BOUDDI ROOFTOP SOLAR ASSESSMENT

Undertaken by the Electrify Our Community Working Group

May 2024

1 Introduction

This report sets out the findings and conclusions of *Electrify Bouddi's* assessment of the current status of rooftop solar panels within the Bouddi Peninsula. In particular, this assessment focused on the number of houses that have rooftop solar installed and the potential for more houses to install solar panels.

This *Bouddi Rooftop Solar Assessment* is a significant stage in *Electrify Bouddi's* campaign to increase solar power generation across the peninsula. It identifies both the physical potential and limits of solar expansion, as well as barriers to overcome to maximise installation potential.

The assessment was conducted during April and May 2024.

2 Rationale for the assessment

During the first three months of 2024, EB undertook an analysis of the sources of energy being consumed on the Bouddi peninsula and our associated energy consumption patterns, i.e. what purposes, appliances and times of day. This analysis was based on a survey of Bouddi residents combined with NSW-wide statistics. (hyperlink to website).

Based on that analysis, EB concluded that the most significant initiative it should undertake in the immediate future, is to campaign for increasing the generation of renewable energy in the Bouddi area. This will reduce the current reliance on fossil fuel sourced energy. The most viable and cost-effective method of achieving this is to expand rooftop solar electricity capacity. This approach is consistent with expert opinions, from organisations such as the Clean Energy Council and the Clean Energy Regulator, that rooftop solar is the key to the nation reaching its 2030 renewable energy targets, in particular the Federal Government target of 82% renewables in the National Electricity Market (NEM).

3 Methodology

A team of Electrify Bouddi members of the Electrify Your Community working group developed the following methodology for this study.

- Solar potential generation estimates were to be assessed by studying publicly available aerial imaging of all rooftops on properties on the Bouddi Peninsula. We estimate to have covered 97% of all homes in Bouddi.
- We applied the same process that solar PV installers use to provide feasibility assessments and quotes for individual homes. This involved the use of software that estimated the impact of shading on the viability of solar power generation; and measured rooftop dimensions to determine how many panels could potentially be installed.
- Bouddi Peninsula was divided into ten precincts for the purpose of the project to:
    - Allow for division of the task among volunteer assessors
    - To assess whether variations existed across Bouddi and
    - To identify the potential reasons for those variations.
- Precincts were:

1. Wagstaffe (North-West)
2. Wagstaffe (South-East)
3. Pretty Beach
4. Heath Rd (West))
5. Heath Rd (East) and dead-end Araluen Rd
6. Hardys Bay (South-West) and Killcare Beach
7. Hardys Bay (North-East)
8. Killcare Height escarpment (north of Manly View Rd)

9. Killcare Heights escarpment (south of Manly View Rd)
10. Killcare Height plateau (southern boundary Scenic Rd)

- The data collected for every house was:
    - Whether existing solar panels were evident - Yes/No
    - If solar panels are installed, then is there potential for further capacity?
    - For houses where no solar panels were evident, then:
        - was the site too shady or had insufficient roofscape for solar panels – Yes/No
        - for solar viable houses, did they have capacity for 9, 18 or more than 18 solar panels.
- We used the measure that 3 panels equated to one kilowatt regeneration capacity, in line with the current industry standard.
- Quality assurance was undertaken to ensure the consistency of assessments.

4 National rooftop solar PV installations

As a comparison, and a benchmark, we have included national statistics of the extent of rooftop solar installations. The following statistics present the status as at the end of 2023.[1]

The total number of rooftop installations across Australia was 3.69 million. This means that approximately 40% of free-standing households across the nation were powered with solar PV systems. They had a combined capacity of 34.2 gigawatts. The average rooftop install capacity was 8.7 kW. The average PV system size has grown steadily in the ten years since 2012, when systems averaged less than 3kW.

The percentage of households, per State and Territory, with installed rooftop solar systems is set out below:

Table 1: Household penetration of rooftop solar by State and Territory, 2023

State / Territory	Percentage with Rooftop Solar
Queensland	45.8
South Australia	44.9
Western Australia	39.9
ACT	32.5
New South Wales	31.7
Northern Territory	26.2
Victoria	26.1
Tasmania	20.3

At 31.7%, NSW's percentage of installations was significantly lower than the national average.

