



**ATTACHMENTS TO REPORTS OF THE BLAYNEY SHIRE COUNCIL MEETING
HELD ON MONDAY 20 JULY 2020**

CORPORATE SERVICES REPORTS

10 2020/21 Councillor and Mayoral Remuneration

**Attachment 1: Local Government Remuneration Tribunal Report
and Determination..... 1**

INFRASTRUCTURE SERVICES REPORTS

14 Renewable Energy Action Plan Review

Attachment 1: Renewable Energy Action Plan..... 25

**Local
Government
Remuneration
Tribunal**

**Annual Report and
Determination**

*Annual report and determination under sections 239 and
241 of the Local Government Act 1993*

**10 June
2020**

[NSW Remuneration Tribunals website](#)

Local Government Remuneration Tribunal

Contents

Contents	1
Executive Summary	2
Section 1 Introduction	4
Section 2 2019 Determination	4
Section 3 Review of categories	5
Scope of review	5
Submissions received - categorisation	6
Findings - categorisation	7
Allocation of councils into categories	9
Section 4 Fees	13
Section 5 Other matters	15
Conclusion	16
Section 6 Determinations	17
Determination No. 1- Determination Pursuant to Section 239 of Categories of Councils and County Councils Effective From 1 July 2020	17
Table 1: General Purpose Councils - Metropolitan	17
Table 2: General Purpose Councils – Non-Metropolitan	18
Table 3: County Councils	18
Determination No. 2- Determination Pursuant to Section 241 of Fees for Councillors and Mayors	19
Table 4: Fees for General Purpose and County Councils	19
Appendices	20
Appendix 1 Criteria that apply to categories	20

Local Government Remuneration Tribunal

Executive Summary

The *Local Government Act 1993* (the LG Act) requires the Local Government Remuneration Tribunal (the Tribunal) to report to the Minister for Local Government by 1 May each year as to its determination of categories of councils and the maximum and minimum amounts of fees to be paid to mayors, councillors, and chairpersons and members of county councils.

In response to the COVID-19 pandemic the Minister for Local Government, the Hon Shelley Hancock MP, made the *Local Government (General) Amendment (COVID-19) Regulation 2020* which extends the time for the making of this determination to no later than 1 July 2020.

Categories

Section 239 of the LG Act requires the Tribunal to determine the categories of councils and mayoral offices at least once every 3 years. The Tribunal last undertook a significant review of the categories and the allocation of councils into each of those categories in 2017. In accordance with the LG Act the Tribunal undertook a review of the categories and allocation of councils into each of those categories as part of the 2020 review.

In reviewing the categories, the Tribunal examined a range of statistical and demographic data and considered the submissions of councils and Local Government NSW (LGNSW). Having regard to that information, the Tribunal has determined to retain a categorisation model which differentiates councils primarily on the basis of their geographic location, and the other factors including population, the sphere of the council's economic influence and the degree of regional servicing.

For the Metropolitan group the Tribunal has determined to retain the existing categories and has amended the population criteria applicable to Metropolitan Large and Metropolitan Medium. For the Non-Metropolitan group, the Tribunal has determined to: create two new categories - Major Strategic Area and Regional Centre; rename one category - Regional City to Major Regional City; and revise the criteria for some of the existing categories to account for the new categories.

In accordance with section 239 of the LG Act the categories of general purpose councils are determined as follows:

Metropolitan

- Principal CBD
- Major CBD
- Metropolitan Large
- Metropolitan Medium
- Metropolitan Small

Non-metropolitan

- Major Regional City
- Major Strategic Area
- Regional Strategic Area
- Regional Centre
- Regional Rural
- Rural

Local Government Remuneration Tribunal

Fees

The Tribunal has determined that there will be no increase in the minimum and maximum fees applicable to each existing category. For the new categories, the Tribunal has determined fees having regard to relevant relativities.

Local Government Remuneration Tribunal

Section 1 Introduction

1. Section 239 of the LG Act provides for the Tribunal to determine the categories of councils and mayoral offices and to place each council and mayoral office into one of those categories. The categories are to be determined at least once every 3 years.
2. Section 241 of the LG Act provides for the Tribunal to determine, not later than 1 May in each year, for each of the categories determined under section 239, the maximum and minimum amount of fees to be paid to mayors and councillors of councils, as well as chairpersons and members of county councils.
3. In response to the COVID-19 pandemic the Minister for Local Government, the Hon Shelley Hancock MP, made the *Local Government (General) Amendment (COVID-19) Regulation 2020* which extends the time for the making of this determination to no later than 1 July 2020.
4. In determining the maximum and minimum fees payable in each of the categories, the Tribunal is required, pursuant to section 242A (1) of the LG Act, to give effect to the same policies on increases in remuneration as those of the Industrial Relations Commission. The current policy on wages is that public sector wages cannot increase by more than 2.5 per cent, and this includes the maximum and minimum fees payable to councillors and mayors and chairpersons and members of county councils.
5. The Tribunal is however able to determine that a council can be placed in another existing or a new category with a higher range of fees without breaching the Government's wage policy pursuant to section 242A (3) of the LG Act.
6. The Tribunal's determinations take effect from 1 July in each year.

Section 2 2019 Determination

7. The Tribunal considered ten requests for re-categorisation. At the time of making the determination the Tribunal had available to it the 30 June 2018 population data. In reviewing the submissions received the Tribunal applied a multi variable approach assessing each council against all the criteria (not only population) for the requested category and the

Local Government Remuneration Tribunal

relativities within the categories.

8. The Tribunal found that the allocation of councils into the current categories was appropriate but again noted that some of those councils seeking to be moved were likely to meet the criteria for re-categorisation in future determinations.
9. The Tribunal's 2019 Determination was made on 15 April 2019 and provided a general increase of 2.5 per cent which was consistent with the Government's policy on wages.
10. The Tribunal's findings for North Sydney was not addressed in the 2019 Determination and is dealt with in Section 3 below.

Section 3 Review of categories

Scope of review

11. Section 239 of the LG Act requires the Tribunal to determine the categories of councils and mayoral offices at least once every 3 years. The Tribunal last reviewed the categories during the 2017 annual review.
12. In determining categories, the Tribunal is required to have regard to the following matters that are prescribed in section 240 of the LG Act:

"240 (1)

- *the size of areas*
- *the physical terrain of areas*
- *the population of areas and the distribution of the population*
- *the nature and volume of business dealt with by each Council*
- *the nature and extent of the development of areas*
- *the diversity of communities served*
- *the regional, national and international significance of the Council*
- *such matters as the Remuneration Tribunal considers relevant to the provision of efficient and effective local government*
- *such other matters as may be prescribed by the regulations."*

13. The Tribunal foreshadowed in the 2019 Determination of its intention to undertake a review of the categories in accordance with the LG Act:

Local Government Remuneration Tribunal

“12. A few submissions have suggested alternative categorisation models. The Tribunal will consider this in detail in the 2020 review. The Tribunal intends to commence the 2020 annual review earlier than usual to ensure there is time to review the existing model and to examine alternatives. The Tribunal is of the preliminary view that a case may exist to revise the number of categories, and their applicable criteria, particularly for regional and rural councils.”

14. The Tribunal wrote to all mayors in October 2019 advising of the commencement of the 2020 review and invited submissions from councils on the following matters:

1. *Proposed classification model and criteria*
2. *Allocation in the proposed classification model*
3. *Range of fees payable in the proposed classification model*
4. *Other matters*

15. The Tribunal also wrote to the President of Local Government NSW (LGNSW) in similar terms, and subsequently met with the President and Chief Executive of LGNSW. The Tribunal thanks the President and Chief Executive for making the time to meet with the Tribunal.

16. The Tribunal also met with the Mayors and General Managers of Central Coast and Maitland Councils and the Tribunal thanks them for making the time to meet with the Tribunal.

Submissions received - categorisation

17. The Tribunal received 38 submissions from individual councils, a submission from LGNSW and a submission from Regional Cities NSW. Most of the submissions addressed the Tribunal’s proposed categorisation model, the allocation of councils into those categories and fees. A summary of the matters raised, and the Tribunal’s consideration of those matters is outlined below.

Proposed classification model and criteria

18. Submissions from 20 councils and LGNSW supported the Tribunal’s proposal to create a new category of Regional Centre for the Non-Metropolitan group and were of the view

Local Government Remuneration Tribunal

that the range of fees would be somewhere between Regional Strategic Area and Regional Rural.

19. Several submissions from Non-Metropolitan councils proposed alternative changes to the model such as, the merging of the Regional Rural and Rural categories, the creation of a new 'Regional' category and the renaming of Regional City to 'Gateway City' or 'Nationally Significant Regional City'.
20. Four submissions from Metropolitan councils sought the creation of a new Metropolitan category with the title of 'Metropolitan Large – Growth Area' or 'Metropolitan Major'.

Allocation in the proposed classification model

21. The Tribunal proposed to allocate 24 councils in the proposed new category of Regional Centre. Of these 24 councils, 14 provided a submission - 11 councils noted or supported their allocation as Regional Centre and 3 councils sought re-categorisation as Regional Strategic Area.
22. In addition to the 3 councils, another 17 councils sought re-categorisation into one of the categories included in the Tribunal's proposed model or into requested alternative new categories. The 20 re-categorisation requests are addressed in Section 3 – Allocation of councils into categories.

Findings - categorisation

23. The Tribunal acknowledges the significant number of submissions received this year and is grateful for the positive response and effort made in those submissions to comment on the proposed categorisation model and suggest alternatives for consideration.
24. There has been broad support to the Tribunal's proposal to create a new Non-Metropolitan category of Regional Centre and rename Regional City to Major Regional City. On that basis the Tribunal will determine the new category of Regional Centre and rename Regional City to Major Regional City. There have been some new criteria added to the category of Major Regional City to acknowledge the broader national and state focus of these cities which impact upon the operations of the council.
25. After considering the views in submissions the Tribunal re-examined the Non-Metropolitan category of Regional Strategic Area in terms of its criteria and the

Local Government Remuneration Tribunal

characteristics of the councils allocated into it. The Tribunal concluded that the characteristics of the two councils allocated to this category – Central Coast and Lake Macquarie – were sufficiently different to warrant further differentiation. Central Coast has a population greater than 340,000 making it the third largest council by population in NSW and the sixth largest council by population in Australia. It also has the second largest revenue base of all councils in NSW. Central Coast is a significant contributor to the regional economy associated with proximity to and connections with Sydney and the Hunter Region. A new category has been created for Central Coast Council and is to be titled Major Strategic Area. The criteria for this category include local government areas with a minimum population of 300,000, and larger scale and scope to those categorised as Regional Strategic Area. There is no change to the population threshold for the category of Regional Strategic Area, however the other criteria have been amended to account for other changes in the Non-Metropolitan group.

26. The Tribunal's preliminary thinking was that no changes to the categories and criteria for Metropolitan and County Councils were warranted. In respect to the categories, the Tribunal continues to hold that view. In respect to the criteria, after considering submissions the Tribunal re-examined the population criteria for both the Metropolitan Medium and Metropolitan Large categories.
27. North Sydney and Willoughby councils again put forward cases for non-resident workers to be included in the population for Metropolitan Medium. To examine this claim more broadly the Tribunal reviewed non-resident working populations across all metropolitan councils. After careful consideration the Tribunal concluded there was a strong case to recognise the impact on councils of serving significant numbers of non-resident workers. The criteria now provide for councils with a non-resident working population of 50,000 or above to move to another category if their combined resident and non-resident working population exceeds the minimum population threshold. The criteria for Metropolitan Medium and Metropolitan Large have been amended as follows:

Metropolitan Large

Councils may also be categorised as Metropolitan Large if their residential population combined with their non-resident working population exceeds 200,000. To satisfy this criteria the non-resident working population must exceed 50,000.

Metropolitan Medium

Local Government Remuneration Tribunal

Councils may also be categorised as Metropolitan Medium if their residential population combined with their non-resident working population exceeds 100,000. To satisfy this criteria the non-resident working population must exceed 50,000.

28. In making this determination the Tribunal reviewed the criteria for other Metropolitan categories and found that the current population thresholds are appropriate.

29. The revised model which will form the basis of this determination is as follows:

Metropolitan	Non-Metropolitan
<ul style="list-style-type: none">• Principal CBD• Major CBD• Metropolitan Large• Metropolitan Medium• Metropolitan Small	<ul style="list-style-type: none">• Major Regional City• Major Strategic Area• Regional Strategic Area• Regional Centre• Regional Rural• Rural

30. The criteria for each of the categories are outlined at Appendix 1. Minor changes have been made to the criteria for some of the existing categories to account for the new categories. As with the previous categorisation model the predominant factor to guide categorisation is population. Other common features of councils within those categories are also broadly described. These criteria have relevance when population alone does not adequately reflect the status of one council compared to others with similar characteristics. In some instances, the additional criteria will be significant enough to warrant the categorisation of a council into a group with a higher population threshold.

31. There is no change to the categorisation of county councils.

Allocation of councils into categories

32. In accordance with section 239 of the LG Act the Tribunal is required to allocate each of the councils into one of the categories. The allocation of councils is outlined in Determination No. 1 of Section 6.

33. Twenty (20) submissions received from councils requested re-categorisation and were considered having regard to the case put forward and the criteria for each category.

34. At the time of making the determination the Tribunal had available to it the 30 June 2019 population data released by the Australian Bureau of Statistics (ABS) on 25 March 2020.

Local Government Remuneration Tribunal

35. A summary of the Tribunal's findings for each of the applications for re-categorisation is outlined in the following paragraphs.

Metropolitan Large Councils

36. Canterbury-Bankstown, Penrith and Blacktown have requested the creation of new categories into which they be re-categorised. Canterbury-Bankstown has requested a new category named 'Metropolitan Major'. Penrith and Blacktown have requested a new category named 'Metropolitan Large – Growth Centre'.

37. The Tribunal considers that Canterbury-Bankstown, Penrith and Blacktown are appropriately categorised as Metropolitan Large.

Metropolitan Medium Councils

38. Inner West has again sought to be re-categorised as Metropolitan Large. The Tribunal outlined in the 2019 determination that Inner West's June 2018 population of 198,024 was below the indicative population of other Metropolitan Large councils, but based on growth predictions it was likely Inner West would meet the minimum population threshold for inclusion in Metropolitan Large in 2020.

39. Inner West's June 2019 population is 200,811 and the council now meets the criteria to be categorised as Metropolitan Large.

40. Ryde has sought to be re-categorised as Metropolitan Large on the basis of the large non-resident working population in the Macquarie Park Business Park (MPBP) precinct, the economic output of the precinct and its array of significant regional services.

41. The Hills has requested the creation of a new category named 'Metropolitan Growth' and that it be categorised into it. Recognition is sought for councils experiencing significant growth. The submission also notes that while Ryde does not meet the residential population criteria for Metropolitan Large it meets the other relevant criteria.

42. As previously discussed, the Tribunal has reviewed the impact of large numbers of non-residents visitors and workers and revised the criteria for Metropolitan Large Councils. Ryde and The Hills have been assessed against the new revised criteria being - *Councils may also be categorised as Metropolitan Large if their residential population combined*

Local Government Remuneration Tribunal

with their non-resident working population exceeds 200,000. To satisfy this criteria the non-resident working population must exceed 50,000.

43. Both Ryde and The Hills have a non-resident working population of more than 50,000 and combined with their resident populations they meet the revised criteria for inclusion in the group of Metropolitan Large councils. Both councils also provide a sphere of economic influence and provide regional services considered akin to those of other metropolitan large councils.

Metropolitan Small Councils

44. Camden, Willoughby and North Sydney have sought to be re-categorised as Metropolitan Medium.
45. The Tribunal outlined in the 2019 determination that Camden's June 2018 population of 94,159 was below the indicative population of other Metropolitan Medium councils, but based on growth predictions it was likely Camden would meet the minimum population threshold for inclusion in Metropolitan Medium in 2020.
46. Camden's June 2019 population is 101,437 and the council now meets the criteria to be categorised as Metropolitan Medium.
47. The Tribunal has previously considered requests from Willoughby and North Sydney Councils to be re-categorised as Metropolitan Medium in 2018 and 2019. Both Councils have populations within the indicative population range for Metropolitan Small councils but well below that of Metropolitan Medium. Both Councils have argued that their scale of operations, degree of regional servicing and high number of non-resident visitors and workers more closely align with the characteristics of Metropolitan Medium Councils.
48. As previously discussed, the Tribunal has reviewed the impact of large numbers of non-resident workers and revised the criteria for Metropolitan Medium Councils. Willoughby and North Sydney have been assessed against the new revised criteria being - *Councils may also be categorised as Metropolitan Medium if their residential population combined with their non-resident working population exceeds 100,000. To satisfy this criteria the non-resident working population must exceed 50,000.*
49. Both Willoughby and North Sydney have a non-resident working population of more than 50,000 and combined with their resident populations they meet the revised criteria for inclusion in the group of Metropolitan Medium councils. Both councils also meet the

Local Government Remuneration Tribunal

other criteria having: a significant regional role as the third and fourth biggest CBDs in Sydney after Sydney City and Parramatta; strategic significance as either transport hubs, business, cultural or employment centres.

