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Eastern Alliance for Greenhouse Action

**EAGA Group Business Case Report –
Scaling Up Solar on Council Facilities**

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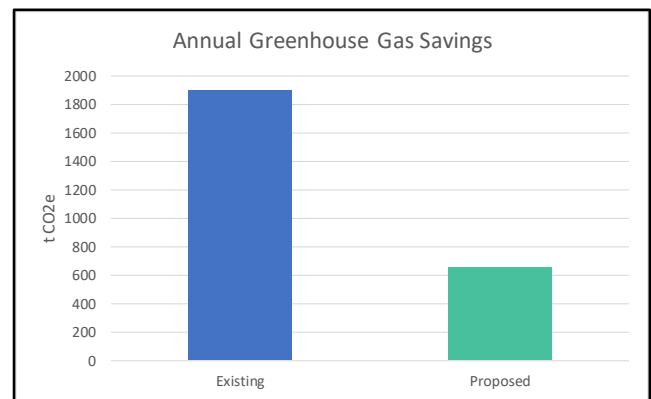
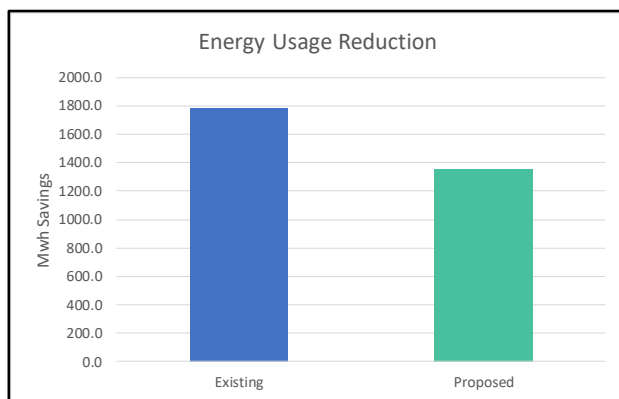
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1. Key Highlights

Significant efficiency and cost benefit outcomes have been identified in the EAGA Group Business Case Report – Scaling Up Solar on Council Facilities:

- The assessment of 53 sites indicates that a total of 935kW of solar could be installed for a capital investment of \$1.7M resulting in average annual savings of \$170,000 per year. Greenhouse emissions of 1,400 tonnes per annum could be avoided as a result.
- Whilst some sites have more attractive returns than others, investing in solar at a portfolio level would provide payback of under 10 years across all sites. This excludes the additional savings that could be captured through a collaborative group procurement and delivery approach as described in Section 5 of this report.
- Installing solar on all sites within the scope of the project would result in energy consumption reductions of 24% and reduce GHG emissions by 70%.¹



- The business case for including solar storage at preferred sites is less attractive, with payback periods of 15 years or longer.
- An assessment of alternative funding solutions indicates that:
 - on-site solar leases may provide an additional opportunity to avoid nearly \$500,000 in capital costs
 - Behind the meter Power Purchase Agreements (PPAs) can potentially reduce \$180,000 in capital cost expenditure.
- An analysis of council joint procurement and bulk purchasing of all the \$1.7M in solar opportunities in one year versus staggering the installations over three or more years would likely:
 - Provide a cost saving benefit of at least \$200,000 in capital costs (equivalent to supporting investment in a further 120kW of solar)

¹ The GHG Emissions reduction is higher than the energy usage reductions due to the significant amount of export at some sites and reflects the total amount of energy produced by the solar installations in comparison to current usage

- Reduce greenhouse gas emissions by a further 150 tonnes
- Reduce council resources utilised in procurement activities by 30% or more

2. Background

The development of this “Business Case for Scaling up Solar on council Facilities” identifies the opportunity for councils to effectively assess and target cost saving opportunities as part of the implementation of broader environmental strategies.

Currently a small amount of funding is allocated to solar PV in asset renewal budgets which typically occurs in an ad-hoc and uncoordinated manner. In the instances where councils have committed additional resources to addressing energy use and costs (e.g. EAGA’s Joint EPC Program) these initiatives typically target the largest consuming sites and exclude smaller, ‘second tier’ facilities where there are also opportunities to save costs.