[1] Australian PV Institute – *Mapping Australian Photovoltaic Installations* - https://pv-map.apvi.org.au/historical

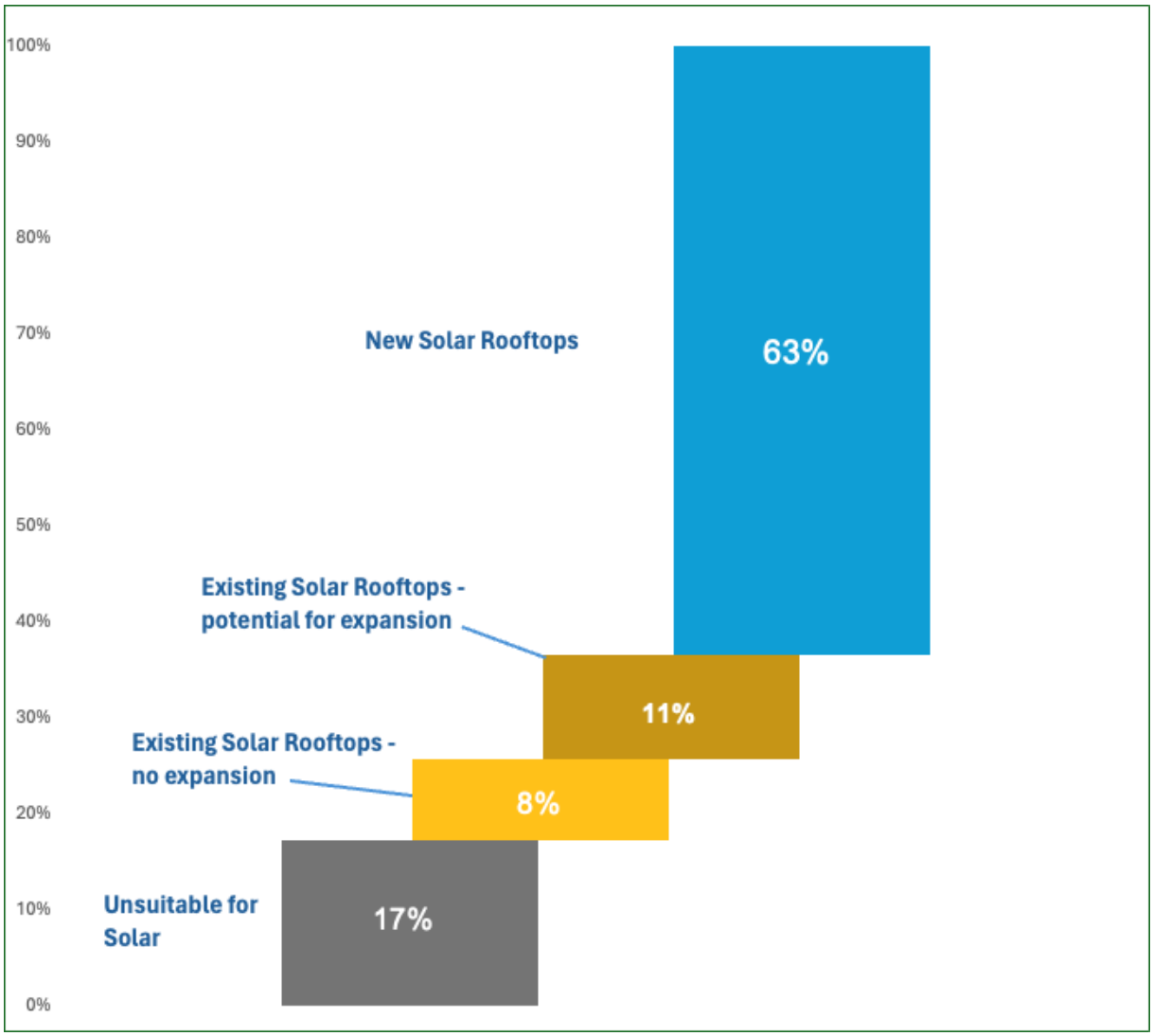
5 Assessment findings in Bouddi

5.1 Current status

This study assessed a total of 1372 residential rooftops across the Bouddi Peninsula. The overall findings were:

- 265 houses currently have solar PV's installed on their rooftops. Of these, 150 have the potential to increase their current solar PV capacity.
- 237 houses are not suitable for solar PV installation because they are either excessively shaded or have insufficient suitable roof area.
- 870 houses do not have solar PVs installed but are suitable for such installation. Of these:
    - 350 are suitable for more than 18 panels
    - 277 are suitable for 18 panels
    - 243 are suitable for 9 panels

Figure 1: Current status of solar PV in Bouddi



5.2 Precinct variation

Significant variations in current solar PV installations and potential are identified across the ten area precincts assessed in this study. The following table sets out those variations.