50. Both North Sydney and Willoughby meet the criteria for re-categorisation as Metropolitan Medium.

Regional City Councils

51. Newcastle and Wollongong have proposed new categories into which they have sought to be re-categorised. Newcastle has proposed a new category named 'Gateway City' and Wollongong a new category named 'Nationally Significant Regional City'.
52. The Tribunal's revised categorisation model re-named the existing category of Regional City to Major Regional City and found no case to adopt the new categories proposed by Newcastle and Wollongong. The Tribunal considers that both councils are appropriately categorised as Major Regional City.

Regional Strategic Area Councils

53. Central Coast has again sought to be re-categorised as Regional City. The council submits that its characteristics are more like Newcastle and Wollongong (Regional City) and substantially different to Lake Macquarie (Regional Strategic Area).
54. Central Coast does not meet the broader criteria applicable to other councils in the category of Major Regional City - being Newcastle and Wollongong. As previously discussed a new category - Major Strategic Area - has been created to recognise the scale and unique position of Central Coast Council to both the Sydney and Hunter regions.

Local Government Remuneration Tribunal

Regional Rural Councils

55. Bathurst, Maitland, and Shoalhaven noted that under the Tribunal's proposed allocation of councils they would be allocated to the new Regional Centre category, however the three councils sought to be re-categorised as Regional Strategic Area.
56. Bathurst's June 2019 population of 43,618, Maitland's June 2019 population of 85,166 and Shoalhaven's June 2019 population of 105,648 are below the indicative population of Regional Strategic Area councils. The Tribunal considers that Bathurst, Maitland and Shoalhaven are all appropriately categorised as Regional Centre.
57. Bega, Byron and Eurobodalla have sought to be re-categorised to the new Regional Centre category. Bega's June 2019 population of 34,476, Byron's June 2019 population of 35,081 and Eurobodalla's June 2019 population of 38,473 are significantly below the indicative population of Regional Centre councils. These councils have not demonstrated the additional criteria to warrant inclusion in the Regional Centre group.

Rural Councils

58. Muswellbrook and Federation have again sought to be re-categorised as Regional Rural. Muswellbrook's June 2019 population of 16,377 and Federation's June 2019 population of 12,437 are well below the indicative population of Regional Rural councils. Both councils have not demonstrated the additional criteria to warrant inclusion in the Regional Rural group.

Section 4 Fees

59. In determining the maximum and minimum fees payable in each of the categories, the Tribunal is required, pursuant to section 242A of the LG Act, to give effect to the same policies on increases in remuneration as those that the Industrial Relations Commission is required to give effect to under section 146C of the *Industrial Relations Act 1996* (IR Act), when making or varying awards or orders relating to the conditions of employment of public sector employees.
60. The current policy on wages pursuant to section 146C(1)(a) of the IR Act is articulated in the *Industrial Relations (Public Sector Conditions of Employment) Regulation 2014* (IR Regulation 2014). When the Tribunal undertook the annual review the effect of the IR Regulation 2014

Local Government Remuneration Tribunal

was that public sector wages could not increase by more than 2.5 per cent, and this includes the maximum and minimum fees payable to councillors and mayors and chairpersons and members of county councils.

61. The Tribunal received submissions for consideration during the annual review in late 2019. Those submissions were made prior to the pandemic and overwhelmingly supported a 2.5 per cent increase in the ranges of fees which was consistent with the Government's wages policy at the time. A summary of those submissions is outlined in the paragraphs 62 and 63.
62. The LGNSW submission requested that the Tribunal increase fees by the allowable maximum of 2.5 per cent. The submission also reiterated the long-held view that fees for mayors and councillors are well behind, the current fee structure fails to recognise the work of elected representatives and is inadequate to attract and retain individuals with the necessary skills and experience. Comparative information was again presented in respect to board fees, fees paid to mayors and councillors of councils in Queensland, and salaries for members of Parliament. The LGNSW submission also noted the Tribunal's previous observations that it does not have jurisdiction on the matter of non-payment of superannuation but again invited the Tribunal to make a recommendation to the NSW State Government for councillor remuneration to include a payment for superannuation equivalent to the Superannuation Guarantee.
63. Several submissions sought an increase to the allowable maximum of 2.5 per cent acknowledging the restrictions on the Tribunal from the Government's wages policy. Several submissions sought an increase greater than 2.5 per cent by requesting that fees be aligned to councillor fees in Victoria and Queensland or to NSW members of Parliament.
64. Since receiving and considering those submissions there have been a number of factors which have influenced the Tribunal's views in regard to the annual increase. These include the impact of the bushfires and the current COVID-19 pandemic on the state and federal economies and the wellbeing of our communities.
65. To ensure the Tribunal had sufficient time to consider the COVID-19 pandemic the Minister for Local Government, the Hon Shelley Hancock MP, made the *Local Government*

Local Government Remuneration Tribunal

(General) Amendment (COVID-19) Regulation 2020 which extends the time for the making of this determination to no later than 1 July 2020.

66. On 29 May 2020 the Premier, the Hon Gladys Berejiklian MP, made the *Industrial Relations (Public Sector Conditions of Employment) Amendment (Temporary Wages Policy) Regulation 2020*. That regulation amended the IR Regulation 2014 to implement a temporary wages policy, being a 12-month pause on wage increases for public sector employees covered by the IR Act.
67. On 2 June 2020 the amending regulation was disallowed by the Legislative Council. The effect of that disallowance is that the Government's wages policy which provides for increases of up to 2.5 per cent continues to apply.
68. While the Tribunal is required to give effect to the Government's wages policy in the making of this determination, it is open to the Tribunal to determine an increase of up to 2.5 per cent or no increase at all. Given the current economic and social circumstances, the Tribunal has determined that there be no increase in the minimum and maximum fees applicable to each existing category.
69. The minimum and maximum fees for the two new categories of Major Strategic Area and Regional Centre have been set having regard to relevant relativities. The new category of Major Strategic Area has equivalent annual fees to Major Regional City. The new category of Regional Centre has annual fees between those applicable to Regional Strategic Area and Regional Rural. In accordance with the LG Act councils can be placed in a new category with a higher range of fees without breaching the Government's wages policy.

Section 5 Other matters

70. The Tribunal addressed the matter of non-payment of superannuation in the 2019 Determination:

"40. The submission from LGNSW and several councils have again raised the matter of the non-payment of superannuation. The Tribunal addressed this matter in the 2018 determination as outline below and will make no further comment:

Local Government Remuneration Tribunal

“54. The matter of the non-payment of superannuation has been previously raised in submissions to the Tribunal and is not a matter for the Tribunal to determine. Section 251 of the LG Act confirms that councillors are not employees of the council and the fee paid does not constitute a salary under the Act. The Tribunal notes that the Australian Tax Office has made a definitive ruling (ATO ID 2007/205) that allows councillors to redirect their annual fees into superannuation on a pre-tax basis and is a matter for councils (Ref: Councillor Handbook, Oct 2017, Office of Local Government p.69).”

71. By way of clarification, the amount redirected under this ruling is funded from the annual fees as determined by Tribunal – it is not an additional amount funded by the council.
72. The Tribunal notes that the Hon Shelly Hancock MP, Minister for Local Government released the *Councillor superannuation discussion paper* in March 2020, to seek the views of councils and their communities on whether councillors should receive superannuation payments. The deadline for submissions was Friday 8 May 2020.

Conclusion

73. The Tribunal’s determinations have been made with the assistance of the two Assessors - Mr Brian Bell and Mr Tim Hurst. The allocation of councils into each of the categories, pursuant to section 239 of the LG Act, is outlined in Determination No. 1. The maximum and minimum fees paid to councillors and mayors and members and chairpersons of county councils, pursuant to section 241 of the LG Act, are outlined in Determination No. 2.

The Local Government Remuneration Tribunal

Signed

Dr Robert Lang

Dated: 10 June 2020

Local Government Remuneration Tribunal

Section 6 Determinations

Determination No. 1- Determination Pursuant to Section 239 of Categories of Councils and County Councils Effective From 1 July 2020

Table 1: General Purpose Councils - Metropolitan

Principal CBD (1)	Major CBD (1)
Sydney	Parramatta

Metropolitan Large (11)	Metropolitan Medium (9)
Blacktown	Bayside
Canterbury-Bankstown	Campbelltown
Cumberland	Camden
Fairfield	Georges River
Inner West	Hornsby
Liverpool	Ku-ring-gai
Northern Beaches	North Sydney
Penrith	Randwick
Ryde	Willoughby
Sutherland	
The Hills	

Metropolitan Small (8)
Burwood
Canada Bay
Hunters Hill
Lane Cove
Mosman
Strathfield
Waverley
Woollahra

Local Government Remuneration Tribunal

Table 2: General Purpose Councils – Non-Metropolitan

Major Regional City (2)	Major Strategic Area (1)	Regional Strategic Area (1)
Newcastle	Central Coast	Lake Macquarie
Wollongong		

Regional Centre (24)		Regional Rural (13)
Albury	Mid-Coast	Bega
Armidale	Orange	Broken Hill
Ballina	Port Macquarie-Hastings	Byron
Bathurst	Port Stephens	Eurobodalla
Blue Mountains	Queanbeyan-Palerang	Goulburn Mulwaree
Cessnock	Shellharbour	Griffith
Clarence Valley	Shoalhaven	Kempsey
Coffs Harbour	Tamworth	Kiama
Dubbo	Tweed	Lithgow
Hawkesbury	Wagga Wagga	Mid-Western
Lismore	Wingecarribee	Richmond Valley Council
Maitland	Wollondilly	Singleton
		Snowy Monaro

Rural (57)			
Balranald	Cootamundra-Gundagai	Junee	Oberon
Bellingen	Cowra	Kyogle	Parkes
Berrigan	Dungog	Lachlan	Snowy Valleys
Bland	Edward River	Leeton	Temora
Blayney	Federation	Liverpool Plains	Tenterfield
Bogan	Forbes	Lockhart	Upper Hunter
Bourke	Gilgandra	Moree Plains	Upper Lachlan
Brewarrina	Glen Innes Severn	Murray River	Uralla
Cabonne	Greater Hume	Murrumbidgee	Walcha
Carrathool	Gunnedah	Muswellbrook	Walgett
Central Darling	Gwydir	Nambucca	Warren
Cobar	Hay	Narrabri	Warrumbungle
Coolamon	Hilltops	Narrandera	Weddin
Coonamble	Inverell	Narromine	Wentworth
			Yass

Table 3: County Councils

Water (4)	Other (6)
Central Tablelands	Castlereagh-Macquarie
Goldenfields Water	Central Murray
Riverina Water	Hawkesbury River
Rous	New England Tablelands
	Upper Hunter
	Upper Macquarie

Local Government Remuneration Tribunal

Determination No. 2- Determination Pursuant to Section 241 of Fees for Councillors and Mayors

Pursuant to s.241 of the *Local Government Act 1993*, the annual fees to be paid in each of the categories to Councillors, Mayors, Members and Chairpersons of County Councils effective on and from 1 July 2020 are determined as follows:

Table 4: Fees for General Purpose and County Councils

Category		Councillor/Member Annual Fee		Mayor/Chairperson Additional Fee*	
		Minimum	Maximum	Minimum	Maximum
General Purpose Councils - Metropolitan	Principal CBD	27,640	40,530	169,100	222,510
	Major CBD	18,430	34,140	39,160	110,310
	Metropolitan Large	18,430	30,410	39,160	88,600
	Metropolitan Medium	13,820	25,790	29,360	68,530
	Metropolitan Small	9,190	20,280	19,580	44,230
General Purpose Councils - Non-metropolitan	Major Regional City	18,430	32,040	39,160	99,800
	Major Strategic Area	18,430	32,040	39,160	99,800
	Regional Strategic Area	18,430	30,410	39,160	88,600
	Regional Centre	13,820	24,320	28,750	60,080
	Regional Rural	9,190	20,280	19,580	44,250
	Rural	9,190	12,160	9,780	26,530
County Councils	Water	1,820	10,140	3,920	16,660
	Other	1,820	6,060	3,920	11,060

*This fee must be paid in addition to the fee paid to the Mayor/Chairperson as a Councillor/Member (s.249(2)).

The Local Government Remuneration Tribunal

Signed

Dr Robert Lang

Dated: 10 June 2020

Local Government Remuneration Tribunal

Appendices

Appendix 1 Criteria that apply to categories

Principal CBD

The Council of the City of Sydney (the City of Sydney) is the principal central business district (CBD) in the Sydney Metropolitan area. The City of Sydney is home to Sydney's primary commercial office district with the largest concentration of businesses and retailers in Sydney. The City of Sydney's sphere of economic influence is the greatest of any local government area in Australia.

The CBD is also host to some of the city's most significant transport infrastructure including Central Station, Circular Quay and International Overseas Passenger Terminal. Sydney is recognised globally with its iconic harbour setting and the City of Sydney is host to the city's historical, cultural and ceremonial precincts. The City of Sydney attracts significant visitor numbers and is home to 60 per cent of metropolitan Sydney's hotels.

The role of Lord Mayor of the City of Sydney has significant prominence reflecting the CBD's importance as home to the country's major business centres and public facilities of state and national importance. The Lord Mayor's responsibilities in developing and maintaining relationships with stakeholders, including other councils, state and federal governments, community and business groups, and the media are considered greater than other mayoral roles in NSW.

Major CBD

The Council of the City of Parramatta (City of Parramatta) is the economic capital of Greater Western Sydney and the geographic and demographic centre of Greater Sydney. Parramatta is the second largest economy in NSW (after Sydney CBD) and the sixth largest in Australia.

As a secondary CBD to metropolitan Sydney the Parramatta local government area is a major provider of business and government services with a significant number of organisations relocating their head offices to Parramatta. Public administration and safety have been a growth sector for Parramatta as the State Government has promoted a policy of moving government agencies westward to support economic development beyond the Sydney CBD.

The City of Parramatta provides a broad range of regional services across the Sydney Metropolitan area with a significant transport hub and hospital and educational facilities. The City of Parramatta is home to the Westmead Health and Medical Research precinct which represents the largest concentration of hospital and health services in Australia, servicing Western Sydney and providing other specialised services for the rest of NSW.

The City of Parramatta is also home to a significant number of cultural and sporting facilities (including Sydney Olympic Park) which draw significant domestic and international visitors to the region.

Local Government Remuneration Tribunal

Metropolitan Large

Councils categorised as Metropolitan Large will typically have a minimum residential population of 200,000.

Councils may also be categorised as Metropolitan Large if their residential population combined with their non-resident working population exceeds 200,000. To satisfy this criteria the non-resident working population must exceed 50,000.

Other features may include:

- total operating revenue exceeding \$200M per annum
- the provision of significant regional services to greater Sydney including, but not limited to, major education, health, retail, sports, other recreation and cultural facilities
- significant industrial, commercial and residential centres and development corridors
- high population growth.

Councils categorised as Metropolitan Large will have a sphere of economic influence and provide regional services considered to be greater than those of other metropolitan councils.

Metropolitan Medium

Councils categorised as Metropolitan Medium will typically have a minimum residential population of 100,000

Councils may also be categorised as Metropolitan Medium if their residential population combined with their non-resident working population exceeds 100,000. To satisfy this criteria the non-resident working population must exceed 50,000

Other features may include:

- total operating revenue exceeding \$100M per annum
- services to greater Sydney including, but not limited to, major education, health, retail, sports, other recreation and cultural facilities
- industrial, commercial and residential centres and development corridors
- high population growth.

The sphere of economic influence, the scale of council operations and the extent of regional servicing would be below that of Metropolitan Large councils.

Metropolitan Small

Councils categorised as Metropolitan Small will typically have a residential population less than 100,000.

Other features which distinguish them from other metropolitan councils include:

- total operating revenue less than \$150M per annum.

While these councils may include some of the facilities and characteristics of both Metropolitan Large and Metropolitan Medium councils the overall sphere of economic influence, the scale of council operations and the extent of regional servicing would be below that of Metropolitan Medium councils.

Local Government Remuneration Tribunal

Major Regional City

Newcastle City Council and Wollongong City Councils are categorised as Major Regional City. These councils:

- are metropolitan in nature with major residential, commercial and industrial areas
- typically host government departments, major tertiary education and health facilities and incorporate high density commercial and residential development
- provide a full range of higher order services and activities along with arts, culture, recreation, sporting and entertainment facilities to service the wider community and broader region
- have significant transport and freight infrastructure servicing international markets, the capital city and regional areas
- have significant natural and man-made assets to support diverse economic activity, trade and future investment
- typically contain ventures which have a broader State and national focus which impact upon the operations of the council.

Major Strategic Area

Councils categorised as Major Strategic Area will have a minimum population of 300,000.

