

CITY OF HOBART  
ENERGY SAVINGS ACTION PLAN  
2018–20



City of **HOBART**



## TABLE OF CONTENTS

INTRODUCTION	5
PAST ENERGY EFFICIENCY MEASURES	9
SCOPE OF THE ACTION PLAN	11



# INTRODUCTION

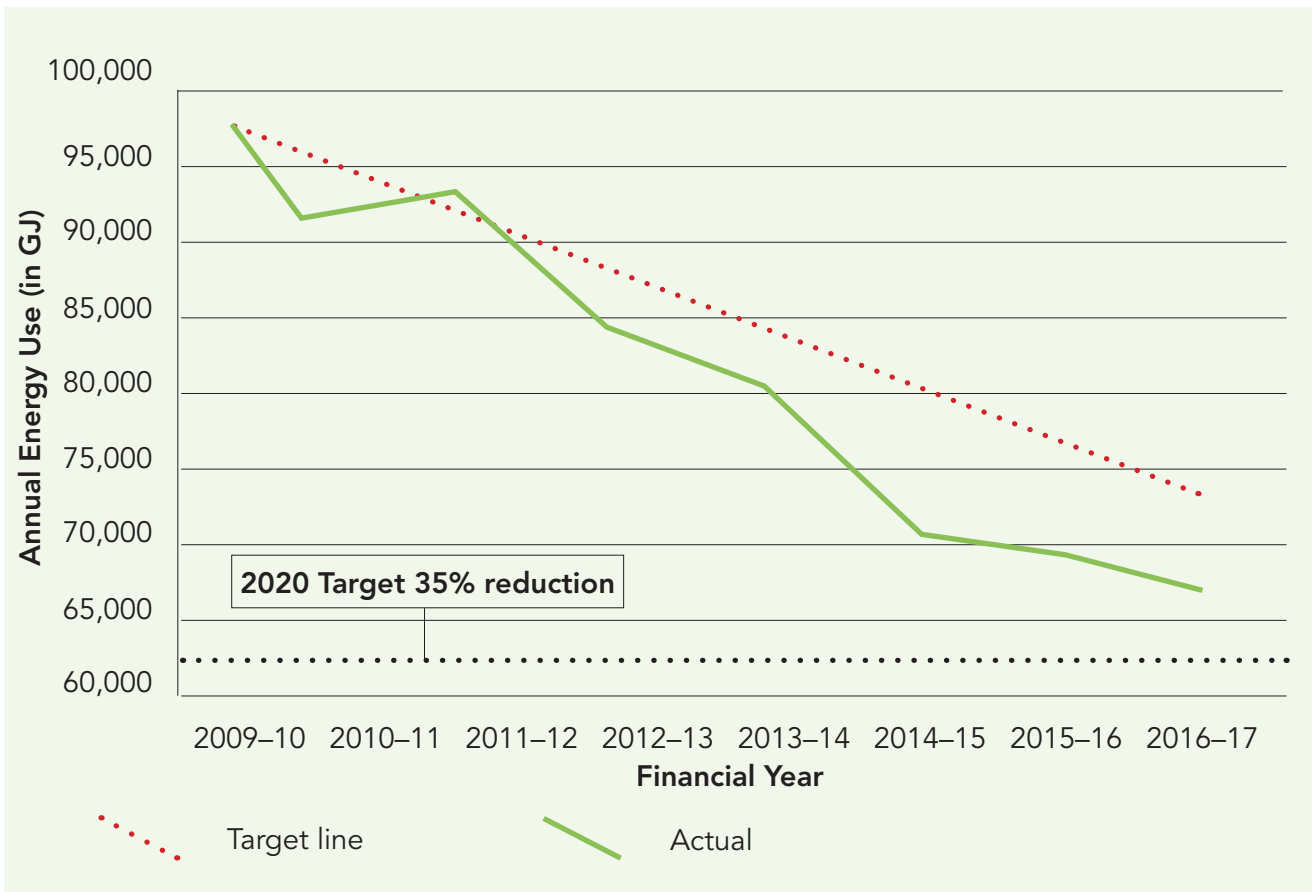
This Energy Savings Action Plan (“Plan”) has been prepared with the objective of planning the identification, investigation, scoping and implementation of energy saving initiatives for the City’s operations.