Table 2: Results of solar PV status by precinct

Precinct	Existing System		No Current System	
	No potential for expansion	Potential for expansion	New Solar rooftops	Unsuitable for Solar
1. Wagstaffe (North-West)	8%	9%	57%	25%
2. Wagstaffe (South-East)	3%	13%	63%	20%
3. Pretty Beach	13%	8%	48%	30%
4. Heath Rd (West)	4%	11%	66%	19%
5. Heath Rd (East) and dead-end Araluen Rd	14%	7%	63%	17%
6. Hardys Bay (South-West) and Killcare Beach	8%	8%	63%	21%
7. Hardys Bay (North-East)	2%	9%	74%	17%
8. Killcare Heights escarpment (north of Manly View Rd)	9%	16%	67%	7%
9. Killcare Heights escarpment (south of Manly View Rd)	17%	9%	48%	25%
10. Killcare Heights plateau (southern boundary Scenic Rd)	9%	16%	70%	4%
Overall Bouddi Average	8%	11%	63%	17%

Reasons for the above variations are set out below:

Wagstaffe (North-West): average number of installations; significant shading and many houses impacted by proximity to escarpment; reasonable scope for installation expansion on flatter areas.

Wagstaffe (South-East): slightly below average number of installations; significant shading and many houses impacted by proximity to escarpment; still considerable scope for installation expansion on flatter areas.

Pretty Beach: above average number of installations; significant flat area with good sun exposure; some escarpment and shading issues impacting future expansion.

Heath Rd (West): below average number of installations; no obvious impacts preventing significant expansion.

Heath Rd (East) and dead-end Araluen Rd: slightly above average number of installations; some shading and escarpment issues but still high potential for expansion due to north facing sun exposure areas.

Hardys Bay (South-West) and Killcare Beach: slightly below average number of installations; some escarpment and shade issues on beach side; considerable potential for expansion of installations on north facing bay side.

Hardys Bay (North-East): significantly low number of installations; some shading and escarpment issues but considerable flat area with good sun exposure as well; major scope for installation expansion.

Killcare Heights escarpment (north of Manly View Rd): higher than average number of installations; no major physical impediments to further significant expansion.

Killcare Heights escarpment (south of Manly View Rd): significantly higher than average number of installations; predominantly south facing exposure slightly limits future installation capacity.

Killcare Heights plateau (southern boundary Scenic Rd): significantly higher than average number of installations; excellent sun exposure; major scope for future installation expansion.

5.3 National comparison

Currently 19.3% of Bouddi Peninsula households have installed solar PVs. This is significantly below the national average of 40%, as well as the NSW average of 31.7%.

Reasons for the poor rooftop solar take-up across the Bouddi Peninsula need to be identified, assessed and addressed to remedy this situation.

6 Potential increase in solar capacity

Bouddi does not have the installation limitations associated with urban high density living, such as high rise multi-dwelling buildings, social housing or extensive permanent rental housing, three sectors that are significantly underrepresented in Australia's penetration of residential solar.

However, Bouddi does have its own unique rooftop solar expansion limitations include rooftop shading from trees, escarpment shadowing, and the high percentage of holiday houses, as illustrated in the above precinct analysis.

Despite the above negative influencing factors, this study concluded that there is a huge capacity for the expansion of residential rooftop solar PV installations across the Bouddi area

6.1 Issues impacting expansion of capacity

This study leads to a conclusion that the following environmental and household ownership issues are the main barriers to rooftop solar PV expansion:

- **Prevalence of holiday houses and short-term rentals –** The last Australian Government census identified that approximately 50% of Bouddi residences are holiday houses and/or short-term rentals. This is probably the most significant issue to be confronted. This form of property ownership presents a different perspective on the cost-effectiveness and return of investment in rooftop solar PVs because the owners are not full-time occupants.
- **Extent of Shading** - There is a perception that many houses are unsuitable for rooftop solar systems due to the prevalence of tall trees close to many houses. In addition, some houses are close to the base of escarpments that restrict the amount of available sunlight hours. To an extent, this perception is real, as our rooftop analysis concluded that 19.3% of houses in the area are unsuitable for solar PV installation. However, we believe that there is not a clear understanding that the latest solar PVs can effectively generate electricity is semi-shaded locations. As a result, a significant number of residents may erroneously believe they cannot install solar PV.

