

Energy Saving Action Plan

2019–2023

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Introduction

AlburyCity has prepared an annual Energy Savings Action Plan (ESAP) since 2016. The ESAP outlines an implementation schedule for energy saving measures over the next four year period based on management priorities and fiscal responsibility. Energy saving measures includes energy efficiency initiatives (e.g. installing LED) as well as the installation of renewable energy (e.g. solar).

Each ESAP is developed on information from a variety of sources including external assessments (undertaken primarily on the energy performance of Council heating, ventilation and air-conditioning and lighting), internal solar suitability assessments and information obtained from NSW Environment and Heritage energy efficiency for business workshops. These measures have been prioritised according to management priorities, asset life, and fiscal responsibility including the use of financial criteria relating to the payback.

This report provides a review of the implementation schedule for 2017/18, including commentary on the status of measures and related energy and cost savings achieved. This plan can only confirm actual energy and cost savings of implemented measures where verification has been implemented, otherwise energy consumption and financial savings from assessments are used.

The major feature of the ESAP (2019–2023) is the conversion of metal halide street lights to LED at a total cost of \$2 million. AlburyCity street lights are proposed to be replaced as part of the Southern Lights project that will replace 70,000 street lights across 38 Local Government Areas in southern NSW. The project is expected to have a 4 to 6 year payback and reduce AlburyCity’s unmetered street lighting electricity consumption by 900,000 kWh or 20 per cent.

This ESAP also includes for the first time the “Community Energy Fund” New Initiative. This New Initiative seeks for the first time to pursue energy efficiency and renewable energy projects at Council assets that are community run (that is leased by a community group). Usually energy saving measures implemented at Council assets that are community run are only implemented as part of asset management / maintenance schedule. Renewable energy projects are the responsibility of the community group to pursue. This proposed funding fits with Albury 2030 Outcomes 2.1.1 Minimise Albury’s ecological footprint and 2.1.2; Investigate and encourage energy saving initiatives for individuals, business and industry.

Summary

A summary of the implementation schedule, capital spend and energy and cost savings of energy saving measures is provided in Table 1. Table 1 summarizes proposed New Initiatives that seek a budget allocation in order for the measure to be implemented. New Initiatives relating to AlburyCity assets include technical assessments, energy efficient lighting for assets, as well as new and replacement public and private street lighting, and solar / battery assessments and installations. It must be noted that technical assessments are excluded from Table 1 as these don’t have an identified ‘cost

saving' nor a 'electricity saving'.

Table 1: Measures

Year	Capital Cost (\$)	Cost Savings (\$/yr)	Electricity Savings (kWh/yr)
2019/20	1,297,000	735,533	249,800
2020/21	111,000	42,000	12,600
2021/22	113,000	50,400	12,500
2022/23	191,000	128,000	21,600
Total	1,712,000	955,933	296,500

1 The majority of the electricity savings in year 1 are estimated from LED installation at AlburyCity public streetlights and two car parks, including include an estimated 450,000kWh of unmetered street light consumption.

Energy Savings Action Plan

The Energy Savings Action Plan schedule of activities (2019–2023) is a revision of the previous plan and outlines information on the capital spend, estimated energy and operating cost savings, simple payback and an implementation schedule. The Energy Savings Action Plan is reviewed on an annual basis under the Energy Management Framework, and in line with the annual Council budget development processes. A key change introduced in this Energy Savings Action Plan is the separate tabulation of technical assessments and measures for which are yet to have an identified ‘cost saving’ nor a ‘electricity saving’.

The Energy Savings Action Plan (2019–2023) focuses on electricity and mains gas measures as these combined accounted for approximately 4.0 per cent of Council’s total annual expenditure in 2017/18 (\$5M electricity and \$228K gas). In 2006/07 the cost amounted to \$3.4M and accounted for 3.7 percent of the total AlburyCity budget. Consumption (excluding street lighting) over the same period has fluctuated but in 2017/18 is fairly constant at 17.26 million kWh compared to the base year of 18.0 million kWh; although new assets have been added (e.g. sewer pumps) or renovated (Albury Airport, Murray Arts Museum Albury).

Table 1 above summarizes the energy saving measures per fiscal year of the plan. The energy assessments estimate that an investment of \$2.5M over the next four years will result in annual energy savings in year 5 of 296,500 kWh from electricity. It must be noted that New Initiative funding sought for the technical assessment of measures are not included in Table 1 as ‘cost saving’ nor a ‘electricity saving’ will be estimated from this assessment. Thereby any saving found will be included in future Energy Saving Action Plan reports, however projects will only proceed where the energy and maintenance savings have an acceptable payback or assets are life expired.

Cities Power Partnership

Council at the Ordinary Council Meeting held 22 May 2017 resolved to sign-up to the Cities Power Partnership (CPP). The CPP is a Climate Council initiative that seeks action on climate change at the local level. Council endorsed the following five pledges.