The coverage of the Plan includes all of the City’s direct energy use including electricity, diesel, petrol, liquid petroleum gas (LPG), natural gas and compressed natural gas (CNG). It does not include consideration of embodied energy (ie energy used by others in making and providing goods and services to the City).

The overall energy consumption of the City’s operations has reduced from 97,000 gigajoules in 2009–10 to 67,700 gigajoules in 2016–17,

largely as a result of projects and measures taken by the City to improve energy efficiency. It is noted that a gigajoule is a unit of energy being 1,000 million joules. For comparison, a car with typical mileage and engine size will use in the order of 40 gigajoules per year, while a four person household with electric heating and hot water on average uses about 25 gigajoules per year.

The graph below shows the City’s annual energy use during the period 2008–09 to 2016–17, along with a line showing the average reduction required to achieve the 35% reduction target by 2020.



The major energy source used by the City is electricity, which comprised 61% of the total energy use in 2016–17. Liquid fuels, including diesel and petrol, used in vehicles and plant make up about 36%, with the remaining 3% being natural gas used in CNG trucks, at facilities with services connected to the reticulated natural gas system and bottled LPG.

The cost of energy to the City is about \$2.4 million per year or about 1.8% of the annual budget.

The major energy using activities are building operations, street lighting and vehicles & plant. The following table lists broad categories of uses and amount of energy for each category.

CATEGORY	ENERGY USE 2016–17
Vehicles and plant	25 847 GJ
Hobart Aquatic Centre	15 003 GJ
Street lighting	9 708 GJ
Civic and administrative buildings	7 122 GJ
Multi-storey car parks	3 836 GJ
Community halls and parks	3 302 GJ
Depots, waste management and nursery	1 496 GJ
Public space lighting and fountains	1 389 GJ
<b>Total</b>	<b>67 704 GJ</b>

Vehicle and Plant is the largest energy use category and much of the use is by trucks and heavy plant, including refuse and recycling collection, civil maintenance, civil construction and Waste Management Centre operations activities.

The Hobart Aquatic Centre is a high energy user due to relatively long opening hours, the high heating requirements and significant mechanical plant systems such as circulating pumps and fans.

Street lighting is largely managed and operated by TasNetworks and includes about 5,000 lights on roads around Hobart. Some street lighting (including in the CBD) is on metered supplies and is owned and operated by the City.

The remaining 27% of energy is used in the City's other buildings and facilities.







## PAST ENERGY EFFICIENCY MEASURES

Opportunities for energy efficiency and the net reduction of the City's energy use are continually being identified and assessed as to whether they would provide a worthwhile economic and environmental return to the City.

Many actions have been taken over the years to reduce energy use. More recently this work has been guided by the City's Energy Savings Action Plan 2014–17.

The large majority of projects identified in the 2014–17 Action Plan have been implemented, along with other works that have been identified during recent years.

The projects have included both works to reduce energy use, but also systems which generate renewable energy such as through solar panels.

### THE WORKS HAVE INCLUDED:

- The installation of about 460 kilowatts of solar panels on the City's buildings (with a further 50kW planned), including 402kW on the Doone Kennedy Hobart Aquatic Centre;
- Numerous projects at the Hobart Aquatic Centre to improve the energy efficiency of its heating, ventilation and pumping systems;
- About 2,300 unmetered streetlights were upgraded from 80 watt mercury vapour lights to 18 watt LED;
- More efficient building heating systems installed in the Town Hall, Council Centre and Clearys Gates Works Depot, replacing direct electrical heaters with heat pump technology;
- Direct electrical hot water services have been replaced with heat pump hot water systems at over 25 of the City's facilities;

- Lighting in most of the City's multi-storey car parks has been upgraded to LED technology;
- Use of natural gas to replace LPG for cooking and to provide instant hot water at some sites;
- Improved insulation of buildings;
- Increasing fuel efficiency standards of vehicles and plant, being used as part of the selection criteria for new purchases;
- Trialling of new fuel efficient technologies, such as diesel hybrid trucks and a plug in hybrid electric vehicle;
- Replacing plant with energy efficient alternatives such as solar powered variable message signboards with LED lights;
- Reduced use of vehicles and plant, by improvements in efficiency in the way services are delivered (for example changes to litter bin collection arrangements has reduced collection vehicle mileage and saved over 150 GJ/year);
- Driver education programs aimed at more fuel efficient driving techniques.