Other features may include:

- health services, tertiary education services and major regional airports which service the surrounding and wider regional community
- a full range of high-order services including business, office and retail uses with arts, culture, recreation and entertainment centres
- total operating revenue exceeding \$250M per annum
- significant visitor numbers to established tourism ventures and major events that attract state and national attention
- a proximity to Sydney which generates economic opportunities.

Currently, only Central Coast Council meets the criteria to be categorised as a Major Strategic Area. Its population, predicted population growth, and scale of the Council's operations warrant that it be differentiated from other non-metropolitan councils. Central Coast Council is also a significant contributor to the regional economy associated with proximity to and connections with Sydney and the Hunter Region.

Regional Strategic Area

Councils categorised as Regional Strategic Area are differentiated from councils in the Regional Centre category on the basis of their significant population and will typically have a residential population above 200,000.

Other features may include:

- health services, tertiary education services and major regional airports which service the surrounding and wider regional community
- a full range of high-order services including business, office and retail uses with arts, culture, recreation and entertainment centres
- total operating revenue exceeding \$250M per annum
- significant visitor numbers to established tourism ventures and major events that attract state and national attention
- a proximity to Sydney which generates economic opportunities.

Currently, only Lake Macquarie Council meets the criteria to be categorised as a Regional Strategic Area. Its population and overall scale of council operations will be greater than Regional Centre councils.

Local Government Remuneration Tribunal

Regional Centre

Councils categorised as Regional Centre will typically have a minimum residential population of 40,000.

Other features may include:

- a large city or town providing a significant proportion of the region's housing and employment
- health services, tertiary education services and major regional airports which service the surrounding and wider regional community
- a full range of high-order services including business, office and retail uses with arts, culture, recreation and entertainment centres
- total operating revenue exceeding \$100M per annum
- the highest rates of population growth in regional NSW
- significant visitor numbers to established tourism ventures and major events that attract state and national attention
- a proximity to Sydney which generates economic opportunities.

Councils in the category of Regional Centre are often considered the geographic centre of the region providing services to their immediate and wider catchment communities.

Regional Rural

Councils categorised as Regional Rural will typically have a minimum residential population of 20,000.

Other features may include:

- a large urban population existing alongside a traditional farming sector, and are surrounded by smaller towns and villages
- health services, tertiary education services and regional airports which service a regional community
- a broad range of industries including agricultural, educational, health, professional, government and retail services
- large visitor numbers to established tourism ventures and events.
- Councils in the category of Regional Rural provide a degree of regional servicing below that of a Regional Centre.

Rural

Councils categorised as Rural will typically have a residential population less than 20,000.

Other features may include:

- one or two significant townships combined with a considerable dispersed population spread over a large area and a long distance from a major regional centre
- a limited range of services, facilities and employment opportunities compared to Regional Rural councils
- local economies based on agricultural/resource industries.

County Councils - Water

County councils that provide water and/or sewerage functions with a joint approach in planning and installing large water reticulation and sewerage systems.

County Councils - Other

County councils that administer, control and eradicate declared noxious weeds as a specified Local Control Authority under the *Biosecurity Act 2015*.



Blayney Shire Council Renewable Energy Action Plan

Version 2

Completed by Ashley Bland and Tom Griffiths – Constructive Energy Pty Ltd

March 2020

Contents

- Executive Summary 4
- 1.0 Introduction..... 5
 - 1.1 Blayney Shire Council (BSC) 5
 - 1.2 Purpose Statement 5
 - 1.3 BSC Objectives 6
 - 1.4 Decision Making Framework 6
 - 1.5 Current Situation..... 6
- 2.0 Review of 2017 REAP..... 8
 - 2.1 Blayney STP 9
 - 2.2 Centrepont 10
 - 2.3 Council Chambers / Offices 11
 - 2.4 Works Depot 13
 - 2.5 BtM solar Installation Results (2017-now) 13
- 3.0 Priority Renewable Energy Options..... 14
 - 3.1 Energy Efficiency 14
 - 3.2 Solar 14
 - 3.2.1 Medium Scale Solar Arrays 14
 - 3.2.2 Distributed Solar Installation (Virtual Net Metering) 22
 - 3.3 Council as Energy Generator / Retailer 24
 - 3.4 Energy Storage 25
 - 3.5 Smart Meters 27
 - 3.6 Retail Arrangements 27
- 4.0 Other Renewable Energy Options 28
 - 4.1 Hydro 28
 - 4.2 Wind..... 29
 - 4.3 Bioenergy 30
 - 4.4 Ground Source Heating and Cooling..... 30
 - 4.5 Transport and Plant 30
 - 4.6 Microgrids 31
 - 4.7 Demand Side Participation (DSP) 35
 - 4.8 Off-grid Facilities and Critical Infrastructure 35
 - 4.9 CAPEX Funding and Ownership Models..... 35
- 5.0 Proposed Renewable Energy Projects (1 – 3 Years) 37
 - 5.1 Proposed Renewable Energy Projects (3 years +) 42

6.0 Activity – Outcomes summary 44
7.0 Constructive Energy 45
Appendix A 46

Disclaimer

This report documents the results of preliminary observations and analysis of material provided to Constructive Energy Pty Ltd. In preparing the report, we have relied upon information provided by Blayney Shire Council, E21 EnergyPlus, Origin Energy and Energy Australia through referral to form our conclusions. Whilst we have reviewed this information to assess its reasonableness and internal consistency, we are not able to consider specific and/or abnormal circumstances that may impact your energy use.

The findings, conclusions and recommendations and all written material contained in the report represents our best professional judgement based on estimated and generic data and visual inspection where appropriate. Recommendations have assumed average conditions and historical usage.

Executive Summary

Blayney Shire Council was proactive in identifying energy efficiency and renewable energy opportunities in 2015. Since that time Council has benefitted from reduced operating costs created by lighting and equipment upgrades and created a culture that proactively considers energy in decision making.

A Renewable Energy Action Plan was produced in 2017 and as a result, government funding was successfully attracted to implement rooftop solar on 4 core facilities, leading to savings in the order of \$15,000 per year.

In a review of the original report the authors have found the content remains relevant. However, improvements in affordability, changes in energy market dynamics and the advent of peer-to-peer trading mechanisms have necessitated a review. These changes have opened new opportunities for Council, although the most obvious form of renewable energy is still solar PV. Regarding solar there is now a choice to be made:

1. Build on the success of behind the meter solar installations in reducing costs and 'over-size' existing and new systems to share excess amongst Council and stakeholders. Collectively the systems are operated as a Virtual Power Plant and trade excess from some sites with others that can't directly install solar.
2. Construct a mid-scale solar array at a single site and manage it as an instrument to offset Council consumption and generate revenue to offset unavoidable non daylight hours consumption.

Both of these choices have pros and cons, and both will be enhanced with energy storage, particularly as Council moves toward the objective of being "self-sufficient through renewable energy". At the time of writing chemical storage batteries are economically viable in specific circumstances and so should be modelled in all projects from this point forward.

All future energy projects will be enhanced, if not dependent, on increased metering and control of sites and the new generation of smart meters will be important to identify better management of assets, both as a result of insightful data and the ability to benefit from future cost-reflective pricing and other emerging retail innovations.

Given the positive business case, particularly for solar with Council as both generator and retailer to itself, either distributed or mid-scale, it is highly likely that Council can fund projects externally in a manner that is cash positive from commencement. Indeed, the investment appetite for small scale commercial solar projects remains strong.

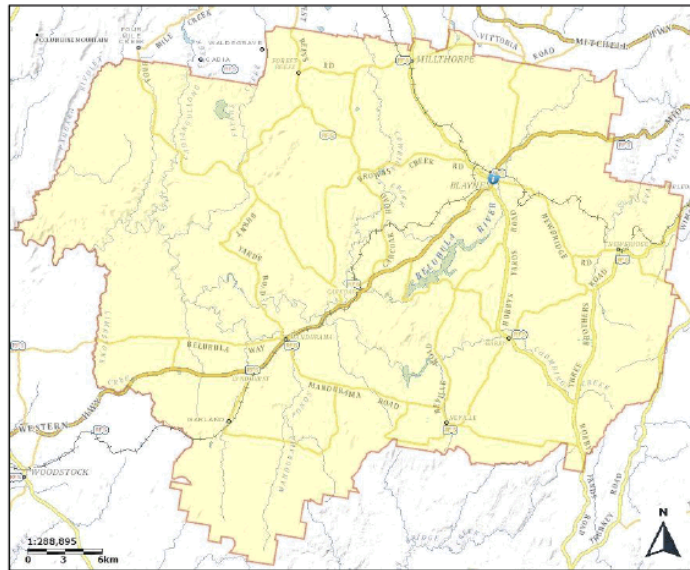
Constructive Energy has provided a series of immediate and mid-term projects for the consideration of Council to prioritise and act upon subject to further detailed analysis.

1.0 Introduction

1.1 Blayney Shire Council (BSC)

Blayney Shire Council (BSC) is located in the Central West region of New South Wales. Within the Shire are the villages of Newbridge, Neville, Barry, Carcoar, Mandurama, Forest Reefs and Millthorpe.

The Shire covers approximately 1,525 km² and is located within the Essential Energy distribution network.



Map 1. BSC boundary – (source: <https://maps.six.nsw.gov.au/> - Feb 2020)

1.2 Purpose Statement

The Renewable Energy Action Plan reflects Blayney Shire Council's leadership stance in the delivery of energy efficiency and renewable generation projects for the benefit of Council and the community. We support innovation in energy use and delivery for the purpose of improved long term environmental and financial sustainability.

- Blayney is attractive to business and residents who value secure, affordable, clean energy.
- BSC is a smart Council that optimises the use of technology to reduce operating costs and deliver better value to constituents, including social value.
- BSC leads the community through education, demonstration, partnership and 'walking the talk'.

1.3 BSC Objectives

BSC has developed this Renewable Energy Action Plan with the following objectives:

That Blayney Shire Council is:

- Self-sufficient through renewable energy
- An energy provider to businesses and residents
- A facilitator of efficiency and renewable energy in the community

1.4 Decision Making Framework

The following framework was developed in consultation with BSC staff and Councillors to assist in evaluating the relative importance of projects identified through the Renewable Energy Action Plan:

- Benefit/Cost – does the project have positive financial impact?
- Community benefit – how does the wider community benefit from this project?
- Logic – is the project practical, defensible, sound, ethical, enduring?
- Leadership – will the project stimulate positive change in others?

1.5 Current Situation

Solar arrays now operate at the Sewerage Treatment Plant, Works Depot, Council Chambers and Centrepoint and are having a positive impact on reducing daytime energy use. Even so, electricity costs remain a significant impost on the Council and there is a sense that more could be done. There are still opportunities to reduce usage through energy efficiency measures however these are hampered by the usual staff workload priorities and a lack of transparency and accountability around energy usage. That said, it is apparent that energy considerations are given high priority for new developments and projects, particularly at the Senior Management level.

At the time of drafting the original REAP, emerging technologies and business models held promise in delivering positive outcomes for BSC. This revised version of the same document examines what's changed and whether these technologies and models are now applicable.

The table below summarises BSC energy consumption (for electricity only)

	No. of Sites	kWh	MWh	% usage	Cost \$	% cost	c/kWh
Contract	3	690,819	691	71%	\$ 155,280.82	63%	0.22
Tariff	32	280,033	280	29%	\$ 89,514.20	37%	0.32
Total	35	970,852	971		\$ 244,795.02		

Table 1. Summary of FY2018-19 consumption and costs

Of the approximately 700,000 kWh or 700 Megawatt hours (MWh) consumed in contestable sites (sites with annual consumption greater than 100 MWh), about 330 MWh is consumed for street lighting. This is an important fact because this energy cannot be met with solar, of course, unless battery storage is available. However, the 330MW can be offset in terms of carbon emissions through Council producing its own excess solar equivalent, or financially, through Council deriving an income from renewable energy projects.

Of the 280 MWh consumed at smaller tariff sites, we estimate about 1/3 can be directly offset by solar, either on or offsite, with the remainder addressed as per street lighting.

The remaining 360MWh is consumed by Centrepoint and the Sewerage Treatment Plant which form part of the detailed analysis below.

2.0 Review of 2017 REAP

All of the previous recommendations in Council's 2017 report remain valid, however rapid developments in technology and affordability mean that some of the opportunities foregrounded at the time are now more readily achievable. The National Energy Market, which was peaking at the time due to retirement of coal fired generators and interconnector disruption, has since changed, becoming more variable and more subject to over-supply during daylight (9-5) hours. At the time of writing it is fair to say the large-scale solar investment bubble has burst and similarly, large wind farms are also subject to curtailment of output. Investment appetite has fallen and in combination with policy uncertainty, we are unlikely to see the same 'gold rush' for solar that existed in 2017-18 unless something changes.

On a smaller scale, residential and commercial roof-top solar installations have continued apace and with current small-scale subsidies, they continue to deliver highly attractive returns. Battery installations have accelerated with 70,000 being installed in 2018/19 and the famous 100MW South Australian Tesla unit demonstrating the value in stabilising and improving grid energy. Electric cars are also beginning to scale with 2 million sold worldwide in 2018/19 and most manufacturers moving toward EVs on a rapid timescale.

Gas prices hiked significantly in the period since 2017 but have stabilised to some extent and may fall as policy changes and additional reserves come on-line. That said, analysis from the Alternative Technology Association shows that all-electric homes are now more cost-effective than combined energy source homes in all states and territories.

As a result of modelling performed in 2017, BSC elected to install Behind the Meter solar at 4 major energy usage sites. State government funding assisted in delivery and market testing resulted in a local installer being engaged for the installation. A performance monitoring platform, Solar Analytics, was integrated into each installation and interval data from this platform plus billing data has been utilised for the following analysis. Note that we have identified some inconsistencies in this data set however they are minor and in aggregate it is suitable for the analysis.

The table below represents the financial impact of the 4 installations.

Site name	Usage cost	FIT revenue	Avoided costs	Costs savings	Combined savings ratio
Blayney STP	\$16,145.20	\$1,404.96	\$3,106.87	16%	28%
Centrepont	\$14,098.75	\$555.68	\$3,044.38	18%	26%
Chambers	\$6,799.97	\$381.58	\$3,286.03	33%	54%
Works Depot	\$4,225.15	\$1,224.75	\$2,327.95	36%	84%
	\$41,269.07	\$3,566.97	\$11,765.23	26%	48%

Table 2. Blayney existing solar installation savings

Graphs below will further illustrate the point, however the varying savings percentages are partly resultant of the approach taken in tendering where 4 projects were developed within a set funding envelope of \$201,300, as opposed to being sized based on usage data and optimal economic impact.

2.1 Blayney STP

Because of the nature of the STP load profile, aggregating the data into hourly intervals loses some important detail. CE modelled the energy profile in 5-minute intervals which fortunately is available via the solar analytics data set.

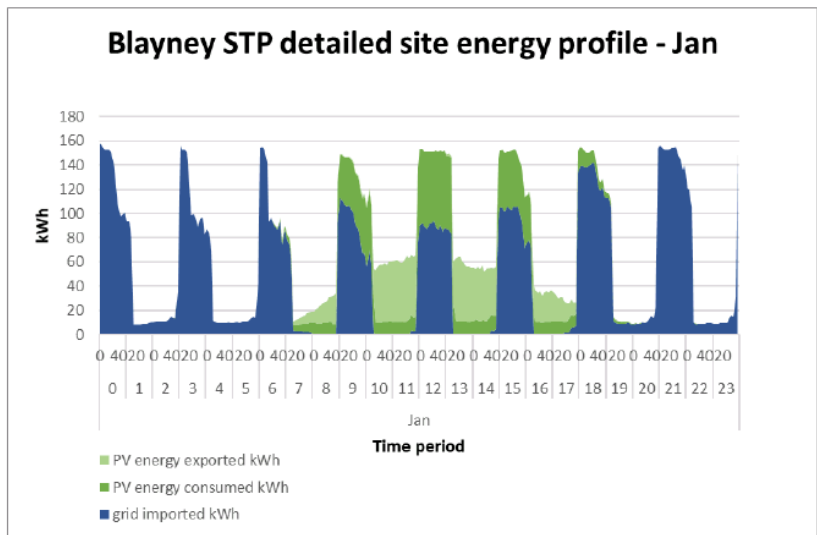


Chart 1. Blayney STP 24-hour energy consumption profile (January 2019)

The chart 1 above illustrates the impact of solar as it reduces peak demand when both aerators are operating and the relatively large export volume. This intermittent load is the cause of Blayney STP achieving the lowest financial return of all sites and the reason batteries were identified as useful at the time. The STP is remarkably consistent in profile and demand across the year as indicated by the equivalent chart for July.