- Renewable Energy 5 – power council operations by renewables, directly (with solar PV or wind), or by purchasing Green power (from electricity retailers). Set targets to increase the level of renewable power for council operations over time
- Renewable Energy 7 – support community energy projects (with location and planning support) so that residents (such as renters) can band together and invest in community renewable energy projects
- Energy Efficiency 2 – adopt best practice energy efficiency measures across all council buildings, and support community facilities to adopt these measures
- Transport 3 – encourage sustainable transport use (public transport, walking and cycling) through Council transport planning and design. Substantial savings in transport energy use can be achieved by designing more compact cities with access to high quality public and active

transport services and facilities

- Working Together and Influence 4 – implement education and behaviour change program to influence the behaviour of council officers, local residents and businesses within the municipality to drive the shift to renewable energy, energy efficiency and sustainable transport

A separate report to Council has been prepared to provide an update against each pledge.

Energy Audit or alternate

AlburyCity has undertaken detailed energy audits in 2008 and 2013 to identify potential energy saving measures at a number of key AlburyCity assets. The majority of the recommendations from these energy audits have been implemented as part of the New Initiative process, are scheduled to be implemented or are not progressing due to an alternative measure being completed or operational barriers identified preventing its implementation. AlburyCity is seeking funding in each year of the program to enable a lower level technical assessment of the feasibility of the proposed measure to be undertaken, and to develop a specification for the measure. The outcomes of these assessments will provide AlburyCity with an informed specification to seek new initiative funding for energy measures in future years, and to plan for procurement.

Lighting upgrades – Buildings and Facilities

In accordance with the CPP pledge regarding Energy Efficiency, AlburyCity has undertaken a number of LED replacement projects in AlburyCity buildings and facilities; these have generally had a less than 3 year pay back.

The airstrip at the Airport has incandescent lights that are supplied via a transformer to convert the supply to a reduced voltage. Currently there are 94 runway and 82 taxiway lights; these vary between 45 to 200watts. It is proposed that these lights be converted to LED except for 56 taxiway lights that are to be removed. An additional 143 lights are proposed for anticipated future expansion. Runway lights are at certain times of the year run via a generator to mitigate risk during periods of low visibility. For operational purposes a new generator is proposed that only runs the airfield lighting; converting existing lights and installing LED in the expanded area enable the generator size to be minimised. The New Initiative process is (in part) seeking to replace the lighting along the Airport landing strip with LEDs.

The ESAP has identified lighting measures at the Council Administration Building, Lavington Depot and the Streets and Drains Workshop. The energy saving lighting measures at the Depot and workshop are to occur prior/ combined with installing solar.

Lighting upgrades – Street Lighting

Street lighting is an essential community service that aims to provide pedestrians and vehicles with a safe and comfortable visual environment at night. Street lighting also plays a vital role in reducing

crime and the fear of crime, and can have a significant influence on the aesthetics of streetscapes. Existing street lighting falls into two primary categories: metered and unmetered. Their ownership, funding and management vary significantly, providing differing opportunities and constraints. While Council has the most direct control over metered street lighting, unmetered street lights are much greater in terms of number, electricity consumption and overall cost.

AlburyCity has approximately 7,500 unmetered or “public” street lights throughout the City. The term “unmetered”, refers to the fact that the electricity the lights use is not directly measured by an electricity meter. The lights turn on and off when sensors detect ambient lighting levels crossing a set threshold level typically before sunset and after sunrise. The amount of electricity consumed by the street lights is estimated, based on sunset and sunrise times and the wattage for the individual light fitting. Based on this, unmetered street lighting consumes approximately 4,100,000 kWh of electricity annually.

AlburyCity plans a bulk replacement of 6,300 category P minor roads and pedestrian streetlights in 2019/20. The existing lighting is a combination of metal halide and compact fluorescent and are proposed to be changed to energy efficient LEDs. The payback from this project is estimated to be 4 to 6 years based on completed international and Australian public lighting projects. AlburyCity has previously been presented with four bulk replacement options and the energy savings have been estimated to be approximately 900,000kWh per year. This changeover is part of the RAMJO Southern Lights initiative for the region.

AlburyCity is also installing LEDs for category V major roadways on new installations. Previously two trial sites have been completed at Thurgoona Drive/ Travelstop Way roundabout and Nexus roundabout on Gerogery Road. A 190w LED was being trialled to replace 250w High Pressure Sodium and 400w Mercury Vapour lights.

AlburyCity has approximately 1,000 metered or “private” lights, in a mixture of parks, sportsgrounds, carparks and streets. The term “metered” refers to the fact that each set of metered street lights have their electricity use measured by a separate meter. Metered street lighting consumes approximately 400,000 kWh of electricity annually.

AlburyCity last year sought \$570,000 over four years to carry out Street Lighting Improvements. The Dean Street private pedestrian lights are coming to the end of their useful life. A trial of suitable LEDs will commence early in 2019 and these are proposed to be replaced over the next three years. In addition, the project proposes to install pedestrian lights where currently no lighting exists. The replacement lights will be energy efficient compared to the existing asset that is approximately 20 years old and will have an associated reduction in energy consumption and running costs. Due to age of this asset and the lighting industry moving to LED, the existing asset is considered life expired.

