Tasmanian Renewable Energy Alliance

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100% renewable, are we there yet – an update

Summary

- In November 2020, Guy Barnett claimed that "Tasmania is now 100 per cent self-sufficient in renewable energy" (This claim actually relates only to electricity, not total energy use.)
- In July 2021 we published an analysis which showed that this claim was at least premature. For the 2020-2021 financial year, renewable electricity generation in Tasmania was at most 94.2% renewable.
- In February 2022 we redid this analysis for the 2021 calendar year. For this period renewable electricity generation was 102% of Tasmanian demand. The increase is not the result of additional renewable electricity generation infrastructure (apart from rooftop solar). Rather it results from the variability of rainfall and hence the capacity of Hydro Tasmania to generate hydroelectricity.
- Tasmania has legislated at 200% renewable electricity target for 2040. However there is no legislated or announced mechanism for meeting this target.

Background to this update

In July 2021 we published a detailed analysis of whether the Tasmanian Government's claim that Tasmania is 100% self sufficient in renewable energy was correct. At that time we showed that the claim was premature, at least for the 2020-2021 financial year. Depending on the assumptions made, renewable electricity self sufficiency for that year was a bit below 95%.

We have now repeated these calculations for the 2021 calendar year and are pleased to report that for that period Tasmania generated more renewable electricity than total on-island consumption. The increase is not the result of additional renewable electricity generation infrastructure (apart from rooftop solar PV). Rather it results from the variability of rainfall and hence the capacity of Hydro Tasmania to generate hydroelectricity.

Following are the actual figures for 2021 alongside the assumptions from the government at the time that the 100% claim was made in November 2020 [TasGov 2020].

(all figures in MWh)	Government assumptions	Actual 2021
Hydro	9,000,000	9,329,028
Musselroe	515,090	567,181
Woolnorth (Bluff Point + Studland Bay)	429,240	388,844
Cattle Hill	454,990	484,030
Granville Harbour	320,090	408,447
Total renewables	10,719,410	11,177,528
Demand	10,500,000	10,934,744
RE as % of demand	102.1%	102.2%

It is also worth noting that between 28 December 2020 and 27 December 2021, energy in storage as reported by Hydro Tasmania [HydroTas] rose from 5,986,000 MWh to 7,094,000 MWh, an increase of 1,108,000 MWh.

So good water inflows to catchments in 2021 allowed both higher than average hydroelectricity generation and the building up of storage levels.

Aren't we aiming for 200% not 100% renewables?

On 13 October 2020, the Tasmanian Government introduced a Bill in state parliament to legislate the previously announced target (the Tasmanian Renewable Energy Target – TRET) whereby Tasmania would set a goal of delivering 200% renewable electricity by 2040. The Bill does not provide any mechanism (other than reporting and the sharing of information) by which the targets may be achieved. The Act as passed on 27 November 2020 requires the Director of Energy Planning to report on "the progress made towards meeting the renewable energy targets…".

As it is now over a year since the Act was passed, we inquired about the required report. We were referred to the Annual Report of the Department of State Growth. The one-page report from the Director of Energy Planning included in the 2020-2021 Annual Report reiterates the existing information about the completed Cattle Hill and Granville Harbour wind farms. It includes the statement "On top of this, prospective new generation developments in Tasmania have the potential to deliver more than 3 200 MW of additional renewable capacity, more than enough generation to meet the 2040 target." There is no detail of this additional proposed capacity and no information about policies to support the construction of this capacity.

Below is the original article analysing progress towards 100% renewable electricity which includes some more details of the methodology used to calculate the figures above.

3 March 2022

Any subsequent updates will be posted at http://tasrenew.org.au/100/

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100% renewable, are we there yet?[1]

Jack Gilding, 27 July 2021

Last November, Guy Barnett claimed that "Tasmania is now 100 per cent self-sufficient in renewable energy". Leaving aside the fact that this is about electricity which is only about half of Tasmania's energy use [ClimateTas 2021a], this is still a complicated issue.