As at September 2017, of the 67 actions identified in the 2014–17 Action Plan, 34 were completed, 25 are in progress and 9 either not yet started or on hold. A further 15 projects were implemented and three underway that were not included in the Action Plan.



## SCOPE OF THE ACTION PLAN

This Plan describes the actions proposed to be taken in the period covered by the 2018 to 2020 calendar years to further reduce energy consumption. It will be reviewed regularly during the period to take into account any new opportunities as they are identified and investigations into project viability are completed.

The Plan describes the proposed works, estimated implementation cost, projected cost and energy savings, expected completion date and some brief explanatory comments.

### FLEET – TRUCKS, CARS AND PLANT

The first area considered in the actions table below is that of Fleet, including vehicles and heavy plant. In this area it can be difficult to identify timelines, costs and savings for energy saving initiatives.

Some of this difficulty is due to the availability and cost of new fuel efficient technologies being dictated by manufacturers. The City can only select from those technologies which are made available in the Australian market place. Australia has not been a conducive environment for alternative technologies and in recent years there have been relatively few such offerings in Australia.

Technology is however developing rapidly overseas in such areas as electric vehicles and these are expected to become available in Australia in the coming years.

Another issue is that fuel usage is linked to the services provided by the City to its residents and changes to the services that are provided and the levels of service can affect fuel consumption. Fuel usage will typically be only one of a range of issues that need to be considered in changes to services and the way services are delivered.

### BUILDINGS

Buildings, as a whole, are the total largest energy use area of the City's assets. The City owns a wide range of buildings including the Doone Kennedy Hobart Aquatic Centre, civic and administrative buildings, multi-storey car parks, depots, community halls, sporting facilities and public conveniences.

Past energy saving initiatives have focused on the higher energy use buildings and facilities as these have had the most scope for energy efficient improvements. As many of the more significant opportunities have been taken, future actions to reduce energy will largely have smaller impacts. There are however still a large number of these smaller changes that can be made.

The Plan includes further actions on the larger buildings, but also identifies actions for some of the lower energy use sites and consideration of some new technologies and their potential applicability to many of the City's buildings.

### STREET AND PUBLIC LIGHTING

Most of the lighting energy use is related to street lights, the majority of which are owned and managed by TasNetworks. With Australian Government grant funding, much of the standard suburban street lighting in the City has been upgraded to energy efficient LED lighting with energy savings of about 2,500GJ/yr.

It is expected that the upgrade of the remaining street lights will be undertaken in the short to medium term, as the cost of LED technology lowers and suitable models for higher illumination utility type lights become available. The timing of this will involve negotiations with TasNetworks.

The City has upgraded most of its own metered street lighting to LED, but there are still some opportunities for improvement.

There is also a range of public lighting, in parks, public open spaces, car parks, sportsgrounds and facade and flood lighting and these are considered in the Plan. Several parks and sportsground lighting projects are planned in addition to those recently completed, and energy efficiency is an important criterion in the selection of the lights.

### **MECHANICAL PLANT**

The City also has a range of mechanical plant, such as pumps for fountains and other pump stations, heat pumps at the Nursery propagation house and there are various heating, pumping, air conditioning and ventilation equipment items within buildings. Some of these systems are quite old and less efficient than modern alternatives and also there are options for improved control to reduce energy use of the plant.

### **RENEWABLE ENERGY GENERATION**

While not actually saving energy, installation of renewable energy generation systems can reduce the City's net energy use from the grid. About 460kW of solar panels were installed by mid-2017 with a further 50kW planned. Further solar generation opportunities exist and may be enhanced by improvements to the viability of battery technology, such as at the Mornington Nursery where most of the energy use is at night time in the form of supplementary heating of the greenhouse.

### **ENERGY SAVING ACTIONS**

The proposed energy saving actions are listed in Table 1.