Two AlburyCity carparks were changed over to LED lighting in 2018; Kiewa St (renovation) and David St. The ESAP proposes to convert Wilson St and Volt Lane to LED in year 1 for a cost of \$110,000, it is estimated that this project would reduce energy consumption by 130,000kWh per year and save \$40,000 per year. An added benefit of LED lights is that they last six years compared to two

years for the existing fluorescent.

These lighting projects fit the Cities Power Partnership pledge regarding energy efficiency.

Solar

Solar installations are an ideal measure to reduce power bills, however the optimum time to consider these installations is when:

- Energy efficiency measures have been implemented first (i.e. energy efficient lighting etc)
- Energy consumption for the building occurs during the day
- Panels can be installed on a structurally sound roof/ structure in an area with no or limited shading

AlburyCity has installed ten solar systems ranging from 4kW to 51kW onto key buildings and facilities; Banjora Children's Centre, LibraryMuseum, Mirambeena Community Centre, Albury Airport, Waterview Laboratory, Albury Entertainment Convention Centre, Lauren Jackson Sports Centre, Council Administration Building and Crematorium (workshop and office) (a review of existing solar installations is discussed later in the document).

Solar investigations into potential sites were completed in 2017/18 and as a result AlburyCity is installing solar this financial year at the Retro Café, Jelbart Road sewer pump station and at the Albury Waste Management Centre. The investigation showed Murray Arts Museum Albury (MAMA) had the longest payback period of eight years (due to requirements of a crane, temporary fencing and cable length from the roof to inverters). It is proposed to defer the installation of solar at MAMA to 2022/23.

Glenecho Neighbourhood House is currently staffed by AlburyCity and has daytime core usage Monday to Friday between 9am -3pm, plus intermittent weekend use. AlburyCity staff currently provide day to day management of this facility, but this is currently under review. It is proposed to install a 10kW solar system at the premise in 2019/20.

Albury Airport has an existing 46kW system. In 2018 GPE prepared a report on the Albury Airport which included a recommendation of expanding the solar system by 54kW. This expansion is proposed as a New Initiative in 2021/20.

Solar is proposed at the Lavington Depot and the Streets and Drains Workshop in conjunction with LED upgrades. The system size will be determined by a technical assessment.

AlburyCity's water filtration plant and wastewater treatment plants consume significant amounts of electricity. These sites require detailed onsite assessments to determine the feasibility and business case for solar installations (regarding space available, plant upgrades, and consideration of large scale rebates versus small scale solar systems).

AlburyCity's solar implementation plan to date has focused on facilities that AlburyCity own and is paying the power bill. Additional opportunities would include providing solar on community facilities that are owned by Council and are suitable for solar, but the electricity invoices are not paid by AlburyCity. The Community Energy Program seeks \$50,000 of New Initiative funding to be provided annually from year 2 (2020/21) to install solar at AlburyCity community facilities such as:

- Preschool Buildings (e.g. Albury Preschool, Moresby Park Preschool, Ross Circuit Preschool, Springdale Heights Preschool, Thurgoona Preschool, Yarrunga Early Learning Centre)
- Community Centre (e.g. Thurgoona, Springdale Heights, Westside) and
- Sporting Facilities (e.g. Tennis, Football and Netball etc).

A \$150,000 investment over the next 3 years will install approximately 100kW of solar which will generate 280,000kWh. An internal process will need to be developed to determine the priority of community facilities to be considered for a solar installation. This will require discussion with AlburyCity's Property and Sustainability Officers as well as the Assets team. Only sites with regular day time use will be considered under this proposal.

For solar to be financially beneficial it is preferred that a site operates seven days per week during daylight hours. AlburyCity has conducted a desktop review as to which sites may or may not be suitable to solar. Sites that are currently excluded from considering solar are:

- Sewer and water pumping stations: consume a large amount of daytime energy but have a small roof space. Solar could be considered through a Power Purchase Agreement (i.e. sourcing solar and/or other renewable energy located at a different location)
- Parks and gardens: electricity consumption used at night time for lighting, ignition of BBQ's and sporadically throughout the year for irrigation
- Carparks: AlburyCity has a number of multi-storey carparks with 24hr lighting requirements; vandalism is a risk at Wilson St and Kiewa St (Volt Lane top level is locked at night and could be considered) and in the ten-year plan there is a proposal to add another storey at Wilson St
- Pools are only operational for part of the year and have limited roof space (but could be considered to add shading for participants) and
- Community Halls: used intermittently by the community and predominately in the evening

Proposed New Initiatives for 2019/20 also include numerous Master Plans and Sports Ground Redevelopment projects. In regard to each, energy saving initiatives will be considered and incorporated as appropriate at the design stage such as the inclusion of solar systems to offset the facilities baseload energy consumption (e.g. Lavington Sports Ground Precinct).