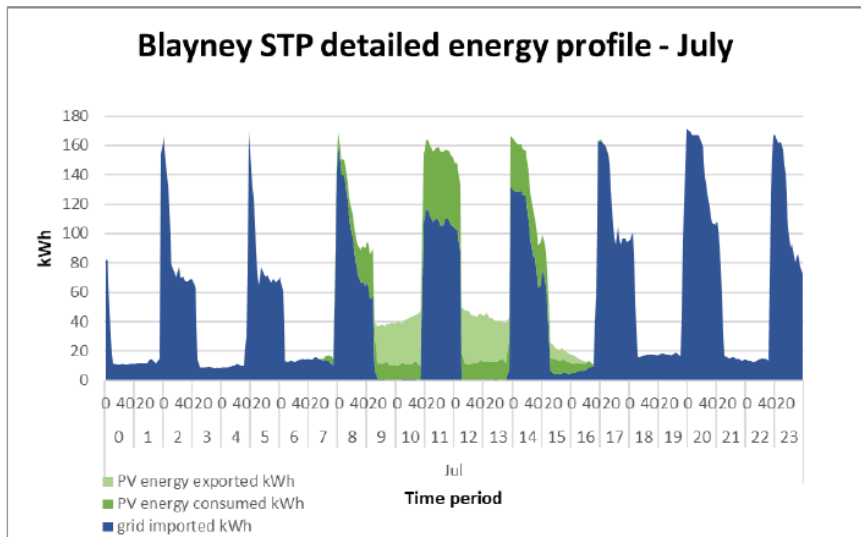


Chart 2. Blayney STP 24-hour energy consumption profile (July 2019)

Of interest in chart 2 is the nature of each peak as the aerators commence. CE is unsure if this occurs due to drawing full current at start-up and then 'backing off' or because both aerators commence and then only one is required as the oxygen level increases more rapidly in winter?

The significance of this insight relates to a potential strategy for improved application of renewable energy at this site. Battery storage would be capable of collecting the energy currently exported and applying it simply to reduce the peaks, particularly overnight.

In the Essential Energy network there exists a 160 MWh threshold at which sites are charged a 'demand charge' based on the maximum possible draw the site could have on the network. A site can still have the same draw and yet if annual consumption falls below 160 MWh the higher demand charges do not apply. BSC has been advised from Essential Energy that Demand charges are being phased in over a 5-year period however STP annual consumption for 2018/19 was 171 MWh – close to the threshold.

BSC has a choice to reduce the site demand below this threshold using renewable energy, either by shifting current exported energy using a battery or simply adding more solar. Without completing detailed financial analysis and market testing CE considers is most likely that adding more solar would be the most cost-effective pathway. However, we do recommend that a detailed financial assessment be performed on the viability of batteries for this site.

2.2 Centrepoint

Solar at Centrepoint has been limited to some extent by works which have been undertaken to upgrade the associated plant and equipment. None-the-less a modest system was added to part of the structure where modification was unlikely and sized according to roof and shading limitations. The following chart indicates the impact of this system.

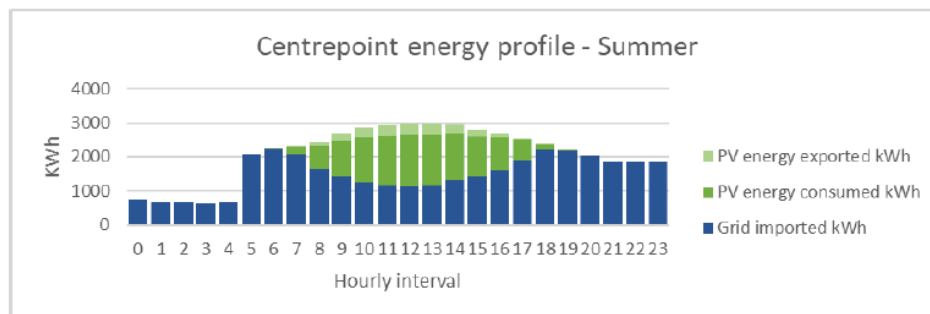


Chart 3. Centrepoint Summer energy consumption profile (24 hour)

As anticipated, the chart demonstrates that this site would benefit from a larger system to offset an increased proportion of usage. Export levels are low and probably relate to weekend or other low-use periods. CE is unclear of what management results in a rapid drop in demand from 12am however this should be investigated to establish if this can be better leveraged.

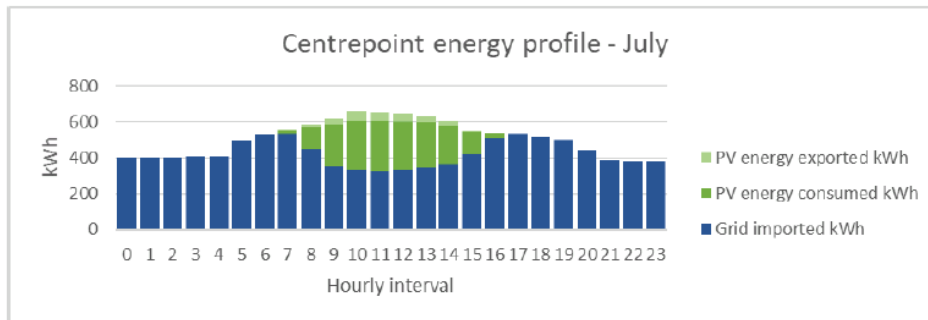


Chart 3. Centrepoint July energy consumption profile (24 hour)

The above chart for July also indicates the relatively small proportion of energy offset by the solar system and very low export. CE recommends that Centrepoint energy consumption be closely monitored after works are completed and used to size an increased BtM system. (Unless BSC chooses to meet demand for this site from a mid-scale array.)

2.3 Council Chambers / Offices

The following charts have been generated by averaging all data for each season to illustrate how the rooftop solar interacts with changing energy demand. The system size for the Chambers was based on minimising export, maximise self-consumption and providing a healthy rate of return on investment.

If anything, retrospective analysis indicates that the system could have been slightly larger however at the time there was uncertainty around the ability to trade export for self-consumption elsewhere (e.g. peer-to-peer trading) so the system size was limited.

Clear from the charts is how effectively the system counters increased energy demand in summer for cooling.

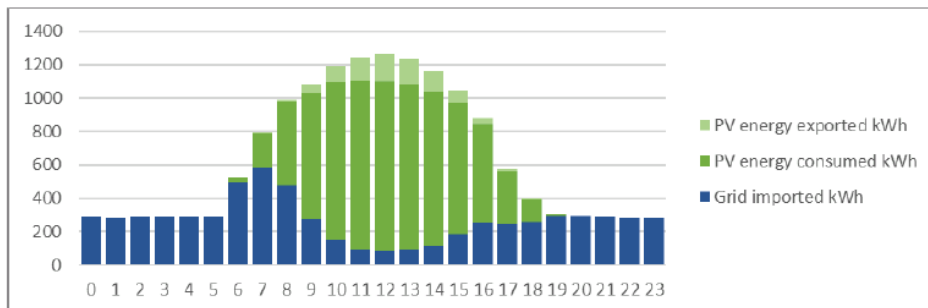


Chart 4. Council Chambers\Office – Summer energy consumption profile (24 hour)

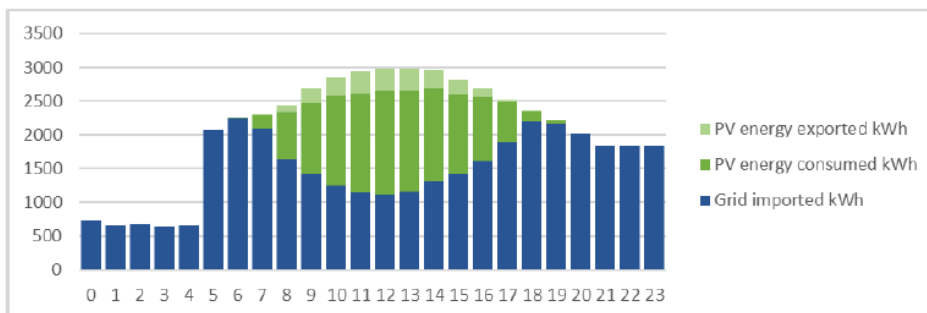


Chart 5. Council Chambers\Office – Autumn energy consumption profile (24 hour)

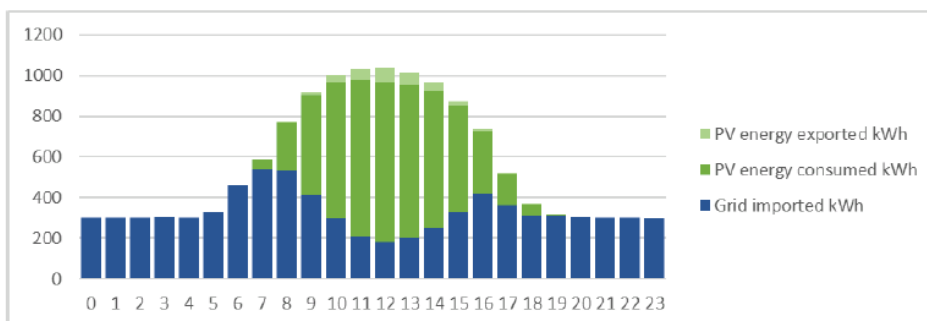


Chart 6. Council Chambers\Office – Winter energy consumption profile (24 hour)

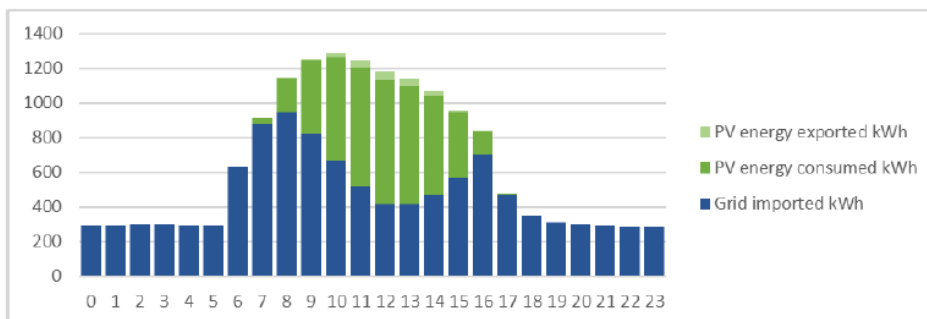


Chart 7. Council Chambers\Office – Spring energy consumption profile (24 hour)

2.4 Works Depot

The works depot profile is quite consistent over all seasons and shows a system that is optimised to easily meet daytime site consumption.

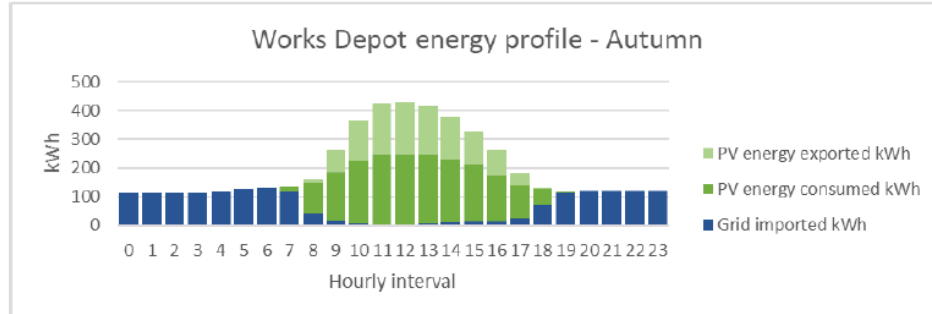


Chart 8. Works Depot – Autumn energy consumption profile (24 hour)

The solar system is well matched to the daytime usage profile of the site and for much of the year the exported power offsets purchased power – an example of what a 100% renewable site would look like. Clearly it is tempting to integrate batteries into this site to shift the daytime export into the evening to avoid purchase. The economics of this will depend on the value of the export versus the value of avoided consumption within the CAPEX and operation of the battery.

2.5 BtM solar Installation Results (2017-now)

In summary, the implementation of solar on 4 key BSC sites has delivered savings in the order of \$11,800 p.a. and revenue of around \$3,500 p.a. with a combined value to Council of \$15,300 p.a. This equates to about 37% of usage costs for those sites and, in terms of the \$201k project funding, a combined yield of approximately 7.6%.

These results vindicate State Government and Council's investment in the solar PV installations and demonstrate that it is possible to fund similar projects within the envelope of current finance rates. In-fact, installation costs have fallen since 2017 as have finance rates so there is a clear pathway for cash-positive structuring of renewable energy projects.

Should Council wish to proceed with a distributed solar model for being energy self-sufficient then these existing projects form valuable case studies. See Distributed Solar Installation below.

3.0 Priority Renewable Energy Options

3.1 Energy Efficiency

BSC understands that before investigating alternative sources of energy, maximising energy efficiency should be a primary objective. To reinforce this the following measures have been adopted:

- **Monitor consumption:** Engineering are responsible for reviewing energy usage at all sites and of key equipment/assets.
- **Reporting and performance:** Energy use for sites/assets is reported in regular section meetings and efficiency forms a component of staff Position Descriptions.
- **Procurement policy:** Energy consumption rates are considered in the procurement of any new equipment or servicing and maintenance of existing items. This includes new buildings and vehicles.
- **Retrofit strategy:** Building modifications will be carried out at least in part for the purpose of reducing energy consumption.
- **Education:** BSC makes it easy for constituents to reduce energy consumption through promotion of strategies and materials that facilitate energy efficiency.
- **Planning:** BSC promotes energy efficiency in design through the planning phase where applicants are encouraged to adopt Guidelines for factors including – insulation, glazing, orientation, primary equipment, water use, etc.
- **Product broker:** BSC applies knowledge and purchasing power to support residents and businesses with products that reduce their energy consumption.
- **Street lighting:** BSC works with other councils to replace existing lights with efficient alternatives.

3.2. Solar

Solar photo-voltaic cells are a proven technology capable of delivering on-site electricity for immediate consumption and/or export. While panel efficiency has improved slightly in recent years, the major factor driving an increase in solar installations has been dramatic reductions in panel costs, combined with government subsidies. The subsidies for systems less than 100kW (Small Technology Certificates or STCs) are reducing year on year until being completely phased out by 2030. Subsidies for systems larger than 100kW exist in a market mechanism that has been volatile and oversubscribed to date resulting in uncertain and low values.

- Currently the greatest economic impact from solar is to consume locally and avoid purchasing from the grid – known as Behind the Meter (BtM). This works particularly well when the demand pattern of solar use closely matches the intensity of the sun.

These circumstances lead to 2 principle approaches; several sub-100kW systems distributed over multiple sites and larger mid-scale single site systems in the order of 500kW to 5 MW. These two approaches are detailed below.

3.2.1 Medium Scale Solar Arrays

When identifying a potential location for standalone medium scale renewable energy installations, it is important to consider proximity to suitable power lines, transformers and electricity substations; close range of a substation or appropriate 'feeder' can lead to more cost-effective grid connection for larger arrays.

Larger solar installations require more research and modelling than those installations below 5 MW because they can have a disruptive and damaging impact on the network. Facilities under 5MW require an intermediary licenced market participant to sell into the National Energy Market but currently avoid extensive Australian Energy Market Operator (AEMO) reporting requirements. Once the 5MW threshold is

broken, these additional costs, along with increased implementation costs such as network fault protection works, typically result in systems of around 8MW to stack up financially.

There is another threshold within the Essential Energy network at 1MW, below which the potential network impact, and hence approval process, is significantly easier and less costly. Solar installations below 1MW are not regarded as High Voltage customers whereas arrays over 1MW require Connection Investigation Services Agreements that will incur costs in the order of \$25,000 to \$250,000, including detailed engineering and High Voltage design.

In the Blayney LGA there is an obvious opportunity for mid-scale solar around the Essential Energy sub-station on the corner of Gerty St and Marshalls Lane. Initial verbal enquiries indicate that facilities in the order of 1MW are likely to be possible at this location, even given the current application by Yingli for a 5MW portal to the grid.

There will be many more sites available within the distribution network for smaller arrays than those over the 1MW threshold which could be useful if BSC villages wish to become renewably powered or Council decides to pursue other arrays to support local business and generate revenue in the longer term. Ideally Council may own land or assets in these circumstances however this is not critical as, for example, site lease costs can be integrated into the business plan.



Map 2. Essential Energy Substation location (Blayney) source: Google Maps

The commercial development appetite for medium to large solar arrays has reduced from a peak in 2018 of around 20 GW as uncertainty relating to the daytime market price has increased. There are now periods where solar supply exceeds market demand, and this is pushing the pool price down resulting in the so-called 'duck curve' already evident in California. In the past, the market price average was reliably above the cost of production making solar projects profitable but now there is an increased risk of a revenue shortfall. This issue has been exacerbated by network constraints resulting in Market Operator curtailment of export from large solar farms. This reinforces the case for more, smaller, solar arrays withing the Distribution network.

