimum load is enforced for coal. Minimum load is assumed to be the minimum load for half the units of a station. For example, Tarong has four units with a minimum load of 140 MW, so the station minimum load is assumed to be 280 MW. It is assumed that when generators hit minimum load, they would be bidding very low, at or below \$0/MWh, to stay on. Therefore they are not assumed to be the marginal generator which sets the price. The first generator which is dispatched to more than its minimum load is assumed to be the marginal generator.

Where there is more renewable energy than minimum load, the price is assumed to be set at the upper end of the long run marginal cost of new solar PV and wind, according to CSIRO's Gen Cost 2021-22 report, of \$65/MWh.

This methodology only provides an indication of likely prices with a high renewable energy system. The system would not function like this, there would be a strong incentive for both more storage to enter the market and move excess electricity throughout the day and coal power to exit the market and reduce minimum load.

Footnotes

1. uComms conducted a survey of 2084 residents across Australia on behalf of Solar Citizens during the evening of 29 November 2022 using self-completed automated voice polling methodologies.
2. Assuming 2,000 MW of wind is built, as that generation profile is more beneficial to Queensland at this time, alongside 500 MW of utility-scale battery storage.
3. Based on assumptions that the solar systems would be standard 6.6kW and the batteries 5kW/13.5 kWh, and about 20% of social housing stock would be suitable for solar in the VPP program.
4. ACT Government data indicates 20 MW of solar was installed through the program at the point where 37% of the loans had been allocated.



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