Heating, Ventilation and Air Conditioning (HVAC)

A New Initiative for the Council Administration HVAC is sought to upgrade wiring, control board upgrades, replacement of air intake dampers for Air Handling Unit 2. The NI will also include a review of the system to determine appropriate timing for the replacement of the boiler and chiller considering performance, environmental and financial outcomes. This review will provide key information for future NIs.

Water and Wastewater

Water and wastewater services was subject to an energy audit in 2013. The final report included a raft of recommendations of which a number of these have been implemented. AlburyCity are progressively reviewing this audit to consider advances in electric motor technologies, variable frequency drive and harmonic filtering technologies and the significant reductions in pricing of this equipment since the original audit, the review is also formally reviewing existing pumping infrastructure and their associated efficiencies and provide recommendations on newer more efficient technology. An annual New Initiatives amount of \$100,000 has been requested to roll out this program as listed in Appendix 2.

Proposed energy saving measures for water services are expected to result in 4 to 5% efficiencies; however demand increases from development are expected to keep total consumption constant in the short term. The overall unit rate of energy consumed per volume of water pumped (kWh per kL) is expected to be lower.

Water Pump Station 24 should be operational mid-2019 and will incorporate Council's first synchronous reluctance electric motors with an IE4 level of efficiency. This will be our first trial of IE4 premium efficiency electric motors. IE5 rated motors are starting to become available and will be trialled when feasible.

To Be Determined

AlburyCity has identified a need to undertake Technical Assessment and Specification measures to guide prioritization and allocation of budget to measures contained in the Energy Audit Recommendations in years 3 and 4. However projects implemented will need to either have a reasonable payback or are required due to equipment being life expired and an energy efficiency replacement selected. Potential measures that are currently being considered include energy efficient lighting in buildings/ public spaces, improved lighting controls (daylight and motion sensors), improved insulation of buildings, upgrades to heating and air condition systems with improved controls and installation of solar with/ or without battery storage.

Other Energy Related New Initiatives

Council as part of its 2018 ESAP review requested information on all New Initiative projects that had an energy implication. The 2019 New Initiative process seeks funding for a number of projects that may result in energy savings, however the savings are yet to be quantified. These projects include the design and installation of sports field lighting at Bunton Park, Albury Sports Ground, and Urana Road Oval, and alterations to water and wastewater infrastructure. These items have been tabulated separately in Appendix 2. Where existing lights have been replaced with LEDs a 50 percent reduction in energy consumption has been achieved. These projects will be moved into the ESAP tables or reported on when/if energy and cost savings data becomes available.

Third Party New Initiatives

New Initiative funding enabled the Thurgoona Community Action Group (TCAG) and Renewable Albury Wodonga Energy (RAW) to hold a Community Renewable Energy forum in November 2017. The community identified a range of opportunities including a community solar bulk buy program and a large scale solar initiative. AlburyCity last year sought New Initiative funding in 2019/20 to provide financial support to TCAG and RAW to investigate the feasibility of a large scale solar initiative in Albury. Subsequent to the workshop TCAG and RAW Energy are pursuing a PV bulk buy through Mondo Energy. Thereby the \$100k NI at this point in time is no longer required, as TCAG is instigating a commercial process directly with Mondo through RAW Energy.

Review of Implemented Energy Saving Measures for 2017/18

Electricity measures have been implemented for a range of Council buildings and facilities and water and wastewater infrastructure.

The previous Energy Savings Action Plan identified 12 measures (although more were implemented) to be implemented in year 2017/18 with measures identified grouped into three funding sources:

- New Initiative
- Council Areas (Information Technology, Maintenance)
- No Cost

The Energy Audit Recommendations is flexible throughout the year as other projects are identified and / or issues arise with proposed projects. Tables 2 and 3 below provide a summary of 2017/18 energy saving measures that have been completed or are in progress. The main cost saving in 2017/18 was from the tariff review, saving AlburyCity a combined \$372,000 (General Fund \$86,000 + Water and wastewater \$285,000); this was followed by a \$42,000 saving (General Fund \$40,000 + Water and Wastewater \$2,000) from solar generation. LED lighting upgrades are also reducing operating costs with an estimated annual saving of \$32,000 (Lauren Jackson Sports Centre \$30,000 + \$2,000 Albury Depot).

Table 2: Measures completed for Financial Year 2017/18

Asset	Measure	Comment
Albury Airport	Investigation re battery back up to support runway lighting in low visibility	Report received; recommendation to expand solar array however battery storage is not currently economically feasible. Reconsider in the medium future.
Council Administration Building	Install building monitoring and control system	Additional temperature sensors and controls incorporated for improved control.
Major sites	Tariff review	Saving achieved in 2017/ 2018 from all tariff reviews was \$372,000. This was \$87,000 General Fund, \$286,000 Water and Wastewater fund and \$85,000 to a third party.
Council Sites	Lighting replacement (halogen and T8)	Albury Depot had halogen and fluorescent lights changed to LED. Smaller LED project also occurred at Albury Skate Park. Kiewa St Carpark renovation included LED lighting.
Lauren Jackson Sports Centre	Installation of LED lights and motion sensors	LED lighting replaced high bays and fluorescent lights throughout the building in February 2018; overall electricity consumption at the site between February and October 2018 has decreased 56% compared to the same time last year. Lighting control system including timers and motion sensors to minimise consumption.
LibraryMuseum	Reinstate Vapour Barrier	Works completed.