Developers usually seek to secure revenue by locking in customers with a fixed price Power Purchase Agreement, however for Councils the opportunity exists to create an internal arrangement. With supply matched to demand and a floating market price, the Council is less concerned with what the energy price is

at any point in time and more concerned about the transactional cost. That is; if the NEM price is high then increased costs of consumption are offset by increased revenue for the array. Equally, low prices reduce revenue to the array but save on expenditure at Council sites. To avoid excess export at low value it is important to match the solar array size to demand, noting that the opportunity exists to increase the pool of customers by signing up local Commercial and Industrial facilities. Of course, once the array is paid off, Council has access to electricity at negligible cost (refer to the section "Council as energy retailer" below).

Understanding this model is critical to the decision for Council to invest in a medium scale array as without it, CE would not currently advise Council to proceed with a large solar project.

Modelling was completed to examine what the options might be for BSC to progress a mid-scale array. Local climate data was used to project solar generation and aggregated to monthly figures. These were mapped against actual usage for the 2018-19 financial year. The following chart represents annual consumption segmented for large/contract sites, tariff sites, combined usage and the percentage of usage likely to currently occur in daylight (solar production) hours.

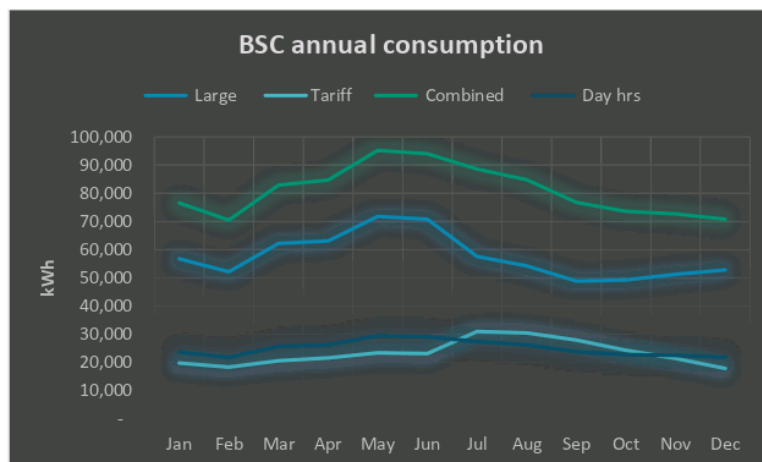


Chart 9. BSC Annual electricity consumption

The profile is interesting as it visually represents two important factors relevant to solar generation; peak consumption occurs in the winter months which is when solar production is at its lowest, and, consumption during daylight hours is around 1/3 of total consumption.

We now need to understand how this profile interacts with the wholesale or spot price on the National Energy Market. The charts below indicate that, on average to date, summer is a good time to be selling solar energy into the market as the price is relatively high – particularly in the peak heat of mid-afternoon. In shoulder seasons daytime export is of lesser value than it is in winter but in all three seasons there is a distinct peak at the start and end of each day.

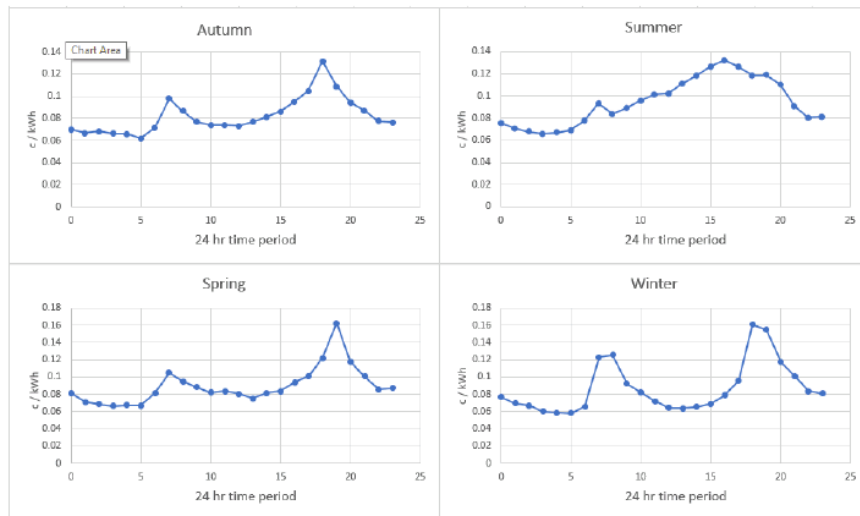


Chart 10. Seasonal average AEMO (Australian Energy Market Operator) spot market electricity price charts

We now examine two scenarios for the purpose of informing decision making around the objectives and scale of a stand-alone BSC solar array. For the sake of illustration all scenarios assume that BSC is happy to pay itself 10c/kWh for solar energy which represents a saving of approximately 4c off retail and that export is also purchased by a third party for 10c. We have also modelled the array install cost at \$1.45 per watt which is inclusive of all project costs.

Our analysis indicates the improved financial case for Council self-consuming the energy vs finding a consumer willing to enter a Power Purchase Agreement (PPA) for 8c or relying solely on the spot market. Not surprisingly, the key variables for financial return are install cost and sale/purchase price.

GENERATION		Array Size		700 kWp		CONSUMPTION				FINANCIAL VALUE							
CAPEX	\$	1.45	per watt =	\$	1,015,000												
Sale price	\$	0.08	/kWh									Purchase	Save	Sell			
Solar Production B. O. M.		Revenue		Council consumption				Export				Int'l rev.	retail savin	Exp. rev.			
kWh/m2	daily kWh	kWh/m	\$	Large	Tariff	Combined	Day hrs	Export	Int'l rev.	retail savin	Exp. rev.						
Jan	7.42	6,317	109,664	\$	8,773	56,788	19,787	76,575	23,738	85,925	\$	2,374	\$	475	\$	8,593	
Feb	6.34	5,355	92,963	\$	7,437	52,130	18,350	70,480	21,849	71,114	\$	2,185	\$	437	\$	7,111	
Mar	5.3	4,648	80,689	\$	6,455	62,214	20,641	82,855	25,685	55,004	\$	2,569	\$	514	\$	5,500	
Apr	4.076	4,095	68,796	\$	5,504	63,091	21,596	84,687	26,253	42,543	\$	2,625	\$	525	\$	4,254	
May	2.936	3,675	63,798	\$	5,104	71,770	23,407	95,176	29,505	34,293	\$	2,950	\$	590	\$	3,429	
Jun	2.256	2,958	49,686	\$	3,975	70,770	23,205	93,975	29,132	20,554	\$	2,913	\$	583	\$	2,055	
Jul	2.516	3,430	59,545	\$	4,764	57,565	30,987	88,552	27,451	32,094	\$	2,745	\$	549	\$	3,209	
Aug	3.52	3,938	68,355	\$	5,468	54,263	30,511	84,774	26,280	42,075	\$	2,628	\$	526	\$	4,208	
Sep	4.724	4,368	73,382	\$	5,871	48,840	27,929	76,770	23,799	49,584	\$	2,380	\$	476	\$	4,958	
Oct	5.964	5,058	87,798	\$	7,024	49,268	24,302	73,570	22,807	64,992	\$	2,281	\$	456	\$	6,499	
Nov	6.692	5,697	95,714	\$	7,657	51,286	21,414	72,700	22,537	73,177	\$	2,254	\$	451	\$	7,318	
Dec	7.3125	6,650	115,444	\$	9,236	52,833	17,904	70,737	21,929	93,515	\$	2,193	\$	439	\$	9,352	
	4.9		965,834	\$	77,267	690,819	280,033	970,852	300,964	664,870	\$	30,096	\$	6,019	\$	66,487	
			Payback	\$	13.1					Combined annual revenue				\$	102,603		
																Simple payback	9.9

Table 3. Summary table of generation and revenue

Scenario 1 – offset daytime use only.

In this scenario we examine what it would look like to meet the daytime usage of all Council assets with a mid-scale solar array. We would do this on the basis of minimising exposure to the spot price and maximising self-consumption as Council gets to decide how much to pay itself for energy in this time (as per above, we have assumed 10c).

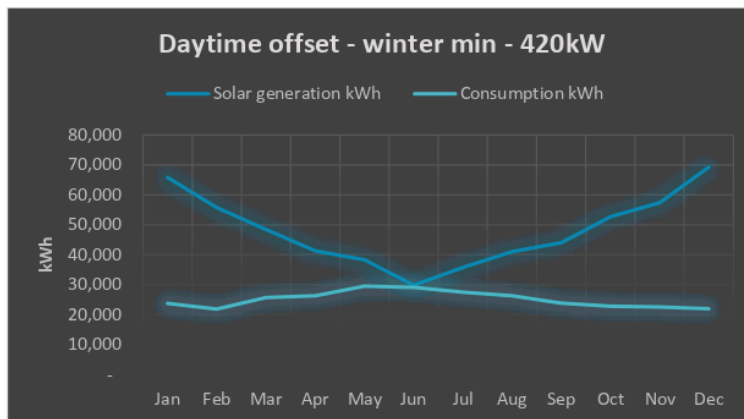


Chart 11. Solar generation matched to daytime consumption – 420kW array

Chart 11 indicates that in order to meet the likely consumption at the ‘worst’ time of year for solar generation, i.e. June, every other month will generate in excess of Council’s own consumption. The array size to deliver this scenario is about 420 kW. The corresponding revenue charts are shown below.

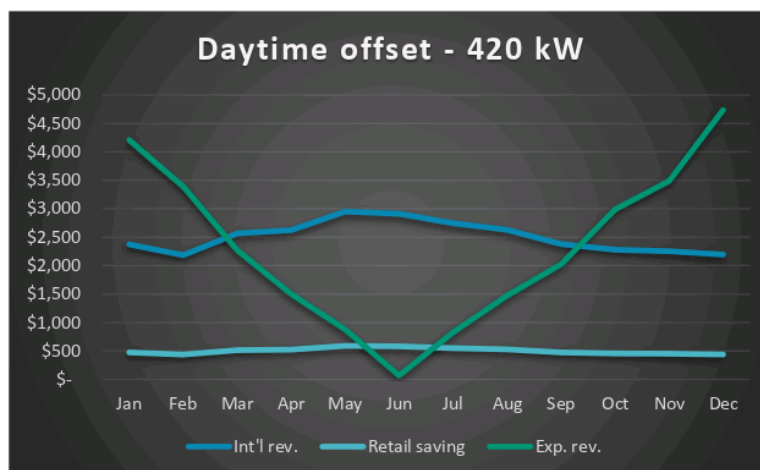


Chart 12. Intersection of monthly revenue/value curves for a 420kW array

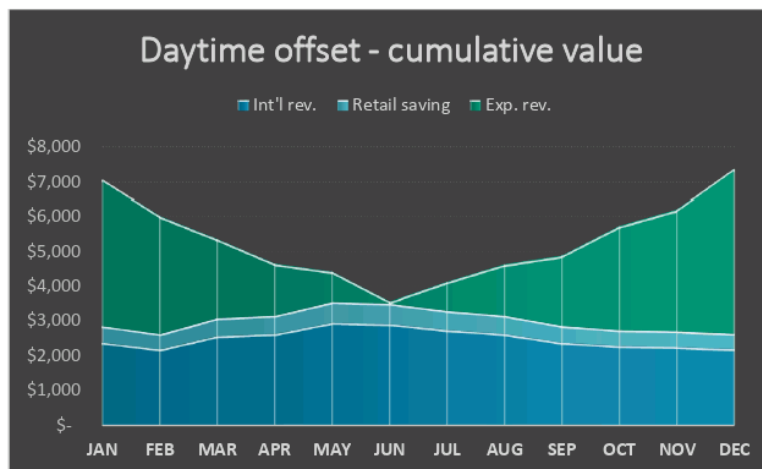


Chart 13. Cumulative value created by a 420kW array

Scenario 2 – offset all consumption.

In this scenario, we consider that Council has elected to fully offset their energy consumption on the basis of creating a revenue stream to offset unavoidable usage and to reach 100% renewable status in terms of carbon abatement. The size of an array to achieve this is approximately 700 kW.

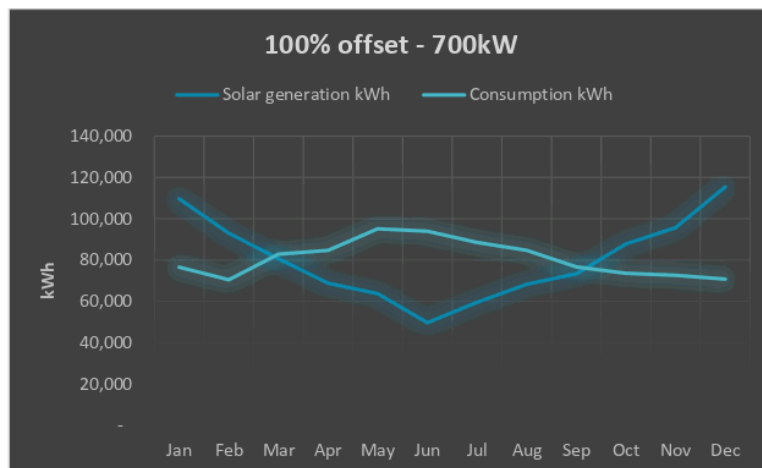


Chart 14. Solar generation matched to daytime consumption – 700 kW array

Chart 14 indicates that the bulk of all energy consumed, 24 hours per day, both exceeds and is less than the amount generated depending on the season. In terms of annual volume however the curves are equivalent. The corresponding revenue charts are displayed below.

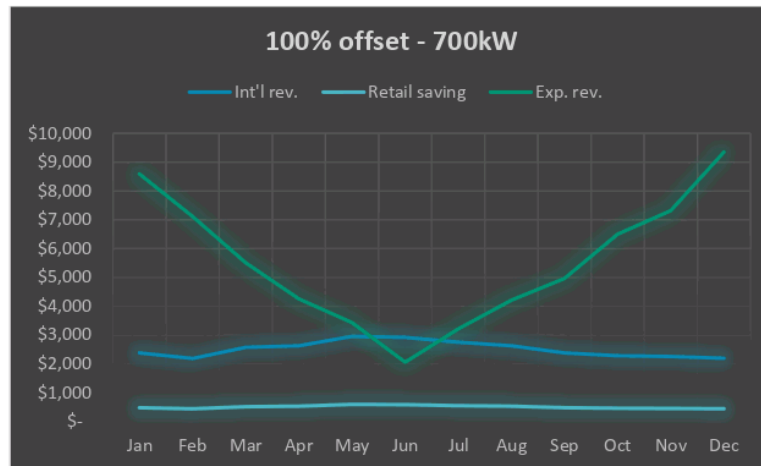


Chart 15. Intersection of monthly revenue/value curves for a 700kW array

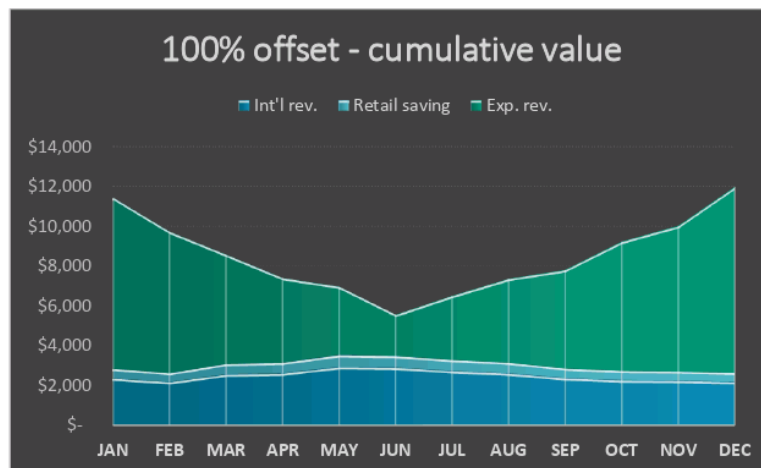


Chart 16. Cumulative value created by a 700kW array.

The above 2 scenarios are illustrative of the need for BSC to be clear on objectives in constructing and operating a mid-scale array. The analysis has been undertaken to illustrate concepts, highlight risks and demonstrate the impact of alternative approaches to becoming active in the renewable energy generation space. We have been careful to be realistic and conservative in our analysis however detailed modelling, costing and analysis will be required before investing in a project.

That said, our analysis reveals that it is possible for an investment in a single site array of just over \$1 million to create annual value of just over \$100,000, with Council paying off a their own solar farm in around 10 years instead of paying a retailer.

Given that the effective life of a solar array is the warranty period, i.e. 25 years, Council will have the future dilemma of what to do with 970 MWh of basically free energy. Aside from whatever advances in technology

are available at that time, including electric vehicles, there are a wide range of social impacts that could be supported with this low-cost energy.

Constructive Energy has completed detailed modelling for another Council who have elected to proceed with this approach based on favourable economic and social returns. The project will reduce current outgoings for energy in the medium term, pay off a 5MW array in just over 9 years, engage local business with lower cost local renewable energy and deliver a financial dividend of \$13 million over 25 years.

If BSC elects to further investigate this concept CE can facilitate the necessary system design and Network Enquiries and work with Council to develop the detailed business plan.