The actions are at various stages of development. Some involve investigations or audits to identify future works, while others have been scoped and are being planned for implementation.

For some actions the costs and savings are dependant on options available at the time, such as fuel efficient plant and fleet purchases, so it is not possible to identify specifically the costs and savings ahead of time.

For other actions, the investigations have not proceeded sufficiently to identify the costs and savings and these have been marked as "Not Known". Work is to be undertaken to quantify the costs and benefits and projects will be undertaken where it is worthwhile to do so.

Some of the Estimated Costs are contract sums or based on detailed estimates, while others are more preliminary and based on indicative estimates or standard unit rates.

Projected Cost Savings include the net savings of a project, and include other cost savings that may result from the project such as reduced maintenance costs.

The completion year for each project are included where known. For projects in future years, the year that the project is likely to proceed is indicated, though this may vary depending on variety of factors. For some of the actions, investigation to establish the business case has yet to be undertaken and for these actions no completion date has been set.

In addition to the projects listed in the table below, officers will work with tenants in facilities leased by the City to identify energy saving opportunities. This has in the past included the Hobart Cat Centre and Resource Recovery Centre and will be extended to other facilities such as leased areas of buildings at the Council Centre, 6 Washington Street, North Hobart Oval buildings and community halls.

TABLE 1: LIST OF ENERGY SAVING ACTIONS

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>FLEET – TRUCKS, CARS AND PLANT</b>					
Trucks, Cars and Heavy Plant – Fuel efficient purchases	Varies	Varies	Varies	Ongoing	Fuel efficiency included as a criterion in the tendering and selection of the City’s trucks, cars and heavy plant
Operator/driver training - Fuel efficient operation of vehicles and plant	Varies	Varies	Varies	Ongoing	Training and refresher courses provided for plant operators and heavy vehicle drivers in fuel efficient techniques, including new plant
Trucks, Cars and Plant – Trial of New Fuel Efficient Technologies (eg Plug In Hybrid Car)	Various	Various	Various	Ongoing	As suitable new technology models become available at a reasonable cost, some may be purchased for trial to analyse costs and benefits
Plant and Truck Usage – Changes to Service Delivery to Reduce Usage	Various	Various	Various	Ongoing	There are some situations where services can be changed to reduce distance travelled or hours run and energy usage/savings to be considered in the analysis of alternatives.

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Doone Kennedy Hobart Aquatic Centre					
DKHAC – Optimisation of natural gas use	\$10,000	\$5,000	100GJ/yr	2018	Natural gas is being connected to DKHAC to improve the overall reliability of the facility. There are opportunities to reduce the total energy use of DKHAC by optimising gas use.
DKHAC – Additional solar panels over reception and gym/aerobics area (Investigation)	\$45,000	\$7,000	175GJ/yr	Investigation by 2020	Potential for 40kW system, to be investigated and funding to be sought if found to be viable
DKHAC – Installation of variable speed drives on smaller pump and fan motors (Investigation)	Not known	Not known	Not known	Investigation by 2018	The larger pumps and fans at DKHAC are controlled with variable speed drives. The move to VSD control for smaller pumps and fans are to be investigated.
DKHAC – Building Air Tightness Upgrade (to minimise air leaks)	\$20,000 (approx.)	\$5,000	100GJ/yr	2018	To identify heat losses due to ingress of outdoor and rectify air leaks
DKHAC – Energy efficient replacement of External Lighting (To be investigated)	\$15,000 (approx)	\$3,000 (approx)	70GJ/yr (approx)	2018	Replacement of external building and car park pedestrian lighting to be investigated
DKHAC – Double Glazing of 25 metre pool windows	\$130,000	\$15,000	400GJ/yr (approx)	Planned for 2018	Double glazing to improve thermal performance and reduce condensation
DKHAC – Double Glazing of Aerobics/Gym areas	\$100,000	\$11,500	300GJ/yr (approx)	Planned for 2019	To be included in DKHAC refurbishment works and also expected to improve occupant comfort