AEC Theatre	New Air Curtain	Better control regarding cooling the space.
Airport Terminal	Lighting upgrade as part of renovation	Lights in the existing terminal changed to LED (and LEDs installed in extension).
Albury Entertainment Centre- Convention Centre	New HWS for main Kitchen, VSD fitted to HVAC in Elizabeth Room	Existing HWS no longer works. Existing HVAC system causing noise complaints.
Numerous	Split systems	Banjora Children's Centre, Wodonga Place Depot (Mechanics Store), Botanical Gardens Depot (Norm's Shed).
Mirambeena Community Centre	Electrical repairs to HVAC and new BMS	BMS controls 5 separate air conditioning units at the centre.

Six energy saving measures were in progress as at June 2018. The measures are described below in Table 3.

Table 3: Measures in progress at June 2018

Asset	Measure	Comment
Crematorium	Solar installation	Complete.
Lauren Jackson Sports Centre	Replace heating units that serve the courts	Tender executed in July 2018.
Street lighting	Street Lighting - (Replace Mercury vapour lights with LED)	Project discussions with RAMJO.
Albury Entertainment Centre- Convention Centre	HVAC system	Consultant is preparing specification for tender.
LibraryMuseum	Installation of PE cells to high level foyer lights	RFQ process identified issues with custom made lighting at this facility. A successful LED trial occurred in December 2018, a RFQ is currently being prepared to convert the remaining fluorescent lights.
Wonga Wetlands	Solar installation	Council applied for a grant for a new building; solar to be incorporated in the new building design in 2020/21.

Tariff Summary

AlburyCity undertook its first internal review of 28 sites operating under obsolete network tariffs in 2014/15 and changed eight sites to current network tariffs. This achieved a \$170,000 saving to AlburyCity and \$99,600 saving for a 3rd party. The 2017 review did not recommend any sites to change tariff; the 2017/18 combined savings from the previous reviews saved AlburyCity \$372,000 with an additional \$85,000 saving passed on to a 3rd party. AlburyCity has saved nearly \$800,000 since the annual tariff reviews began, and an additional saving of \$277K has been passed onto a third party (refer to Table 4).

An annual review is necessary as each year Essential Energy updates its charges, and on occasion creates new network tariffs that may benefit AlburyCity. The review also looks to identify AlburyCity sites operating on current large market contractors or under small market tariffs that potentially would benefit in changing their current tariff.

The tariff review analyses consumption and demand patterns for the previous 12 months and considers historical consumption patterns of the site. Sites which appear that a change in tariff is preferred are discussed with the applicable Facility Manager to understand actual and potential short, medium and long term changes at the site. One site in 2017/18 would have been financially better off on the obsolete tariff by \$3,486; however the saving achieved in the previous two years means the site is financial ahead by \$43,888. One site is worse off over two years by \$9,487 due to changes in consumption in year 1, year 2 shows the site is on the correct tariff.

Additional sites have had savings identified however have not changed due to the likelihood that consumption patterns will change over time (e.g. supply water and wastewater pumps in a known growth area, strategic reviews of community facilities). Each year a review of network tariffs is undertaken to ensure AlburyCity is on the financially preferred available tariff. To date, AlburyCity has saved nearly \$800,000 from annual tariff reviews, and an additional saving of \$277K has been passed onto a third party.

Table 4: Tariff savings

NMI	Site Name	Savings 2015/16 (\$)	Savings 2016/17 (\$)	Savings 2017/18 (\$)	Total Savings (\$)
NDDD00GB976	3 rd Party- RWPS No 2 Corrys Rd	85,338	85,346	73,241	243,925
NDDD00GJ722	3 rd Party - RWPS No 4 4 Hawksote Rd	14,219	6,932	12,089	33,240
NDDD00GF564	Council Chambers	32,838	51,015	45,258	129,111
NDDD00GF589	WWTP Waterview	54,354	71,783	75,019	201,156
NDDD00GF597	WWTP Kremur St	50,757	65,249	31,406	147,412
NDDD00GG876	AEC- Albury Convention Centre	711	3,671	5,454	9,836
NDDD00GN808	Airport Terminal	6,946	8,599	15,870	31,415
NDDD00GN816	RWPS No 2 Riverina H'way	24,850	22,524	-3,486	43,888
4001237686	Volt Lane		9,324	11,600	20,924
NDDD00GF516	SPS Smollett St		25,772	23,863	49,635
NDDD00GF522	Burrows Rd		-12,456	2,969	-9,487
NDDD00GF530	CWPS Skillen Rd		-36,094	75,764	39,670
NDDD00GF556	POOL Smollett St		9,082	8,591	17,673
NDDD00GF571	Hawksote RWPS		10,341	28,634	38,975
NDDD00GN822	Water Filtration Plant		6,147	31,547	37,694
NDDD00GN830	CWBP		7,156	12,592	19,748
NDDD00GN871	SPS Kremur St		8,922	7,431	16,353
Albury City saving		170,456	251,034	372,512	794,002
3rd party savings		99,556	92,278	85,330	277,164
Total savings		270,012	343,312	457,842	1,071,166