A final point of note is to consider that there may be city-based local governments that would welcome the opportunity to partner with a 'country cousin' that can generate renewable energy for them, to offset their usage. This could be another way of locking in price certainty and revenue to de-risk the business plan.

3.2.2 Distributed Solar Installation (Virtual Net Metering)

The most conventional renewable energy option for reducing costs is to install 'Behind the Meter' (BtM) solar arrays at strategic locations. BtM solar arrays in both residential and commercial settings self-consume electricity generated during daylight hours, thus avoiding power costs charged on a per kWh basis. Excess energy generation is sold into the network at a negotiated feed-in tariff or shared with other consumers. An ideal site for this type of installation (where a faster return on capital investment can be achieved) should present the following characteristics; -

- High, regular electricity consumption, with most of the usage occurring during the daylight hours.
- Large suitable roof structure, preferably north facing and not shaded, or suitable nearby space for ground/frame mounted solar.

Important Considerations

- High, regular electricity consumption, with most of the usage occurring during the daylight hours.
- Large suitable roof structure, preferably north facing and not shaded, or suitable nearby space for ground/frame mounted solar.
- Identify project drivers as cost, energy-sharing and carbon offsetting will all lead to different answers
- Size and design individual systems correctly to meet the identified objectives
- The Small-scale Renewable Energy Scheme currently offers significant discounts on solar systems smaller than 100kW. The scheme reduces in value on 31st December each year until it ends in 2030.
- Systems larger than 30kW require additional costs associated with network connection studies and permission from the network provider to connect to the grid.

There are currently new technologies and market-place arrangements being developed that allow peer-to-peer solar energy trading between residential properties, known as Virtual Net Metering (VNM) and the ability to collectively manage multiple installations, known as a Virtual Power Plant. At a small scale, a household can trade their excess solar generation to a property of their choosing at a negotiated price. This system usually requires both parties in the transaction to be with the same retailer and arrangements can be put in place for one-off transactions or longer-term periods.

The integration of battery technology and smart grid software can significantly improve these systems by being able to meet demand during non-solar generating periods. There are pilot schemes in Australia where entire residential housing developments are connected into an embedded network, so residents effectively generate and share power for the net benefit of everyone involved.

Using this concept, it is possible for BSC to develop a Rooftop Solar Virtual Power Plant large enough to power a major portion of Council sites and other businesses and residences in the LGA. Under this model, Council could also subsidise or facilitate the installation of solar and battery systems at selected sites and facilitate customers with the enabling retailer and load control metering devices.

Important Considerations

- All properties/customers operating within the network would probably need to sign up with the same retailer. The retailer would also need to be involved in setting up and operating the system.
- A specific meter/device is required to monitor and acquit energy usage.
- The project may require a significant effort to recruit customers (which could include customers outside of the LGA if desired).

To illustrate this opportunity CE considered the impact of existing/augmented solar systems and new BtM installations as part of a holistic program.

NMI	Site Name	Comments	Panel system size	Inst. cost	Already	Total daily prodn	On site gen/yr
4001021119	Centrepoint Sport and Leisure	Has roofspace and they are keen to offset as much as its usage as possible	70	\$ 91,000	30	280	102,200
NAAA000003	Sewer Treatment Works	Will only be able to install an additional 65kW system.	60	\$ 78,000	33	240	87,600
4001028824	Works Depot and Workshop	Presumably has roof space.	60	\$ 78,000	25	240	87,600
4001248728	Blayney Shire Community Centre	Confirm has adequate roof space, for 100kw system.	100	\$ 130,000	0	400	146,000
40010005145	Council Chambers	Confirm has adequate roof space, for 100kw system.	60	\$ 78,000	20	240	87,600
40010209414	Visitor Information Centre - The Cottage	Has some roof space??	20	\$ 26,000	0	80	29,200
40010238790	Blayney Showground	Has a big shed that could mount 100kW system.	100	\$ 130,000	0	400	146,000
TOTAL			470	\$ 611,000			686,200

Table 4. Example distributed solar BtM installations

CE integrated the capacity for a virtual network and imagined that BSC charged themselves 10c/kWh for energy consumed at the retail tariff sites (which would be a saving in the order of 3 – 4c /kWh). The table 5 below is a summary of the collective financial impact if these projects were to proceed. Energy production was modelled on past weather, financial impact was calculated using current tariff structure and CAPEX was assumed at the middle of the scale.

Council consumption			BtM solar generation		Purchase	Save	Sell		
Large	Tariff	Combined	Day hrs consumption	Export	\$ 0.10	\$ 0.04	\$ 0.10		
					Int'l rev.	retail saving	Exp. rev.	Payback	Yield
690,819	280,033	970,852	300,964	385,236	\$ 30,096	\$ 6,019	\$ 38,524	8.19	12%

Table 5. Example distributed solar BtM collective financial impact

While these figures are very general, it is evident that there is an improvement in the economic case for roof-top solar when viewed holistically under a virtual network. It may also be desirable for Council to facilitate the involvement of other organisations and individuals in a Council-wide virtual network however this can become complex and should be modelled in more detail. It would also be advisable to plan this with the engagement of service/community groups and the business groups.

It should be noted that the resultant yield of 12% is low for BtM commercial solar (while much better than the bank!) because we have modelled sites to achieve whole-of-council daytime offset, not highest financial return. It should also be noted that some of these sites may not be allowed to install the full nominated size array because of network limitations. It is also likely that additional costs and limitations may arise such as old meter-board upgrades, structural reinforcement, the need for tilt-frames, etc.

As for any collective mid-scale projects, detailed project and financial planning will be required to firm up actual figures for investment readiness. This will involve multiple network enquires for a full list of sites in order to establish which sites have enough installation and export capacity. Network limitation at each NMI connection may be a limitation in reaching the full Council self-sufficiency figure of 700kW.

Prior to progressing the case for BtM solar installations, it is important for Council to acknowledge that the broadscale implementation of BtM roof-top solar systems potentially cannibalises the case for a mid-sized solar array. Installing multiple BtM solar installations, reduces the amount of solar energy that Council can sell to itself in order to secure revenue for the larger project (which may be likely to provide a more significant pay-off in the longer term).

That said, BtM solar is readily achievable and delivers an immediate financial return and it may be that a hybrid of the two approaches is acceptable.

There are essentially three options for progressing BtM installations;

1. BSC Capital investment – savings invested to immediately reduce operating costs
2. Project finance – taking advantage of low interest rates in cash-positive structure
3. 'Rent to buy' – Third-party installs and operates until nominated hand-over

Constructive Energy can provide oversight or facilitation of each of these options if desired.

3.3 Council as Energy Generator / Retailer

BSC has the land, load and grid capacity to install and operate a medium scale solar power plant in the order of 1MW. The inevitable question regarding this option is how to consume the generated energy in local assets and how to maximise financial benefit from selling the excess. As a Council owned and controlled asset, a solar PV facility has the potential to generate energy for self-consumption and a revenue stream to off-set unavoidable consumption costs such as street lighting.

Clearly, if it were not possible to consume renewable energy 'behind the meter' then the next best thing would be to supply the excess energy to other Council sites and other larger consumers such as local industry. As described in section 2.2.1 above, Power Purchase Agreements (PPAs) are the most common mechanism for this to occur to date. However, if this is done, it is still necessary to pay for the "poles and wires" either by paying the network owner-operator a fee or through owning the network. It is unclear at this point if discrete rural energy networks will ever be 'for sale', however, an embedded network constructed and owned by Council, such as for a new greenfield development or an industrial estate, already has precedent.

Power Purchase Agreements have been established and tested in the Australian context and are a feasible option for BSC to consume energy from their own solar generation, or any other arrays for that matter, however they do require integration with a 'friendly' retailer and monthly reconciliation of estimated versus actual generated/consumed electricity. For simplicity, it may be possible to find a local large consumer that agrees to purchase all energy generated from a BSC array.

A third option as indicated above, and one which CE has expertise in, would be for Council to effectively operate as a retailer, choosing to purchase energy from its own solar array at an agreed price, but also to purchase energy from the National Energy Market and then choose the level of price mark-up on-selling to themselves (see Chart 8 below). While there are benefits in removing the retailer's margin through purchasing wholesale, the risk of this approach is that the pool price may, or will at times, be higher than the relevant standard tariff. Our modelling has shown for previous years that wholesale consumers tend to be better off overall, but this is not guaranteed. To mitigate against this risk, the ability to control loads automatically would limit exposure to any price spikes. In other words, if the price is high outside of solar production periods, then we switch things off! The other key mitigating factor would be integration of battery storage which could be used as an economic tool to play the market or to load shift (see section 2.8 Energy storage).

To further illustrate the concept, we have prepared the chart below comparing the amount BSC actually paid to power the STP over the previous year with the amount that would have been paid purchasing directly from the wholesale market.

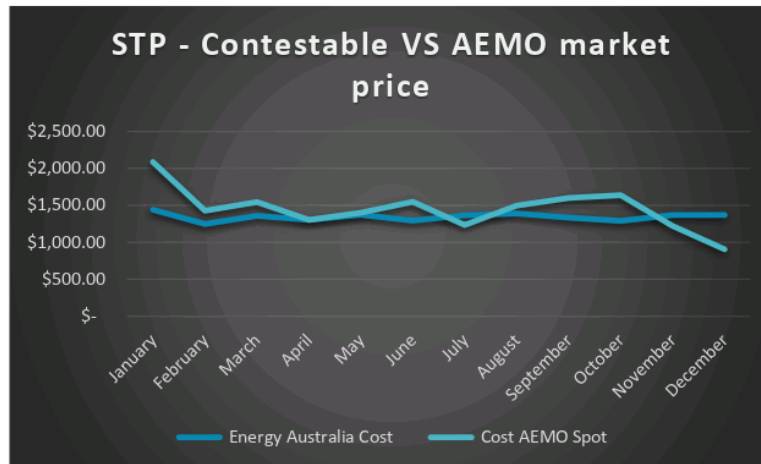


Chart 17. Contestable pricing versus AEMO spot price modelling (calendar year 2019)

Chart 17 indicates that BSC would be losing out through purchasing wholesale for this site overall but particularly in summer. The STP does not however have a 'typical profile' and the chart does not incorporate the overall impact of a solar generation project which would be making money during the higher price periods.

The primary purpose of bringing this to the attention of BSC is to be aware of both the opportunity and consequence of 'stepping into' the generator retailer space. Part of the on-going role of Constructive Energy is to guide and support Council decision making, in establishing projects, negotiating deals and managing renewable energy assets to optimise benefit.

There are costs in establishing Councils as generator-retailers however the savings and potential revenue are significant. It should be noted that no local government currently operates as a generator-retailer in New South Wales however this has only been the case since the last of the County Councils ceased to operate in the 1990's. Conceptually, the 'Council retailer model' is a case of 'back to the future' and yet still a major disruptor to the status quo. In our opinion the drivers for such a model are very strong, including financial gain and self-determination.

Interestingly, an example of where Council has successfully operated as a retailer, exists in the telecommunications industry. The Southern Phone company was formed in 2002 and is a successful collaboration of 35 regional Councils providing mobile, fixed line and data services to the benefit of regional Australians. Their website states that ... "since 2008 we've delivered more than \$15.8 million in dividends and grants for the benefit of regional communities".

Southern Phone has acquired and services over 100,000 customers with the vast majority located within regional Australia. In December 2019, Southern phone was acquired by AGL Energy Ltd, providing each of their shareholders \$785,000 return from their initial investment of \$2 (source [Southern Phone Jan20](#)).

3.4 Energy Storage

Batteries have become synonymous with energy storage, which is an increasingly critical part of optimising the economic and environmental benefits of renewable energy generation. There are a range of non-battery storage technologies available including flywheels, compressed air, pumped hydro and capacitor systems but the most prominent 'market ready' batteries are chemical based. Chemical batteries are now affordable to the extent that pay-back periods are usually less than 10 years and can be less than 5 in the right circumstances. The battery market is continuing in price decline as various providers and technologies vie for

market share. In addition, the impact of batteries on the grid is not well tested in practice so case studies will have important flow-on impact.

An additional form of storage may be available in the form of heat or cold where potential solar export can be redirected to pre-chilling cool rooms or heating hot water. This facility usually involves additional technical equipment and/or IT control.

The business case for energy storage becomes apparent through understanding the Spot Price of energy on the National Electricity Market or NEM and differential Time of Use pricing.

At its most simple, batteries can purchase energy from the grid or a renewable energy source when it is cheap and sell at the time it is most expensive. The figure below illustrates this market profile in winter when it is usually at the most extreme. Clearly, if a storage facility can purchase at 6c/kWh and sell at 14c/kWh then there is 8c/kWh available to pay for the facility.

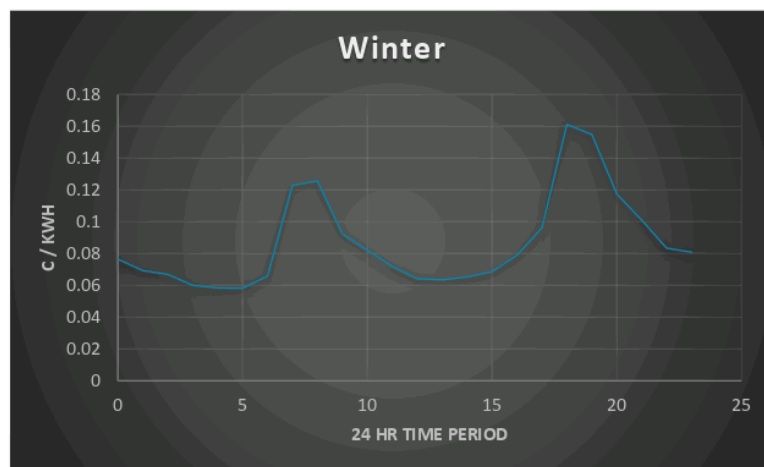


Chart 18. AEMO spot market fluctuation winter profile

In addition to the above illustration of simple arbitrage, grid storage has the ability deliver Frequency Control Ancillary Services (FCAS) to the network. This involves management of the device/infrastructure to help the Market Operator deliver on Standards for frequency, voltage, network loading and system restart processes. These services are delivered through a separate market and can be worth considerable revenue. Unfortunately, it is difficult to forecast the value of these markets accurately at a small scale however this can be regarded as an 'upside' similar to the delivery of Demand Side Participation (see Section 2.7.7 below).

In addition to economic and operational impacts, energy storage can be of higher importance when used to protected critical infrastructure or services. This already occurs in the form of diesel stored in tanks to run back-up generators – useful and economic because of the relatively low cost of diesel generators and infrequent use of the supply fuel. If BSC is considering energy security for critical infrastructure, then the reduced cost of storage and ability to install a renewable source that can save or generate money at all times may be smart. Combined solar/wind/battery/generator sets are already commercially available.

There are other reasons to integrate batteries, including control and monitoring. For example, if every BtM solar installation included a Tesla Powerwall, this would automatically provide data and control measures plus a degree of redundancy/security in the case of blackouts. A trial of 1200 households in Adelaide equipped with a Tesla Powerwall and rooftop solar, operating a virtual network, is proving successful in

providing cheaper energy to householder partly because the system as a whole can be controlled and derive revenue from demand management to support network stability.

Battery modelling is complex. Our recommendation is that batteries should be seriously considered as part of any renewable energy project and at the very least, projects should be made 'battery ready'. Detailed modelling based on reliable existing and projected usage data will be required to develop a business case for investing in batteries.

3.5 Smart Meters

Access to detailed consumption data will become a critical element in maximising operation of projects under the REAP. The original 'spinning disc' meters and many current digital meters simply measure consumption in bulk (like a water meter). Only sites with high enough usage to qualify for individual contract negotiation (over 100 MWh per year) were supplied with meters that measured usage at regular intervals during the day, either 5 or 30 minutes. Meter technology has now evolved to deliver the capability of monitoring consumption effectively in real time including offering load control.

Rule changes by the market regulator also ensure that information gathered by the meter is available to consumers, however in practice this is not possible with older and most existing meters in NSW as they simply do not record the data. In addition, this data is currently requested in arrears from the retailer and supplied as a .csv file so is not immediately useful.

Meters used to be the property of the network operator and/or retailer however now it is common practice for the meters to be owned and operated by a specific metering company. These third-party companies usually recoup the cost of installing, reading and maintaining the meters through a service fee from the retailers.

True to the adage "What we inspect we improve, what we measure we manage", it is easy to see how having real-time access to data has the potential to help Councils manage their energy better. Furthermore, it will be possible with this technology to create 'dashboards' and operational algorithms which automatically manage energy usage across the full suite of Council assets.

It is hard to put a dollar value on this capability however in practice we often see simple 'mistakes' being made, such as running pumps and equipment unnecessarily in peak rate energy times, which could be easily avoided though implementing smart meters and an associated visibility/control platform.

The application of smart meters will enable greater energy transparency and literacy throughout Council. They will also make reporting easier and give rise to opportunities for staff and community engagement.