The project addresses these issues by:

- Identifying, mapping and prioritising the most cost-effective approach for the partner councils to generate/store on site renewable energy and reduce emissions in line with their own emission reduction goals
- Complementing existing energy efficiency upgrades programs (i.e. EPC program) and current collaborative retail energy procurement processes to reduce the risks associated with rising energy costs in council facilities, particularly in second tier facilities
- Fostering innovation and the development of ownership and contract models in sites where there is a split incentive for councils to invest in on site generation (i.e. sporting facilities owned by council where clubs pay utility bills) and extend savings to community groups and rate payers

3. Introduction

This business case report provides an independent and objective financial assessment of the opportunity for scaling-up delivery of behind the meter solar for five members of the Eastern Alliance for Greenhouse Action (EAGA). The project aims to systemically assess and prioritise sites, compare technology, contracting and financing models, and develop procurement and coordinated implementation plans.

DIAGRAM 1 - EAGA Solar Opportunity Business Case Process



EAGA has engaged Frontier Impact Group (FIG) to evaluate solar opportunities at 53 council facilities across the following EAGA councils:

- City of Boroondara
- Knox City Council
- Maroondah City Council
- Monash City Council
- Whitehorse City Council

3.1 Portfolio Type and Types of Funding

Sites captured within the project scope consume between 3MWh and 320 MWh per annum and cover a range of local government assets including child care, sporting club, libraries and other small facilities.

The funding options below were considered for the solar investment opportunities identified in the report:

- Upfront purchase
- Onsite leases
- Behind the meter power purchasing agreements (PPAs).

The upfront purchase is usually most cost effective for councils given their low cost of financing compared to the premium interest rates embedded in leases and PPA's. However, there are several reasons why these may be considered including:

- Avoid significant capital investment potentially allowing financially constrained councils to deliver solar at more sites

- Assisting in the case where a council site is leased to a third party where the benefits of a solar installation energy savings are passed onto the tenant

3.2 Key Assessment Criteria

The key assessment criteria that are used in the business case assessment include the following:

- Energy savings
- GHG reduction
- Return on investment
- Annual cash impacts

3.3 Council Level Site Reporting

The EAGA member business case includes Individual council level reports detailing the business case for solar at council nominated sites. In addition, 2 sites per council were assessed to demonstrate the costs and benefits of investing in solar storage.

This Group Business Case report aggregates these opportunities across the participating EAGA members and presents the case for a regional approach to procurement and project delivery. The report presents the likely efficiencies and economies of scale that could be captured through a collaborative program.

4. Group Solar Summary

Table 1 provides an aggregate summary of solar opportunities for all 53 sites. In total, 935kW of solar could be installed with a capital investment of \$1.7M resulting in average annual savings of \$170,000 per year. Greenhouse emissions of 1,300 tonnes per annum could be avoided as a result. Whilst some sites have much more attractive returns than others, investment at a portfolio level for solar would provide a payback of just under 10 years across all sites. This excludes the additional savings that could be captured through a collaborative group procurement and delivery approach as described in section 5 of this report.

The individual council reports identify specific sites that may not be appropriate for solar implementation, typically due to heavy shading or minimal day time energy usage. They are included in the numbers below but represent a small proportion of overall solar capacity.

TABLE 1: Summary of Solar Opportunity by Council

Council	# sites	Capacity (kW)	Capital Investment (\$'000)	Annual Savings (\$'000)	Average Simple payback (Years)	GHG Savings (tCO2e) p.a.
Boroondara	13	170	315	23.6	10	236
Knox	11	160	294	28.4	9	236
Maroondah	9	108	185	20.4	9	138
Monash	9	200	334	39.9	8	277
Whitehorse	11	297	618	55.8	9	431
Overall	53	935	1,746	168.1	10	1318

Figures 1 and 2 demonstrate installing solar on all sites within the scope of the project which would result in:

- Energy consumption reductions of 24% and
- GHG emissions reductions of nearly 70% (includes exported energy)²

In relation to the site's current energy usage.