Solar review

Eight sites had solar installed and operational for 2017/18. An additional two solar systems have been procured for the Crematorium and are now operational. The installed sites produced over 200,000kWh of electricity and AlburyCity used 99.9% of all solar energy produced, thus saving Council approximately \$42,000. Solar production was lower compared to 2016/17 as the Airport system was disconnected from July 2017 to June 2018 as a result of renovations. Accumulated savings from the panels include 732,000kWh and \$143,000. Solar systems have been sized to match the individual sites consumption pattern.

Table 5 provides a summary of AlburyCity's solar systems, including electricity generated and consumed onsite.

Table 5: Solar systems details

Site	Install year	Size (kW)	kWh produced	kWh exported	2017/18 \$ saving ¹
Banjora Children's Centre	2013	4	583 ¹	326	131
LibraryMuseum	2015	42	61,090	0	11,155
Mirambeena Community Centre	2015	10	15,031	0	3,070
Airport	2015	46	102	0	19
Albury Entertainment Centre	2015	18	16,075	233	4,109
Waterview Lab	2015	12	13,791	175	2,066
Council Administration	2016	51	64,800	0	11,253
Lauren Jackson Sports Centre	2016	22	34,358	0	10,250
Total		205	205,247	734	42,053

¹ Calculations use varying electricity rate for the different sites depending on their costs

² Online monitoring system did not record data for full year.

Lighting

Full lighting changeovers occurred at a number of AlburyCity premises:

- The Lauren Jackson Sports Centre upgraded high bays over the sport courts and T8 fluorescent lights in office and change rooms; this project is estimated to save 160,000kWh per annum
- The Albury Depot changed 76 high bay and fluorescent lights to LED high bay and battens lights in April 2018. A desktop analysis indicates the project will reduce lighting consumption at the site by 60%, or 11,000 kWh
- Kiewa St Carpark renovations (creating an undercover carpark with lift) increased the number of lights at the facility and extended their operating hours. This has resulted in increased consumption at the facility despite those lights installed being LED

The first two projects outlined above generated Energy Saving Certificates under the NSW Energy Saving Scheme; these certificates were generated and sold by an Accredited Certificate Provider on behalf of AlburyCity.

Small lighting projects also occurred including the Albury Entertainment Centre purchasing an additional 12 LED wash lights (now have a total of 20). These use 150watts and can replace four 1000watt incandescent halogen fittings. The facility also replaced three data projectors with higher energy efficiency models, replaced seven fluorescent lights and installed a new PE cell.

The Energy Audit Recommendations New Initiative was proposed to be spent entirely on a lighting upgrade at the LibraryMuseum in 2018/19. A trial was completed in December 2018 replacing the fluorescent with LED lighting. AlburyCity is currently obtaining quotes to deploy this measure more broadly at the LibraryMuseum. The LEDs are being installed to reduce electricity consumption and costs as well as to reduce maintenance costs.

Envizi

Envizi is an online data and analytics program. AlburyCity receives a variety of electricity and gas

information ranging from daily updates to quarterly invoicing. Envizi enables this information to be accessed across the organisation allowing electricity consumption to be optimised.

Each year AlburyCity reviews sites with zero consumption to determine if these meters are required going forward (may include flood pumps etc). In 2017/18 AlburyCity decommissioned two electricity meters, a saving of approximately \$500 per meter (NMI 42041456126, 42041414407).

An additional connector has been created which enables mains gas invoices to be directly uploaded into Envizi; this allows more frequent analysis of this data.

Third Party Assistance

AlburyCity owns and maintains numerous community buildings, however in some cases is not responsible for the energy invoices. Energy saving measures undertaken at these facilities predominately relates to building maintenance such as lighting upgrades to LED or replacement of air conditioning (refer to Table 6); however the electricity and financial savings of these measures go to the community group leasing the building.

Table 6: Energy saving measures to Council leased buildings

Asset	Measure
SES Headquarters	Insulation to 24 Hour temp controlled space and humidity vapour barrier
Bonnie Doon Change rooms	Upgrade lighting in change rooms and toilets
Thurgoona Pre-School	Lights and Power to new garden shed
Springdale Heights Pre School	Replace 3 lights with LED

AlburyCity has continued its support and participation in the NSW Government energy efficiency for business program. Council Officers attended a number of OEH webinars on a range of topics and promoted these locally to business. The courses are designed to introduce business to potential energy efficiency measures at their own facilities.

Household support to reduce energy consumption and associated costs occurred through community activities such as the Enviro Talks at the Libraries and the Sustainable Living Festival. Participants were encouraged to borrow the Save Power Kit, compare the Energy Rating of electrical appliances when purchasing and use the Energy Made Easy website to compare electricity and gas retailers. Households also received a free 4 minute shower timer and thermometer to assist their household energy savings. AlburyCity has also been actively promoting the NSW Government's Appliance Offer, where eligible households can receive up to 50% assistance when replacing inefficient refrigerators and televisions.