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Doone Kennedy Hobart Aquatic Centre					
DKHAC – Improved pool pumping control (investigation)	\$5,000	\$1,000	30GJ/yr	Investigation by 2018	Impacts of control to be investigated in more detail and implemented if practical
DKHAC – Battery to store solar panel energy (Investigation)	Not known	Not known	Not known	Investigation by 2019	Does not save energy directly but can mean more efficient use of solar energy and reduce costs
Council Centre Building					
Council Centre Building – LED Lighting Upgrade to Levels 4 and/or 5	\$30,000	\$8,000	140GJ/yr	2018	Replace fluorescent and halogen lights with LED, dependant on negotiations with tenants
Council Centre Building – Building Management System Upgrade	\$75,000	\$16,000	200GJ/yr	2018	Implement upgrade to improve control of building systems, including reduction of energy use
Council Centre Building – Double Glazing for upper levels	Not known	Not known	Not known	Investigation by 2019	Investigation to determine feasibility, savings and costs
Council Centre Building – Solar Panel system	Not known	Not known	Not known	Investigation by 2018	Potential for some solar panels but limited by building orientation and overshadowing roof top structures (potentially 10-20kW)

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Town Hall					
Town Hall – Building Management System Upgrade	\$50,000	\$12,000	250GJ/yr	2018	Implement upgrade to improve control of building systems, including reduction of energy use
Town Hall – Additional Building Lighting Upgrades (Investigation)	\$20,000 (approx.)	\$4,000 (approx.)	80GJ/yr (approx.)	2018	Investigation to be undertaken to determine which upgrades will be cost effective
Town Hall – Hot Water Service – Energy Efficient Upgrade (Investigation)	Not known	Not known	Not known	Investigation by 2019	Investigation to be undertaken to determine costs and savings
Town Hall – Car Park Lighting Upgrade to LED	\$5,000	\$1,000	30GJ/yr	2018	Lights on the parking deck at the Town Hall to be replaced with energy efficient LED lights
Town Hall – Foyer and corridor and Dame Mabel Miller Room heating to heat pumps	\$55,000	\$9,000	200GJ/yr	2018	Areas currently heated by direct electrical systems and to be upgraded to heat pumps
Town Hall – Main Auditorium – Insulation of Roof	\$50,000	\$8,000	180GJ/yr	2018	Lining of roof completed, insulation to be installed, also improving thermal comfort
Town Hall – Macquarie Wing air conditioning controls upgrade	\$30,000	\$5,000	110GJ/yr	2018	New controls to manage outside air requirements to minimise energy use



DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Car Parks					
Salamanca Car Park – Installation of Power Factor Correction	\$3,000	\$500	0GJ/yr	2020	Does not reduce energy but does lower maximum demand on network
Salamanca Car Park – Ventilation Fan Control Upgrade (Investigation)	\$15,000 (approx.)	\$2,000 (approx.)	60GJ/yr (approx.)	Investigation by 2018	To reduce usage of fans when not required
Argyle St Car Park – Ventilation Fan Control Upgrade (Investigation)	\$7,000 (approx.)	\$1,000 (approx.)	30GJ/yr (approx.)		
	Not known	Timing dependant on redevelopment works at Argyle St Car Park			
Argyle St Car Park – Power Factor Correction (Investigation)	\$7,500	\$1,500	0GJ/yr	Not known	Power factor correction does not reduce energy use, but does lower maximum demand. Investigation awaiting redevelopment works.
Argyle St Car Park – Roof Top Photovoltaic System (To be investigated)	\$100,000 (approx)	\$10,000 (approx)	300GJ/yr (approx)	May not be viable	Investigation of overshadowing from surrounding buildings will need to be undertaken, this may reduce savings and project not being viable
Hobart Central Car Park – Heating to heat pumps	\$10,000 (approx)	\$1,500 (approx)	50GJ/yr (approx)	2018	Current heating system is direct electrical and this is to be replaced by heat pump
Trafalgar Car Park – Power Factor Correction (Investigation)	\$5,000 (approx.)	\$1,000 (approx.)	0GJ/yr	Investigation by 2018	Power factor correction does not reduce energy use, but does lower maximum demand and results in lower overall electricity costs