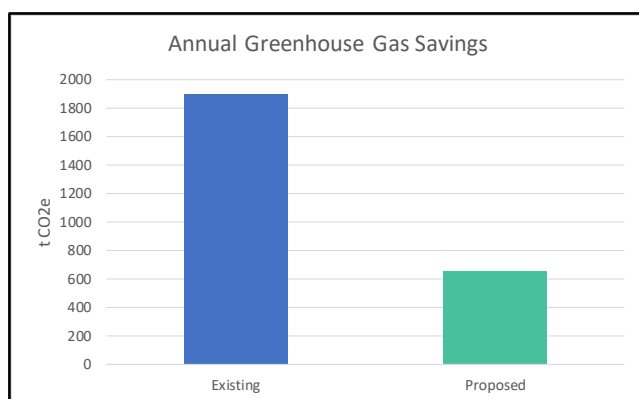


Figure 1 – Annual GHG Reduction

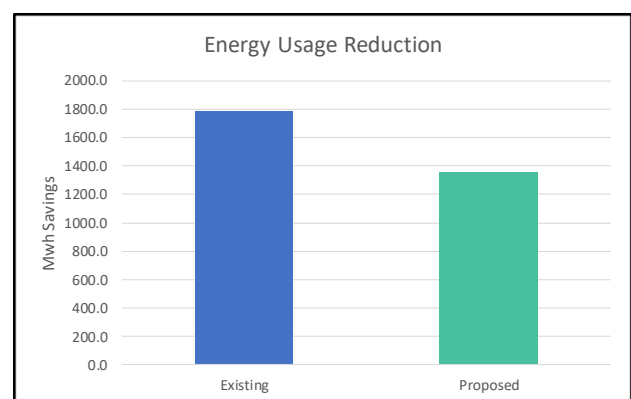


Figure 2 – Annual Energy Savings

² The GHG Emissions reduction is higher than the energy usage reductions due to the significant amount of export at some sites and reflects the total amount of energy produced by the solar installation in comparison to the current energy usage

The business case considers the potential for solar leases and behind the meter PPAs. The sites that appear to be feasible are summarised in Table 2.

The main advantage of these approaches is their ability to avoid significant capital investment, potentially allowing financially constrained councils to deliver solar at more sites. The co-benefits of this are that councils are achieving greater carbon reductions and improved reputation on climate change risk mitigation actions in their community.

The business case assessment has identified that leasing may avoid nearly \$500,000 in capital costs or alternatively PPA financing options may avoid \$177,000 in capital costs.

TABLE 2: Leasing and PPA Opportunities by Council and Community/Council Sites

Council	Leasing Opportunities				PPA Opportunities			
	Council Pays bill?	# sites	Capacity (kW)	Avoided Capital Investment (\$'000)	Council Pays bill?	# sites	Capacity (kW)	Avoided Capital Investment (\$'000)
Boroondara	YES	0	0	\$0	YES	0	0	\$0
	NO	0	0	\$0	NO	0	0	\$0
Knox	YES	3	43	\$72	YES	0	0	\$0
	NO	2	25	\$42	NO	1	15	\$25
Maroondah	YES	1	16	\$26	YES	0	0	\$0
	NO	4	50	\$86	NO	2	20	\$35
Monash	YES	0	0	0	YES	0	0	0
	NO	6	80	\$134	NO	5	70	\$117
Whitehorse	YES	3	60	\$100	YES	0	0	0
	NO	1	15	\$24	NO	0	0	0
Overall		19	289	\$484		8	105	\$177

The mix of sites that are feasible for leasing and PPAs are considered in detail in the individual council reports.

The sites above exclude sites that would not be cash flow positive when entering into a lease or PPA arrangement. The types of sites that would normally fit in this category include:

- Minimal day time usage
- Small electricity usage overall
- Physical constraints such as orientation and shading

5. Solar Storage Opportunities

An assessment of solar storage opportunities was undertaken at two nominated sites for each council with the aim of determining whether solar storage is economical at this time and under what circumstances. Table 3 summarises the solar storage modelling undertaken. It should also be noted

that solar storage will actually reduce the extent of GHG savings as battery operation and storage is not 100% efficient.

Modelling of storage opportunities utilised optimistic assumptions of:

- A 15-year battery life (typically only 10 years³) and
- A capital cost of \$1,000/kWh which is at the lower end of the current pricing spectrum

Even with the optimistic assumptions, there is not a compelling financial case supporting solar storage for sites nominated for analysis.