The Energy Saving Action Plan focuses on measures that are intended to improve AlburyCity's energy efficiency and/or reduce energy consumption. AlburyCity implements other sustainability measures

that are not covered in this report (such as biodiversity improvements, waste management and water saving initiatives etc); information on these measures are communicated as relevant through AlburyCity's fortnightly news, social media channels and Council's Annual Report under the IP&R framework.

Structure of the Energy Savings Action Plan

The implementation schedule of energy saving measures is presented by implementation year below.

Appendix 1 Energy Saving Action Plan

Council considers a number of criteria to determine which measures are implemented in which year, including payback; capital cost; asset condition (e.g. end of life); upcoming scheduled renovations; are required for operational purposes; awaiting outcomes of current strategic review of assets; design and planning aspects that will need to occur; and ensuring a balanced budget. Measures that have the shortest payback are prioritised first, where possible.

New Initiatives are generally measures that are of significant cost and need to be undertaken to equipment that has reached the end of its useful life. However rather than replacing 'like with like', energy saving alternatives are implemented (note: the payback shown is the payback of replacing the item, that is, it doesn't take into account that the item needs replacement). In addition, some activities are for the assessment of potential energy saving measures and thus have no payback.

2019/20

Implementation Measure or Investigative Measure	Asset	Measure	Capital Cost(\$)	Electricity Saving (kWh/y)	Cost Saving (\$/y)
Implementation Measure	Airport	Upgrade airport 130 lights on landing strip with LED	45,000	15,000	4,000
	Airport	Solar -additional 54kW	70,000	80,000	27,000
	Car Park - Volt Lane and Wilson St	LED Lighting	110,000	133,333	40,000
	Council Administration Building	Energy Audit Recommendations (Lighting in basement)	59,000	47,200	11,800
	Street lighting	City Wide LED rollout ¹	1,000,000	450,000	165,000
	Glenecho Neighbourhood House	Solar installation	13,000	10,000	2,000
	Total		1,297,000	735,533	249,800
Implementation Measure	Sites (various)	PV Delivery Program - broader assessment of viability battery storage in Council operations	120,000	TBD	
Investigative Measure	Council Administration Building	Implementation of HVAC and Energy Audit (includes a review of system and planning for chiller and boiler replacement)	100,000	TBD	
	Sites (various)	Technical assessment and Specification (Administration, Glenecho)	20,000	TBD	

1: Australian and International evidence suggests that the City wide LED rollout will deliver a 4-6 year payback; this evidence has been used to estimate the cost saving shown above. The Australian Energy Regulator is yet to establish LED pricing in the Essential Energy network area; AlburyCity has accepted to use Compact Fluro Light charges for LED streetlights until the Regulator sets the LED price from July 2019.

2020/21

Implementation Measure, Investigative Measure or 3 rd party asset	Asset	Measure	Capital Cost(\$)	Electricity Saving (kWh/y)	Cost Saving (\$/y)
Implementation Measure		Energy Audit Recommendations (LED lighting replacement)			
	Council Facilities		61,000	42,000	12,600
	Council Owned Community Facilities	Community Energy Fund	50,000	*benefit to third party	
	Total		111,000	42,000	12,600
Investigative Measure	Sites (various)	Technical assessment and specification	20,000	TBD	TBD
	Waterview	Solar at Waterview feasibility assessment	6,000	TBD	TBD
	Lavington Depot	Lighting and/ or solar	50,000	TBD	TBD

2021/22

Implementation Measure, Investigative Measure or 3 rd party asset	Asset	Measure	Capital Cost(\$)	Electricity Saving (kWh/y)	Cost Saving (\$/y)
Implementation Measure	Sites (various)	Energy Audit Recommendations	63,000	50,400	12,500
	Community Facilities	Community Energy Fund	50,000	* benefit to third party	
	Total		113,000	50,400	12,500
Investigative Measure	Streets and Drain Workshop (Albury Depot)	Lighting and/ or solar	30,000	TBD	TBD
	Waterview	Solar at Waterview- install	150,000	TBD ¹	TBD
	Sites (various)	Technical assessment and specification	20,000	TBD	TBD

1: Solar assessment scheduled for 2020/21 will revise capital cost and provide calculated electricity and cost saving

2022/23

Implementation Measure, Investigative Measure or 3rd party asset	Asset	Measure	Capital Cost(\$)	Electricity Saving (kWh/y)	Cost Saving (\$/y)
Implementation Measure	MAMA	Solar installation	76,000	85,000	8,600
	Sites (various)	Energy Audit Recommendations	65,000	43,000	13,000
	Community Facilities	Community Energy Fund	50,000	* benefit to third party	
	Total		191,000	128,000	21,600
Investigative Measure	Sites (various)	Technical assessment and specification	20,000	TBD	TBD

Appendix 2 Other Energy Related New Initiatives

Appendix 2 collates additional measures over the four-year delivery plan that have an energy implication. These measures form part of Council's overall asset management program and include items that will reduce consumption (i.e. aspects of refurbishments), and some items that will increase consumption (i.e. augmentation of wastewater services). This summary has been included following a request in 2018 by Council for all energy related measures to be included in the Energy Saving Action Plan. Future editions of the Energy Saving Action Plan will report on items listed in appendix 2 as energy implications are determined (where applicable).