3.6 Retail Arrangements

BSC has some sites with large and consistent consumption which has provided a great start point for negotiations in the past and through well run tendering processes, resulted in sharper competition between each of the energy retailers and hence better pricing. We also know that CETROC has included Blayney in negotiating contracts in bulk to deliver better pricing for both Contract and Tariff sites than Council was likely to negotiate on their own. But note, however good these negotiations are, they are very unlikely to ever result in BSC receiving energy for free; these arrangements will always support another entity's business plan!

As BSC implements the recommendations of this REAP, such as distributed solar installations and batteries on select sites, or a mid-scale array, BSC can become a net generator of electricity which is then sold back to other BSC sites, the community and local industry. This changes the relationship with retailers who are already being disrupted by the 'prosumer' revolution affordable solar has created.

We recommend that Council be careful in engaging with any retailer over a long term and ensure the ability to reduce consumption and fair exit conditions. Ideally any new retail agreement needs to enable Council to

sell excess energy production to the retailer at a market or negotiated price, whilst purchasing electricity consumption at a fixed low price during peak times. The contract should also enable peer-to-peer trading and the operation of a Virtual Power Plant.

Proposed changes to network operating rules will see smaller operators such as Councils able to participate in high value demand responses, such as being paid to reduce demand or produce electricity at times where the network is stressed. Any supply agreements should account for this into the future.

Because the sector is rapidly changing it is difficult to provide definitive guidance in respect to retailer contracts. That said, there is also significant innovation and opportunity emerging such as the model described above enabling BSC to effectively operate as a Generator-Retailer.

An ideal agreement would incorporate both elements, so Council is able to negotiate 'certainty' and savings with electricity production and consumption, ultimately benefiting the BSC community. The retailer would provide customer support and billing facilities and in return the Council could assist the retailer with their brand promotion and customer acquisition in their local government area.

Our recommendation going forward is that Council be increasingly wary of simple bulk purchasing contracts for electricity as these approaches can limit the capacity for Council to save or off-set usage and to gain from participating in the new distributed energy economy.

4.0 Other Renewable Energy Options

4.1 Hydro

The Blayney Shire Council region contains hills and disused facilities that may be appropriate for pumped hydro schemes and Lake Rowlands and Carcoar Dam have been identified by NSW Water and the University of Canberra as potential opportunities for mid-scale Hydroelectricity generation. Any new Council water security initiatives should also consider energy production as part of their remit.

Pumped Hydro is emerging as a preferred dispatchable energy source, particularly over longer timeframes, due to its flexibility and low carbon emissions. Using combined pump/turbine plants, water is pumped from lower reservoirs to higher ones at times of plentiful or cheap energy and then released at times of peak demand when the price for electricity is high. Medium scale Pumped Hydro is likely to become an important 'product' in future markets as a buffer or insurance against high power prices and to time-shift large solar production from the middle of the day until night-time.

If BSC elects to proceed with a mid-scale array in proximity of the old saleyards then, being on the side of a reasonable sized hill, an equivalent scale pumped hydro scheme should be investigated in comparison to other chemical forms of storage.

Regardless of progressing BSCs own solar, it may be that a council-owned pumped hydro facility would be economic on the basis of services to other renewable energy projects in the area. In the medium term dispatchable energy is becoming increasingly valuable to the National Energy Market, often attracting pricing around twice the value of daytime generation. CE recommends completing feasibility modelling on this option for further market testing.

At the time of writing CE is aware that BSC intends to reclaim treated wastewater, which was previously supplied to the nearby NewCrest Ltd (Cadia Mine), for use irrigating BSC parks and gardens. Considerations for this model include;

- Would operation of a new wastewater pump significantly increase the STP usage above the 160MW demand charge threshold?
- Could a solar pumping solution be viable?
- Would the initiative support installation of a high-level storage reservoir?
- Could the costs for implementing a water efficiency / security project cross subsidise the CAPEX for a small scale pumped hydro plant?

To illustrate the concept, see below.

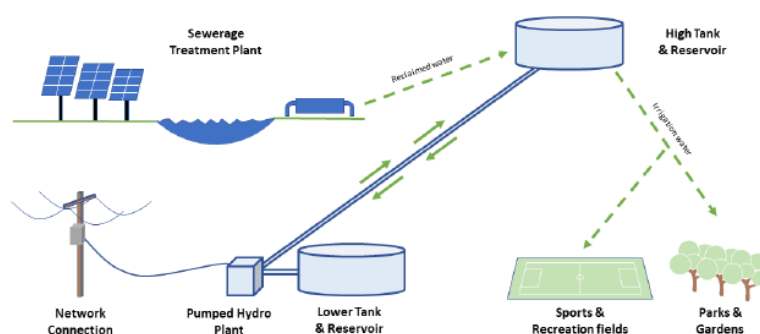


Diagram 1. Pumped Hydro conceptual model (dispatchable energy source).

Operational logic would determine how the system operated noting that if tanks are used (rather than a turkeys-nest dam) there is virtually no water loss in operating the pumped hydro plant. Installation of the tanks would allow irrigation to occur at night under gravity but there would be limitations if this conflicted with opportunities to generate revenue from high prices – particularly in peak periods. These factors will need to be incorporated into the modelling and ultimately will determine storage sizes, etc.

Aside from the opportunity identified above, it is worth considering installation of a pumped hydro plant in conjunction with any solar at the Blayney sub-station. Hydro technology is tried and tested and the economics of buying low and selling high on the energy market will remain valid for a long time.

4.2 Wind

The hills around Blayney contain some of the oldest turbines in Australia and current approval for another separate large-scale wind farm at Flyers Creek. Blayney Council is removed from the approvals process for these. Whilst the LGA is hilly, Council assets are generally in urban areas and not in high wind zones so case-specific detailed modelling would need to be completed to identify where small-medium scale turbines will benefit Council.

There may be a case for small scale solar + wind + battery installations for off-grid applications such as remote or new amenities and these systems are constantly improving in terms of technology and price.

4.3 Bioenergy

The Blayney LGA contains a large area of high altitude, moderately high rainfall, productive soil country suitable for reliably growing a range of agricultural crops and timber. Additionally, there are large manufacturing industries that produce significant quantities of bio-waste which is currently processed into compost products at large treatment facilities which also draw from neighbouring LGAs. Given the price increases and uncertainty around gas supply, the possibility of generating gas or heat locally from these feed stocks should not be overlooked.

While common in Europe, bioenergy has been slow to take root in Australia however there is increasing interest and there are already commercial biogas projects in the Central West region. Most prominently Manildra Group has received \$5.38 million in funding from the Australian Renewable Energy Agency to install and operate a biomass fired boiler. Council should be a participant in these conversations because of the ability of bioenergy to be a dispatchable form of renewable energy.

BSC may wish to act as the facilitator of bioenergy within the LGA to future-proof the larger companies who currently rely on piped gas at prices that threaten viability. Central West Linen is an example of this having disconnected from gas and recommissioned an old coal-fired boiler in order to remain competitive.

The Australian Energy Market Operator has identified bioenergy as part of the 'future mix' of energy for Regional Australia and Blayney Shire presents as an excellent candidate for the integration of this technology for both commercial gain and grid stability.

4.4 Ground Source Heating and Cooling

Where major retrofits are being undertaken or new buildings constructed, the possibility of using ground source air conditioning should be considered. Opportunities such as open trenches for other plumbing work could be used to improve the cost-effectiveness of installing ground loops.

There are examples globally of roads being underpinned with a network of pipes to capture solar-thermal energy which then dramatically reduces heating costs for nearby buildings in winter.

While seemingly left-of-field, using the temperature of the earth to heat and cool can be low-cost, low maintenance renewable energy source.

4.5 Transport and Plant

The development of battery technology and, in particular, greater energy density, has been driven by two significant market forces; transport and power tools. With Tesla most prominently spearheading the 'mainstreaming' of fully electric cars, as opposed to hybrid drive trains, all major brands are now developing Electric Vehicles (EVs). Many countries internationally have incentives and targets for EV uptake and China leads the world with development and sales, particularly in the heavy vehicle sector.

"For a GVW of less than 16 tonnes, an increasingly wide selection of all-electric trucks is reaching the market. In fact, major postal and package delivery companies, including DHL, UPS and FedEx, are expanding their fleets, and the Swiss and Austrian postal services have pledged to transition to all-electric fleets by 2030 or earlier." International Energy Agency 2019 (<https://www.iea.org/reports/tracking-transport-2019/trucks-and-buses>)

For regional councils, the immediate challenges of model availability, range anxiety and relatively high prices are likely to abate by about 2025 (unless government incentives are established before then) as competition increases.

The relevance of EVs to this plan is particularly apparent when considering export of surplus generation and the fact that within the decade, Council will be producing energy for essentially no cost. Even at modest c/kWh prices, the operational savings are clear as illustrated in the table below.

Internal Combustion Engine (ICE)			Battery Electric Vehicle (BEV)		
Fuel efficiency	7	L/100km	Power efficiency	16	kWh/100km
Fuel cost	\$ 1.40	per L	Electricity cost	\$ 0.10	kWh
Annual running cost	\$ 1,470		Annual running cost	\$ 240	
Annual km	15000		Savings with EV	\$ 1,230	per annum

Table 6. Example Battery Electric Vehicle VS Internal Combustion Engine vehicle modelling

However, because the fuel costs are marginal in the context of greater CAPEX, even considering reduced servicing costs, at present the financial case for EVs is not compelling. That said, BSC may decide that there are other reasons to factor, such as carbon reduction, research, leadership, etc and these may outweigh the reduced financial case. CE conceives that the ‘tipping point’ for wide scale adoption will occur when the price gap for equivalent ICE cars reduces to around 15%.

Aside from fleet cars, there is perhaps a more compelling case to look at electrification of heavy vehicles. The City of Casey in Melbourne has commenced garbage collection services with an all-electric truck and many factories Australia-wide already use electric forklifts. Again, the case for these will be made more compelling in years to come if Council has the ability to set its own pricing for the electric ‘fuel’.

Cordless power tools and light plant such as lawnmowers are also the focus of many manufacturers. For example, Makita have allegedly ceased all R&D into petrol powered tools. While these tools and plant use a small amount of energy in comparison to cars for example, there are operational advantages in not having to deal with mixing fuel and small engine maintenance.

The most obvious conflict with solar energy and electric powered vehicles is in the time of use – that being the overlap of solar generation and daylight working hours. This can really only be managed using batteries and/or by analysing which vehicles/plant can be charged during the day.

An additional issue with EVs arises in relation to charging capacity; not just where to place them but the engineering behind delivering large amounts of energy quickly. So called ‘superchargers’ require large amperage, not always available through the existing grid, and therefore can incur significant costs to establish.

Transport vehicles and plant require large amounts of energy relative to operating building lighting, office equipment, etc. If Council chose to power all vehicles with self-generated solar power this would require a significantly larger array than currently forecast.

The view of Constructive Energy is that no immediate action is required in relation to EVs but that the case for them should be reviewed in 2 – 3 years alongside review of additional generation or storage possibilities.

4.6 Microgrids

With privatisation of the electricity network it may be possible to purchase elements of the local grid in the future. This of course would require detailed analysis at the time as Council would be gaining the benefit from distribution revenues but would also incur the maintenance burden.

A more feasible interim measure is to invest in private networks for new developments. The Industrial Estate is a good example of this where BSC has the potential to be an energy provider to business and simply have a single meter between the private grid and the broader network. If Council is the enabler, then individual businesses would be metered and charged by BSC which is likely to result in reduced operating costs for sub-meter customers and an on-going revenue stream for Council. A similar model could be specified for new residential developments and it should be noted that this already occurs throughout Australia and the world; useful for establishing the legal and administrative enablers.

Another model which may stack up financially is to fund a direct line from a generating facility to a business load 'behind the meter'. This would involve evaluating the costs of paying the network provider to use existing poles and wires against the cost of installing a Council owned cable and is obviously dependent on location.

Microgrids are going to play a large role in future greenfield developments in regional Australia. The costs of installing and firming renewables are now competitive and, in some circumstances, much cheaper than installing and maintaining the poles and wires to new remote locations.

An article in ABC News recently reported significant interest in micro-grids and energy sharing in a variety of applications from small townships to university campuses to remote communities (See [ABC News 4th December 2019](#))

It may also be that micro-grids can enable better provision of power and services to villages within the BSC area.

A simple case study of Newbridge is illustrative. In this example it is very difficult to complete detailed modelling however the fundamental test would be to establish if a microgrid could be operated at or below the current operating costs for the community and, if so, what triggers exist in relation to pricing. This high-level overview assumes that the microgrid maintains a connection to the network but has embedded generation and storage capacity.

The following table represents estimates on the number and type of buildings in Newbridge and approximate (based on national averages) and known daily loads.

Load	No.	kWh/yr.	kWh/d	Sum kWh/d
Homes	50		15	750.00
Businesses/school	5		50	250.00
STP	0		50	0.00
Water supply	1		20	20.00
Memorial Park	1	650	1.78	1.78
Streetlights	1	12000	32.88	32.88
Fire shed	1	400	1.10	1.10
			Total	1055.75

Table 7. Estimated daily loads in Newbridge

Without metering data it is impossible to know the impact of seasonal variations on the average demand, however we have envisaged that the microgrid should be able to supply all of this demand for most of the year, apart from a month or so in winter. Rough modelling of Newbridge's demand indicates that a solar array in the vicinity of 400kW would be appropriate.

To enable provision of power overnight we have considered a battery with enough capacity to store and then release this demand for 12 hours.

The following table outlines approximate costs for solar and battery provision along with the revenue based on existing pricing for Newbridge residents.

Solar	System size	400	kW
	Installation cost	\$ 1.00	per kWp
	=	\$ 400,000	
	reduced to daily rate at	13	year Payback
	=	\$ 84	per day to finance
Battery	Cost	600 kilowatt 12 hr	
	Installation cost	\$ 600,000	
	reduced to daily rate at	10	year Payback
	=	\$ 164	per day to finance
	O&M	\$ 10	per day
	Total cost	\$ 259	per day
Revenue			
	Energy sale price	26	c/kWh
	Volume	1055.75	kWh/d
		\$ 266	per day

Table 8. Conceptual costs and revenues related to a Newbridge Microgrid

The outcome of our high-level analysis indicates the following;

- The costs and revenues are roughly equivalent however there has been no incorporation of costs to purchase or replace the existing network. This would be an interesting study; would Essential Energy

be interested in relinquishing control of these parts of their network – known to be costly to support? Could the current High Voltage infrastructure be replaced with undergrounded Low Voltage cables?

- If installation costs fell to 80c per watt solar and \$600,000 for the battery, a daily difference of \$141 results, or ~\$51,500 per year which begs the question, if amortised over 25 years, could a low voltage grid be constructed for around \$1,000,000?
- There are a range of open questions such as who is responsible of ownership and operation of the microgrid? Would the project result in revenue to support provision of services locally?
- There would need to be compelling social and practical drivers for this approach to be viable – such as poor quality and repeatedly interrupted power supply, extensive damage to existing network due to bushfire for example.
- The project could be delivered in a single location or distributed across all residences with on-site solar-battery packs – which would have its own pros and cons.
- The case is not compelling for immediate action but should be kept ‘on the horizon’, particularly if a community becomes pro-active in wanting to be 100% renewable. Millthorpe springs to mind as one such possibility.

4.7 Demand Side Participation (DSP)

Demand Side Participation presents an opportunity for Council to participate and financially benefit from the scheme.

The Australian Energy Market Operator (AEMO) has forecast elevated risk to electricity supply over the next 10 years. AEMO is forecasting interruptions to electricity supply during peak summer periods.

A contractual arrangement can be entered into by Council (the participant) with AEMO, in which they agree to the curtailment of non-scheduled energy consumption or provision of non-scheduled generation in response to the demand for electricity.

Examples include industrial facilities that are exposed to the wholesale price and elect to reduce electric load at times of high prices, consumers that agree to let their battery be controlled by a third party or are incentivised to switch off air-conditioners, and small non-scheduled generators that have the ability to produce electricity at these times, offsetting local consumption (source: [November 2019 Demand side participation forecast and methodology](#)).

We recommend that Council explore opportunities to have excess solar and battery production enabled during these peak periods, for financial reward. Council could benefit significantly from this scheme if it has smart load controlling meters installed, generation capacity and energy storage under its control.

4.8 Off-grid Facilities and Critical Infrastructure

Many remote communities and mining operations are currently installing independent generation facilities across the country. A good example of this has occurred in remote farming communities around Esperance WA. In 2015 a large bushfire caused loss of life and property, including large swathes of the local electricity distribution infrastructure. In agreement with the local community the electricity provider (Horizon Energy) has installed a virtual microgrid with each customer having their own solar production and firming capacity (battery). Locals have confirmed that the outcome for them has been stable and reliable power at equivalent cost (source: [ABC news Oct 2019](#))

We recommend that serious consideration is given to installation of solar, battery and backup generation capacity for any new developments planned by BSC where access to the network may be problematic or expensive. Further, this approach can provide energy security for critical infrastructure in the event of natural disasters.