The detailed official statement from Renewables Tasmania [TasGov 2020] explains some of the confounding factors, including the variability of wind and rainfall and the import and export via Basslink. One additional factor not mentioned is that dam levels can be drawn down to support extra generation beyond what is sustainable in the long term.

The end of the financial year is a good time to fact check this claim by comparing what actually happened in 2020-2021 against the claimed 100% self-sufficiency.

In summary, in 2020-2021 renewable electricity generation was less than 95% of actual consumption. Unless the government takes action to encourage new renewable generation, the situation is not likely to improve in the short term.

This balance varies from year to year, depending mainly on rainfall and hence Hydro's capacity to generate. Saying 'some years we are above 100% and some years we are a bit below' is not ideal for a government that claims to have reached 100% renewable electricity and has a target for 200%. More importantly, without additional renewable generation new energy intensive industries developed in Tasmania will result in increased imports from Victoria.

The state government needs to engage with the community about the need for more renewable electricity infrastructure irrespective of the fate of the proposed Marinus Link. Transparent, consultative mechanisms are needed to ensure that this infrastructure is developed in a way that meets the community's concerns about environmental impact and minimises costs.

How is the 100% claim justified?

Renewables Tasmania [TasGov 2020] base the 100% claim on whether expected annual generation from installed Tasmanian renewables is greater than average annual Tasmanian demand for electricity.

Assumptions within this include that:

- Hydro Tasmania is capable of a long term sustainable yield of 9,000 GWh[2]/year

[1] A shorter version of this article appeared on page 22 of The Mercury on 2 August 2021 under the title "Is Tassie really 100% renewable?"

[2] A gigawatt hour (GWh) is 1,000 megawatt hours (MWh) or 1,000,000 kilowatt hours (kWh).

- existing and newly commissioned wind farms with a combined capacity of 560.8 MW are expected to generate 1,719 GWh of electricity in a year
- baseline consumption (ie typical Tasmanian usage in a year) is 10,500 GWh.

What actually happened in 2020-2021?

The following table compares the assumptions behind the 100% claim with what actually happened in 2020-2021[3].

Since the two new windfarms (Cattle Hill and Granville Harbour) were not fully operational in the first part of the financial year, we have also shown the results if we assume that these had generated as much in the first half of the year as they did in the second.

(all figures in MWh)	Government assumptions	Actual 2020-2021	Annualised
Hydro	9,000,000	8,202,571	8,202,571
Musselroe	515,090	542,736	542,736
Woolnorth (Bluff Point + Studland Bay)	429,240	461,448	461,448
Cattle Hill	454,990	430,534	468,591
Granville Harbour	320,090	336,988	378,361
Total renewables	10,719,410	9,974,277	10,053,706
Demand [4]	10,500,000	10,670,644	10,670,644
Tas RE as % of Tas demand	102.1%	93.5%	94.2%

Whichever way you look at it, in 2020-2021 renewable electricity generation was less than 95% of actual consumption.

It is therefore fair to say that the government's claim of 'mission accomplished' is premature at least. Unless further renewable sources are built the self-sufficiency situation is likely to deteriorate rather than improve as demand increases.

As shown above, all wind farms have actually exceeded the government's conservative assumptions about how much they will generate. The shortfall is mainly due to lower than anticipated hydro yields and a slightly higher demand than was assumed.

Two further factors should also be mentioned, both of which reduce the self-sufficiency argument.

Energy in storage as reported by Hydro Tasmania fell by 545,000 MWh during the financial year so the hydro generation (already lower than the assumed long term yield) was partly achieved by drawing down dam levels.