Table 3 sets out the impact that an additional investment in solar storage has on the return on investment. Whilst it takes longer to achieve payback by adding solar storage, there are some sites that still are able to achieve less than a 10 year payback with a combined solar/storage solution.

However, the following factors may strengthen the case for solar storage:

- Trialling the technology before a larger roll out when the technology becomes more commercial if desired
- Taking advantage of the potential improved reliability associated with batteries
- Securing grant funding to assist in storage Investment which seems to be high on both the Federal and State Government agendas.

Based on this analysis, councils should probably prioritise investment in additional solar before pursuing storage opportunities at these facilities and other sites with similar energy usage profiles.

TABLE 3: Summary of Solar Storage Sites

Council	# sites	Capacity (kW/kWh)	Capital Investment	Annual Savings	Simple payback (Years)
Boroondara	2	35kW/10kWh	\$10,000	\$654	15+
Knox	2	22kW/10kWh	\$10,000	\$338	15+
Maroondah	2	26kW/10kWh	\$10,000	\$675	15
Monash	2	50kW/10kWh	\$10,000	\$647	15+
Whitehorse	2	26kW/10kWh	\$10,000	\$752	14
Overall	10	170kW/50kWh	\$50,000	\$3,066	15+

With current battery technology and the costs of batteries solar, storage would likely be viable only where:

- Solar is economic or near economic in its own right; and
- there are high levels of daytime export; and
- there is a reasonable night time usage; and
- the feed in tariffs are low compared to overnight tariff rates; and
- the price of night time usage electricity is high (e.g. as in single rate pricing arrangements);

³ Whilst 10 years is an appropriate period over which to evaluate solar storage, the analysis was done over 15 years to demonstrate no bias at all against solar storage and to provide a clear indication that payback on storage is well in excess of 10 years.

6. Collaborative Procurement & Delivery Opportunities

Councils can capture economies of scale and implementation efficiencies through taking a collaborative approach to procurement and delivery of projects on the ground. These opportunities could be one or all of the following:

- Bulk purchasing, to optimise reductions in capitals costs
- Joint procurement and centralised contract management
- Taking a portfolio approach to regional roll-out

6.1 Bulk Purchasing

Under a competitive tendering bulk purchase arrangement, FIG has encountered savings in other projects of 10 to 20% over the prices quoted for individual sites and as such would expect similar reductions in the capital costs used in the modelling. This will increase the financial attractiveness of scaling up solar that has been captured in the economic assessments undertaken so far.

Purchasing all the \$1.7M in solar opportunities identified in the site analysis in one year, rather than staggering over 3 or more years, would likely provide a cost saving benefit of at least \$200,000 in lower capital costs. This is equivalent to supporting investment in a further 120kW of solar which would reduce greenhouse gas emissions by a further 150 tonnes per annum.

6.2 Portfolio Approach

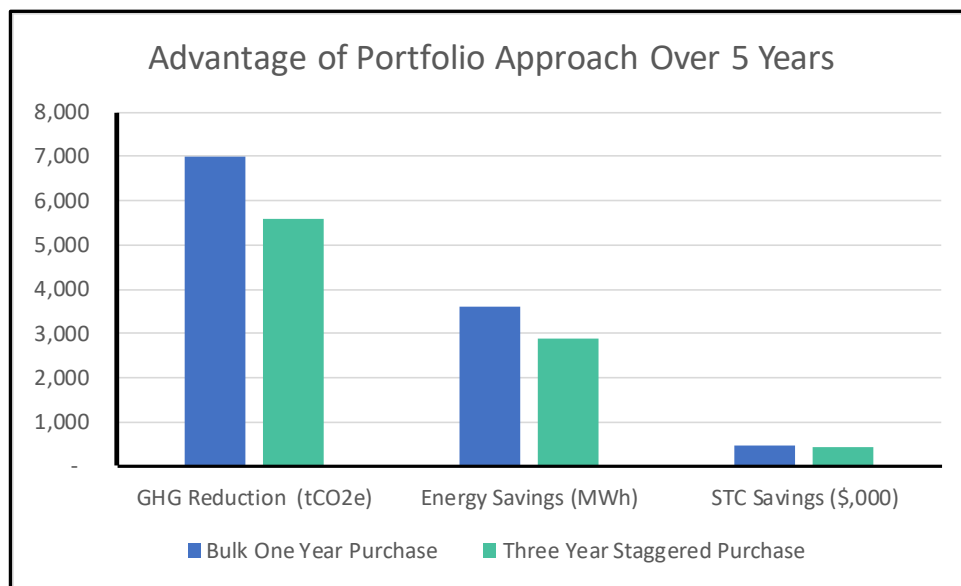
Taking a portfolio approach to investing in solar will increase the immediate GHG emission reduction benefits and allow better capture of bulk purchase benefits. This approach would allow high return individual solar projects to effectively increase the returns on other lower return projects. This approach would only be adopted if councils support this form of cross-subsidisation.