CE also recommends that BSC consider the relative importance of energy security at the STP where solar capacity is already installed. The addition of as little as 50 – 100 kWh of storage capacity would enable the plant to run continuously during daylight hours in a blackout. If BSC has already completed, or intends to complete, an emergency management plan, there may be other critical infrastructure that could benefit from integration into the REAP. Energy security and reliability may be the factor that weights a business case towards proceeding.

4.9 CAPEX Funding and Ownership Models

The strong economic return in renewable energy infrastructure is resulting in a range of potential investment options and there is currently significant investor interest which can be leveraged. The following enabling mechanisms all have relevance and precedent within the local government sphere;

BSC owned and operated on BSC facilities: Delivers BSC the shortest pay-back and maximum return (cash flow) but BSC carries all the risk (after warranty). BSC may choose to invest existing reserves (including grant funding) or take advantage of low borrowing rates to structure projects as cash-positive from day 1.

Corporate owned on BSC facilities: It is common practice for solar companies to offer installation at no cost and to enter into a Power Purchase Agreement (or equivalent lease-type arrangement) that will slightly

reduce and lock in a cost for energy over typically a 7 - 10-year timeframe. In this instance the provider carries the risk and maintenance burden but is able to generate a cash flow and profit after the pay-back period. The asset is often gifted to the host at contractual exit e.g. after a 12-year period

Community Owned on BSC facilities: There is a strong movement for community ownership of commercial and larger scale solar plants and many models and organisations exist to facilitate this. The arrangements are similar to corporate investment however the financial returns are distributed to community investors, typically at around 6 – 10%. Community owned solar is seen as a way to engage community and to share economic benefits locally and in many parts of the world a set percentage of community ownership is stipulated as a condition of consent – particularly in wind projects.

BSC as provider on/to third parties: Subject to the right agreements and on the strength of business modelling, BSC may choose to invest in solar panels on or near industrial sites in Blayney and to benefit from a Power Purchase Agreement while supporting local business through reduced operating costs and energy certainty.

Hybrid funding: For certain larger installations it is possible that a range of funders invest in the project. For example, the host/energy user, the community, Council and a third-party commercial operator may all invest in a set percentage share of a project.

5.0 Proposed Renewable Energy Projects (1 – 3 Years)

CE has developed the following tables to summarise the results of our investigation and present the rationale for our recommendations.

Project 1 - SMART metering and load control installations across all Council's energy consumption sites

Key Points

- Smart metering and load control enable the Council to become a 'smart' energy consumer and energy 'sharer' with the Blayney Community.
- Council will be able to redirect energy expenditure to other capital works that are more beneficial to the community.

Currently Council has limited visibility on its energy usage profile. This hampers sensible decision making that can be made by Councillor's and the Council Executive in reducing energy consumption costs and becoming intelligent in energy usage.

Installing smart metering is a relatively low capital investment and these costs will be immediately recovered, through Council reducing excess energy consumption and any wasted energy.

Actions and Recommendations

CE recommend that budget be allocated in FY20 budget for this project. CE has already commenced on pricing this project for Council and will share 3rd party costings once completed.



Source: energysavers.nsw.gov.au

Project 2 - Medium scale solar (1MW) with Council as retailer mechanism

Key Points

BSC has multiple locations where a potential Medium scale solar array with storage could be constructed, with solar.

A suitable solar energy system could be sized to accommodate BSC's peak seasonal profile. Energy produced from a medium scale solar site is 'sold' back to Council sites at a tariff which both pays back the array CAPEX and reduces electricity outgoings for Council. Project sizing is governed by site and infrastructure constraints and BSCs appetite to engage with local businesses and residents.

CE experience shows these projects deliver yields in the order of 7 – 12%

- Council will reduce uncertainty and price pressure relating to energy.
- Access to affordable, reliable electricity in the BSC LGA would be a driver to stimulate the local economy and to attract more businesses to the LGA

A medium scale solar build would provide Council with a new long-term revenue stream with an attractive ROI, particularly given that Council has access to cheap infrastructure finance. This project represents low financial risk. As previously modelled the payback period on such infrastructure is anywhere between 9-12 years as determined by Council. The lifespan of this build is upwards of 30 years with low operational and maintenance requirements.

Actions and Recommendations

Full site assessments, preliminary network investigations and business case preparation.

Project 3 - BtM Solar and battery installations for Virtual Net Metering

Key Points

Our desktop analysis has revealed that there are over 7 sites where Council will be able to receive a financial benefit from augmented or new solar and battery BtM installation.

- Centrepont Sport and Leisure
- Sewer Treatment Works
- Works Depot and Workshop
- Blayney Shire Community Centre
- Council Chambers
- Visitor Information Centre - The Cottage
- Blayney Showground

Council will own the energy asset(s) within a range of 5-10 year payback period.

- Council will be able to redirect energy expenditure to other capital works that are more beneficial to the community.
- By implementing Virtual net Metering Council will be able to share excess energy across all Community amenities at below market rate e.g. Pools, Halls, Kiosks, etc

The technology and business model now support Council to move from being a passive energy consumer to be a net generator of energy. The approach is well-established and widely successful for businesses and Councils elsewhere as evidenced by Australia's world leading uptake of roof-top solar.

With Council's access to cheap finance and with short payback periods an investment in renewable energy infrastructure is a sound investment for Council.

BtM PV Solar installations come with 80% production warranty over 25 years for an asset that Council will be able to own outright within 5-8 years.

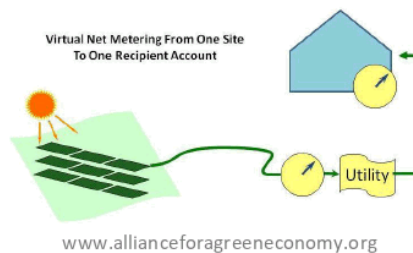
BtM solar requires very low Operational expenditure over the lifetime of the installation.

BtM PV solar can be augmented with battery installations,

Actions and Recommendations

Prioritise the sites best suitable for BtM solar installation and prepare the costings for each individual site installation. The most likely site for immediate augmentation is the STP in order to reduce usage below the 160MW demand charge threshold

SOURCE:



Project 4 - Energy Efficiency measures implemented across Council locations

Key Points

While some positive work has been completed, there are multiple locations where energy efficiency initiatives will have an attractive ROI, mostly relating to building fabric and lighting. Lighting upgrades frequently pay back within 2 years while other measures such as HVAC renewal require detailed analysis outside the scope of this report.

- Council will be able to redirect energy spend to other capital works beneficial to the community.
- Council will reduce their carbon footprint.

This is considered an easy win for Council in reducing their energy consumption and any wasted energy.

LED lighting installation and more efficient heating\cooling will immediately reduce energy consumption and reduce the CAPEX for any renewable energy projects.

Actions and Recommendations

We recommend that BSC's procurement processes specify/preference high efficiency devices for new and replacement devices and, engage a third-party audit/assessment specialist to develop and list of costed savings measures. There are a range of supports available from the State Government through their [Energy Saver Website](#)



source: www.sievo.com

Project 5 - Energy Contract negotiations. Renegotiating with existing providers and/or engaging with novel retail approaches.

Key Points

This project is dependent on which projects Council chooses to enact as a result of this Plan. The development of a mid-scale solar project will necessitate retailer engagement and negotiation.

The BSC negotiation position will also benefit when BSC has excess BtM energy to be sold back to the grid.

Given that the market is volatile but currently trending down there may be strong cases emerging for renegotiating contracts.

- Council to negotiate with the preferred retailer, an offer specific to BSC ratepayers only. A 'best in market' deal.
- Ratepayers and the (business) community will be able to leverage Council's strong negotiation position. As the Council is a large consumer of energy and sought after as a client by many of the Energy Retailers.

Council should exercise caution in participating in bulk deals if they limit the flexibility of Council to install and operate renewable energy infrastructure to the benefit of Council.

Actions and Recommendations

Commence negotiations with retailers in 2022, 3-6 months prior to existing contract expiry.

5.1 Proposed Renewable Energy Projects (3 years +)

Project 6 - Microgrids for BSC villages – special case study on a village

Key Points

Millthorpe, Newbridge and Carcoar are prime candidates for the first implementation of a Microgrid within the BSC LGA.

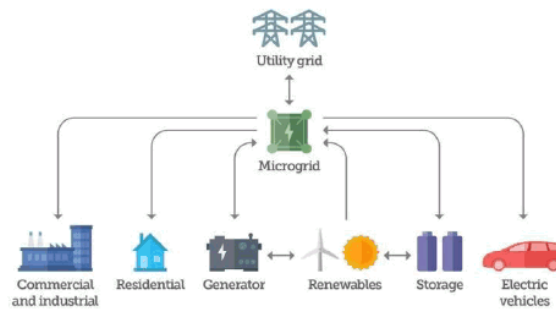
These communities would directly benefit from more reliable energy supply, future proofing in terms of carbon intensity and the possibility of a long-term revenue stream to underpin service delivery.

These communities will likely also have greater energy security in the face of natural disasters.

The villages could remain connected to the grid but would benefit from additional energy reliability. The remote township of Kalbarri in WA is successful example of a remote town developing their own microgrid (source: [Western Power Nov 2019](#)).

Actions and Recommendations

Business case development in 2020 – 2025.



Source: LG CNS
© 2016 The Pew Charitable Trusts

source: www.microgridnews.com

Project 7 - Electrical Vehicle (EV) Fleet and Electrical Vehicle charge stations (also relevant to Hydrogen)

There is now a cost benefit in terms of operational expense for Council to consider changing the ICE (internal combustion engine) vehicle fleet over with EVs. However, the current higher CAPEX out-ways reduced running costs when fleet finance is included.

This project would also need to include the installation of further EV charging infrastructure noting that EVs can be charged during off-peak times or with Council's excess energy generation. Co-funding of EV fast charge stations also exists for local government with the NRMA.

There is also future potential to have the EV fleet as contributors to a Virtual Power Plant managed by BSC.

- Having multiple EV fast charging infrastructure located in the BSC is a tourism drawcard to the country region.
- Council supported EV infrastructure and EV fleet, will support the transition away from ICE vehicles, directly reducing Council's and BSC community's transport costs and emissions.

Preparation for the future where EVs make up most of the transport in the LGA.

Actions and Recommendations

BSC to invite / install further fast charging infrastructure. BSC to prepare for the transition to an EV fleet in 2020's on an 'as-needs' basis. Begin a trial with a vehicle and charging station linked to a solar project with export. Implement changes to procurement processes to ensure a smooth transition commences.



source: www.alavozdegalicia.es

6.0 Activity – Outcomes summary

An outcome summary project table {Appendix A} has been created with a comprehensive listing of potential projects and areas of enquiry. While CE holds a view on which are most important it is clearly the role of BSC to prioritise and integrate as appropriate. In order to complete the table, it is important to consider the project ranking framework.

- Benefit/Cost – does the project have positive financial impact?
- Leadership – will the project stimulate positive change in others?
- Community benefit – how does the wider community benefit from this project?
- Logic – is the project defensible, sound, ethical, enduring?

7.0 Constructive Energy

Constructive Energy (CE) was founded in 2018 in the regional city of Bathurst (NSW). We are a renewable energy strategy and energy management firm.

Constructive Energy has a combined experience of over 25 years' worth of renewable energy and energy efficiency expertise.

Our key focus is to assist regional local government organisations with their transition towards a renewable energy future.

Since forming, Constructive Energy has:

- Developed Renewable Energy Action Plans for 5 local governments.
- Developed the detailed business case and commenced project delivery of a \$7.6 million, 5 MW solar array.
- Completed several major funding applications for renewable energy projects with multi-State and national consortia including microgrid feasibility with the Murray Darling Association, Queensland Farmers Federation and Cotton Australia (result pending).
- Delivered energy efficiency training to builders in Australia and the US.
- Presented on renewable energy at several conferences and forums.

Our service offering includes:

- Renewable energy and energy efficiency strategy
- Small and medium scale renewable energy installation and project management
- Energy contract management and renewable energy procurement
- Outsourced energy management and energy consumption reporting

Our stated goal by 2030 is to:

- Assist Local Government to install and own over \$60m in renewable energy infrastructure.
- Facilitate the micro-grid, VPP and behind-the-meter transition across regional Australia
- Deliver 20m tonnes in Carbon abatement.

Appendix A

OUTCOME SUMMARY TABLE

Activity/Outcome	Summary	Ranking	Responsible
ENERGY EFFICIENCY			
Monitor consumption:	Engineering are responsible for reviewing energy usage at all sites and of key equipment/assets.		
Reporting and performance	Energy use for sites/assets is reported in regular section meetings and efficiency forms a component of staff Position Descriptions		
Procurement policy	Energy consumption rates are considered in the procurement of any new equipment or servicing and maintenance of existing items. This includes new buildings and vehicles.		
Retrofit strategy	Building modifications will be carried out at least in part for the purpose of reducing energy consumption.		
Planning	BSC promotes energy efficiency in design through the planning phase where applicants are encouraged to adopt Guidelines for factors including – insulation, glazing, orientation, primary equipment, water use, etc		
Product broker	BSC applies knowledge and purchasing power to support residents and businesses with products that reduce their energy consumption		
Street lighting	BSC works with CENTROC to replace existing streetlights with efficient alternatives.		
SOLAR ENERGY			
Mid-scale solar array	BSC installs and controls an array in the order of 400kW to 2MW		
On-site Solar for Council assets	BSC installs solar panels on (or nearby) Council owned sites 'behind the meter' sized to minimise purchase and deliver energy sharing/virtual power plant metering where Council and constituents can be the beneficiaries of local renewable generation 'in front of the meter.		
Education and Leadership	BSC makes it easy and safe for residents and businesses to install solar.		
Micro-grids	BSC develops new industrial and residential estates with the capacity for Council owned micro-grids and reduced energy costs to constituents from Council supplied electricity		
Industry support	Local industries are encouraged and supported to offset energy demand with commercial solar installations and/or to purchase Council generated energy at a competitive rate.		
WIND ENERGY			
Micro-turbines	BSC remain cognisant of the potential application of small turbines to supplement generation in specific circumstances.		
HYDRO ELECTRICITY			

Hydroelectric generation	BSC remain on the lookout for opportunities and encourage mine decommissioning plans to investigate this.		
BIOENERGY			
Bioenergy	BSC is home to many carbon-rich agricultural and primary production feedstocks capable of generating bioenergy. As a dispatchable energy source, this may be an important part of the local energy mix in the coming years. BSC should foster and collaborate with local businesses developing bioenergy.		
GROUND SOURCE			
Earth energy	In new buildings and developments consider the merit of integrating ground loops to pre-heat/cool air or fluids for efficient air conditioning. Competent contractors in this field should be invited to tender on HVAC projects.		
TRANSPORT			
Plant and Transport	Keep a watching brief on development of battery powered tools, electric and hydrogen powered plant and electric vehicles noting a likely exponential rise in adoption from 2025.		
Charging stations	BRC supports the use of electric vehicles and encourages the development of charging stations in Blayney, particularly in partnership with businesses in the town. Biofuels are also welcomed if they can be grown and utilised locally		
ENERGY STORAGE			
Critical Infrastructure	Battery storage will be investigated to both maximise the value of solar generation and to provide back-up energy security for key services.		
Batteries for load shift / control	Where Council creates/controls micro-grids, battery storage will be investigated to provide power sharing and grid stabilising faculty		
Medium scale array	Storage must be integrated into any proposal for developing a solar array to enable load shifting and to mitigate market risks if/when BSC becomes a generator-retailer		
Virtual Power Plant / VNM	Distributed batteries are supported as part of developing a community wide VPP/VNM		
MICORGRIDS			
New developments	Where Council is involved in developments, investigate the feasibility of a Council enabled/managed microgrid		
Village strategy	Respond to future community interest and/or economic/government imperatives for village self-sufficiency		
SMART METERS			
Energy transparency	Facilitate the roll-out of smart meters on all main Council sites.		
RETAIL ARRANGEMENTS			
Contract renewal	Ensure any change in retailer enables and does not hinder objectives in the REAP		

Mid-scale &/or VNM projects	Negotiate retailer contracts that support the objectives of BSC in relation to deployment of renewable energy infrastructure		
COUNCIL AS GEN-RETAILER			
Strategic direction	Decide on the extent to which BSC is willing to engage in the energy market in order to optimise renewable generation		
DEMAND SIDE PARTICIPATION			
Registered participant	Investigate how Council can participate in the AEMO scheme		
Increased capacity	Develop energy transparency and control through metering and a management portal to optimise participation		
OFF GRID / CRITICAL INFRASTRUCTURE			
New projects	Consider the feasibility of not connecting to the network		
Emergency resilience	Apply new energy technologies to provide energy security for key infrastructure/services		
FUNDING			
Strategy	Develop a position on the investment strategies best suited to underpin progress in relation to this REAP		