Year	Asset	Measure	Capital Cost (\$)
2019/20	Administration Building	Refurbishments	300,000
2019/20	Albury Entertainment Centre	Upgrading of sound and lighting equipment throughout the venue	50,000
2019/20	Flood pumps	Flood pump review	50,000
2019/20	Sewer	Standardise existing/future electrical control system for entire 'sewer' reticulation system.	20,000
2019/20	Sewer pump station 47 (Horseshoe Lagoon)	Install VSD for pump number 1	35,000
2019/20	Sewerage projects -	Upgrades and equipment replacement	345,125
2019/20	SPS 16 Kiewa Street No 6.	New pump station	150,000
2019/20	SPS 37 Jelbart road	Upgrade pump capacity of sewage pump station number 37	200,000
2019/20	Water and Wastewater	Energy Efficiency (review installations, lighting, PFC, VFD, efficient pumps etc)	106,100
2019/20	Water Filtration Plant A&B	Replace/upgrade Electrical Control Systems	100,000
2019/20	water reticulation system.	Standardise existing/future electrical control system for entire 'water' reticulation system.	250,000
2019/20	Water supply projects	Upgrade and/or equipment replacement	472,500
2019/20	Waterview Wastewater Treatment Plant	Stage 2 augmentation	100,000
2020/21	Albury Entertainment Centre	Upgrading of sound and lighting equipment throughout the venue	50,000
2020/21	Bunton Park	Sports field lighting & power upgrade -design & installation	60,000
2020/21	Sewer	Standardise existing/future electrical control system for entire 'sewer' reticulation system - year 2	285,000
2020/21	Sewerage projects -	Upgrades and equipment replacement	355,500

Year	Asset	Measure	Capital Cost (\$)
2020/21	SPS 37 Jelbart road	Upgrade pump capacity of sewage pump station number 37	500,000
2020/21	Street Lighting Improvements	Stage 3- New lights	200,000
2020/21	Water and Wastewater	Energy Efficiency (review installations, lighting, PFC, VFD, efficient pumps etc)	109,300
2020/21	Water Filtration Plant A&B	Replace/upgrade Electrical Control Systems	300,000
2020/21	water reticulation system.	Standardise existing/future electrical control system for entire 'water' reticulation system.	50,000
2020/21	Water supply projects	Upgrade and/or equipment replacement	486,650
2020/21	Waterview Wastewater Treatment Plant	Stage 2 augmentation	100,000
2021/22	Albury Entertainment Centre	Upgrading of sound and lighting equipment throughout the venue	50,000
2021/22	Albury Entertainment Centre	Theatre Profile Lights	150,000
2021/22	Bunton Park	Sports field lighting & power upgrade -design & installation	106,533
2021/22	Sewerage projects -	Upgrades and equipment replacement	366,125
2021/22	SPS 37 Jelbart road	Upgrade pump capacity of sewage pump station number 37	500,000
2021/22	Street Lighting Improvements	Stage 4 - Replace old fittings	200,000
2021/22	Water and Wastewater	Energy Efficiency (review installations, lighting, PFC, VFD, efficient pumps etc)	112,600
2021/22	Water Filtration Plant A&B	Replace/upgrade Electrical Control Systems	200,000
2021/22	Water supply projects	Upgrade and/or equipment replacement	501,250
2021/22	Waterview Wastewater Treatment Plant	Stage 2 augmentation	100,000
2022/23	Administration Building	Refurbishments	300,000
2022/23	Albury Entertainment Centre	Upgrading of sound and lighting equipment throughout the venue	50,000
2022/23	Albury Sports Ground	Sports field lighting & power upgrade -design & installation	250,000
2022/23	Bunton Park	Sports field lighting & power upgrade -design & installation	33,467
2022/23	Sewerage projects -	Upgrades and equipment replacement	377,125
2022/23	Water and Wastewater	Energy Efficiency (review installations, lighting, PFC, VFD, efficient pumps etc)	116,000
2022/23	Water supply projects	Upgrade and/or equipment replacement	516,250

Year	Asset	Measure	Capital Cost (\$)
2022/23	Waterview Wastewater Treatment Plant	Stage 2 augmentation	25,000,000
Total			33,604,525

Glossary

Measure Cost: includes costs directly associated with the purchase and installation of devices or equipment within an Energy Saving Measure. It does not include training costs, project management costs or other staff costs.

Measure Saving: includes savings in direct energy costs (such as energy consumption and / or energy demand charges), and indirect costs such as chemical costs, water costs, labour and maintenance costs and operating costs associated with an Energy Saving Measure