The added advantage is that by taking early action the group can speed up the implementation of solar which will provide an additional upfront \$40 per kW saving of STC rebates as the value of the STC rebates currently reduce over time.

Figure 3 over shows the benefits of a portfolio approach and purchasing all of the solar requirements in one year compared to staggering purchase and implementation over 3 years with:

- A 25% comparative higher reduction in greenhouse gases over 5 years
- A 25% comparative increase in energy savings
- A \$40,000 saving through additional STC rebates

Figure 3: Illustration of Comparative Advantage of Differing Implementation Approaches



6.3 Joint Procurement and Centralised Contract Management

Table 4 estimates the human resource requirements associated with solar procurement under four scenarios. The first two scenarios demonstrate that individual councils can nearly double time efficiencies through procuring and managing multiple sites projects. Time efficiency gains can be further leveraged through joint procurement and centralised contract management at the multi-council level. This scenario assumes the adoption of a shared serviced model that leverages technical specialists/skills which is an established and proven approach within EAGA councils.

The graphic over sets out four different scenarios with the last scenario achievable under the analysis undertaken in this group business case study.

TABLE 4: Joint Procurement and Centralised Contract Management Human Resource Scenarios⁴

Human resources (hours)	SCENARIO			
	Single council, 1 system (5kW), less than \$10K	Single council, 10 systems (70 kW), less than \$120K	Five councils, 50 systems (350kW), greater than \$500K, joint procurement	Five councils, 50 systems (350kW), greater than \$500K, joint procurement, centralised delivery
Director	0	0	2.5	2.5
Procurement officer	8	16	24	24
Co-ordinator / manager	4	8	12	12
Consultant / provider	8	56	280	196
Project officer (sustainability)	8	56	280	196
Project manager (assets)	8	56	280	196
Centralised delivery - EE specialist (i.e. EAGA)	0	0	0	100
Total hours	36	192	878.5	626.5
Efficiency (hrs/kW)	7.2	2.7	2.5	1.8
Efficiency (hrs/sites)	36	19	18	13
Comments	Business as usual, assumes just one written quote required for a 5kW system under \$10K (\$1,950/KW)	A marginal increase in procurement time for three detailed quotes, assumes efficiency gain of 30% for internal management time for bulk implementation/delivery	Assume joint public tender of 50 systems across five partners with Director level sign off. Assumes same amount of time to manage delivery for isolated or independent installations within each council	Assumes joint public tender of 50 systems across five partners with Director level sign off. Centralised delivery via a shared service model captures 30% time efficiency on managing implementation across partners for internal staff

⁴ This table was prepared by EAGA

7. Summary

The analysis work undertaken and summarised in the EAGA Group Business Case report provides a strong case for councils to invest in solar PV behind the meter installations and to realise considerable savings. Those savings can either be reinvested in further solar installations or utilised in further business initiatives. The additional co-benefits include increased renewable energy utilisation, reduced greenhouse gas emissions as well as greater stability of energy costs for councils. This has considerable community benefits with the EAGA councils showing leadership in climate change mitigation and being able to achieve this within a good economic business case.

The additional work undertaken on the case for councils to jointly purchase, demonstrates the opportunity to generate greater efficiencies and enhance the financial and environmental savings that can be achieved. The scaling up of solar, by taking a portfolio approach to investment, provides an opportunity to immediately increase the financial, environmental and social benefits to the Council community.