Comparing on-island renewable generation with Tasmanian consumption assumes that all of the benefit of renewable generation is attributed to Tasmanian consumers[5]. In fact Tasmania exported some renewable

[3] We used Global Roam's NEM Review to download daily production for all Tasmanian generation and daily Basslink flows for 2020-2021. The NEM Review data also includes assumed Tasmanian solar generation based on the methodology from the APVI. We have not included this in the table for two reasons. Firstly the APVI figures are total generation and hence include self-consumption which is effectively accounted for as a reduction in demand for centrally generated energy. Secondly if we included the approximately half of the distributed solar generation that is exported to the grid it would increase both calculated demand and renewable generation so the impact would be minimal. It is interesting to note that APVI estimates Tasmanian solar generation for 2020-2021 was 218,356 MWh, which is more than the output of the Tamar Valley gas fired power station, but about half the output of the Cattle Hill Wind Farm.

[4] Demand is defined as total on-island generation (the listed renewable sources plus the gas-fired Tamar Valley Power Station) minus Basslink exports plus imports. All figures are based on metered generation at the source and do not include adjustments for losses.

[5] It is worth noting that this treatment is at odds with the way interconnector flows are treated in the national greenhouse accounts. See page 18 of the National Greenhouse Accounts Factors, October 2020. The national greenhouse methodology attributes the Tasmanian emissions factor to electricity exported to Victoria and the Victorian emissions factor to energy imported to Tasmania.

electricity to Victoria and imported some (largely brown coal fired) electricity from Victoria. Although this balance varies from year to year, in 2020-2021 imports from Victoria exceeded exports to Victoria.

What about the future?

Rainfall is variable so estimating the long term average yield from hydro is complex. An earlier estimated annual yield of 10,000 GWh was reduced to 8,700 following the 2006-2008 dry period and then increased to 9,000 based on average inflows since 1997[6]. Estimates are made even more difficult by uncertainty about the exact impact of climate change which is likely to result in more variable rainfall and reduced run-off due to hotter and drier conditions.

The Tasmanian Government has legislated a 200% renewable electricity target [TRET 2020] but this legislation does not provide any mechanism for how this target would be achieved [ClimateTas 2021b]. The target assumes that a second interconnector to Victoria (Project Marinus) will be built and that this will provide an incentive for new wind farm development in Tasmania with export to the mainland.

The state government also has ambitious plans for the development of green hydrogen based industries in Tasmania which will require a substantial increase in renewable electricity generation.

Tasmania has committed to net-zero greenhouse gas emissions by 2050 and has announced a consultation process on setting an earlier net-zero target. Meeting this target will require reducing emissions from the half of Tasmania's energy use that is not currently electricity use. Widespread use of electric vehicles and the use of electricity rather than gas for all domestic and some commercial heating loads are some of the most practical ways of starting to meet this target and will require additional renewable electricity generation.

While increased renewable electricity investment is needed to meet climate objectives, if capacity exceeds demand this investment can place an unnecessary cost burden on electricity consumers or taxpayers. It is also possible that one or more major industrial consumers could close down which would substantially reduce demand.

Fortunately Tasmania has a lot of flexibility in matching supply and demand. Our dams, which are only at about 36% of capacity can store over a years worth of energy. There is also capacity on the existing Basslink to export more energy to the mainland.

An earlier (pre Marinus) feasibility study of a second interconnector [Tamblyn 2017] found that without a second interconnector, "Tasmanian wind generation could increase by up to 730 MW by 2036". This is nearly three times the 252.8 MW combined capacity of Cattle Hill and Granville Harbour which were built subsequent to the Tamblyn report.

Despite uncertainties about future hydro yield and future demand, it is clearly desirable to increase renewable electricity generation in Tasmania. The question arises as to what is the most desirable way to do this (which includes both minimising cost, and in the context of a climate emergency, ensuring rapid implementation).

Wind farms at Granville Harbour and Cattle Hill were facilitated by contracts signed with Hydro Tasmania and Aurora. In their respective annual reports these are described as 'community service obligations' and 'onerous contracts' [ClimateTas 2020]. Such arrangements lack public transparency.

The state government needs to engage with the community about the need for more renewable electricity infrastructure irrespective of the fate of the proposed Marinus Link. The ACT's use of reverse auctions is one example of a more transparent way of encouraging new investment while minimising costs to the public.

[6] Page 80 of the 2016 Interim Report of the Tasmanian Energy Security Taskforce.

References

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