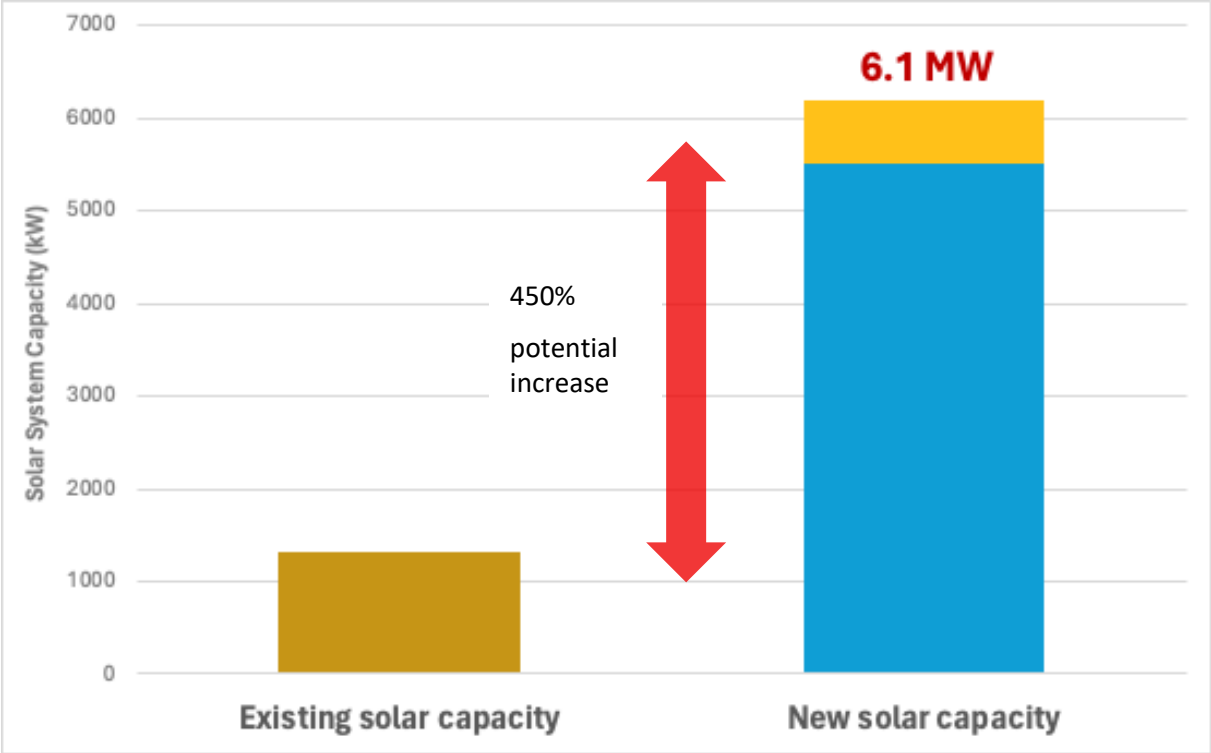
6.2 Future capacity potential

If rooftop solar PV's were installed on all houses, to the full potential identified by this project, then over 6 megawatts of renewable energy generation capacity would be added. If realised, this would produce an equivalent total amount of electricity per annum to that which is currently consumed by all Bouddi households from the grid.

It should be noted that electricity produced by solar panels cannot directly substitute for grid electricity without the use of some storage capacity in the system. In addition, it is likely that electricity consumption will increase in future years as a result of the charging of electric vehicles and consumers switching from gas to electric cooking. Nevertheless, it demonstrates that rooftop solar has the potential to make a very considerable contribution our energy needs without the major

demand on resources from alternative local major renewable energy generation infrastructure projects.

Figure 2: Potential rooftop solar capacity in Bouddi



Note: New solar capacity comprises both the expansion of existing PV systems and new solar rooftop systems.