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Car Parks					
Other Car Parks – Lighting to LED (Investigation)	\$20,000 (approx.)	\$4,000 (approx.)	100GJ/yr (approx.)	Investigation by 2018	Sites include Lefroy St, Dunn Place, 275 Liverpool Street, where lighting is City owned.
Halls and Tourist Information Centre					
City Hall – Replace Heating in YouthARC/ tenanted section of building	Not known	Not known	Not known	Not known	To be considered in future redevelopment of City Hall.
City Hall – Upgrade Lighting in YouthARC/ tenanted section of building	Not known	Not known	Not known	Not known	To be considered in future redevelopment of City Hall.d
City Hall – Replace Heating in Main Hall	\$400,000	\$7,000	120GJ/yr	Not known	Some investigation work completed. To be considered in future redevelopment of City Hall.
City Hall – Upgrade Lighting in Main Hall	Not known	Not known	Not known	Not known	Investigation required. To be considered in future redevelopment of City Hall.
City Hall – Replace External Lighting	Not known	Not known	Not known	Not known	Investigation of economic feasibility required
City Hall – Additional Solar Photovoltaic System	\$30,000 (approx)	\$4,000 (approx)	100GJ/yr (approx.)	Possibly in 2019	To be investigated and funding to be sought if found to be viable
Mathers House – Additional Photovoltaic System	\$12,000 (approx.)	\$1,500 (approx.)	40 GJ/yr (approx.)	Possibly in 2019	To be investigated and funding to be sought if found to be viable
Tasmanian Travel & Information Centre – Double Glazing (Investigation)	Not known	Not known	Not known	Not known	To be investigated, will need to take into account heritage considerations

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Halls and Tourist Information Centre					
Mawson Pavilion – Lighting to LED	\$5,000	\$800	20GJ/yr	2018	Some lighting upgraded to LED, remainder to be replaced by LED
Mawson Pavilion – Review of heating and hot water systems (investigation)	Not known	Not known	Not known	Not known	To be investigated including improvements to thermal comfort levels.
Washington Street Child Care Facility and Hall – Review of Energy Efficiency Opportunities	Not known	Not known	Not known	Not known	Audit undertaken, potential savings in heating, lighting and hot water identified. Discussions to be held with new tenant as to implementation.
Sporting and Parks					
North Hobart Oval – Additional Solar Panels (Investigation)	\$40,000 (approx.)	\$5,500 (approx.)	175GJ/yr	Possibly 2019	To be investigated and funding to be sought if found to be viable
Domain Athletic Centre – Heating Systems (Investigation)	Not known	Not known	Not known	Possibly 2020	Investigation to be undertaken of heating systems due to relatively high use in winter
Other Sporting Buildings – Review of Energy Efficiency Opportunities	Not known	Not known	Not known	Not known	A review of sporting buildings is to be undertaken to identify energy savings opportunities.
Parks and Sporting Lighting Upgrades – Use of LED lights	Varies	Varies	Varies	Several projects	A number of projects are to be undertaken in the 2018 to 2020 period to replace or upgrade lighting. High efficiency LED lights and controls will be required for all of these projects.

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Sporting and Parks					
Flame of Remembrance – Optimise gas use	Not known	Not known	Not known	Investigation by 2019	The Flame of Remembrance at the Cenotaph uses a significant amount of gas. Operation and alternatives to reduce gas use to be investigated.
Depots and Nursery					
Clearys Gates Depot – External Lighting to LED	\$10,000	\$1,500	50GJ/yr	2018	Main floodlighting at site replaced with LED, but external building lighting still to be upgraded
Clearys Gates Depot – Workshop Heating Systems (Investigation)	\$100,000 (approx.)	\$8,000 (approx.)	200GJ/yr (approx.)	Investigation by 2018	Current heating system not very effective. Investigation needed to identify appropriate system and costs and savings
Clearys Gates Depot – Building Management System Upgrade	\$20,000 (approx.)	\$3,000 (approx.)	80GJ/yr (approx.)	Investigation by 2019	An existing system with limited capacity is in place but is in need of replacement
Clearys Gates Depot – Additional Solar Panels	\$33,000 (approx)	\$4,500 (approx.)	140GJ/yr (approx.)	Possibly 2019	To be investigated and funding to be sought if found to be viable
McRobies Gully WMC – Additional Solar Panels	\$33,000 (approx)	\$4,500 (approx.)	140GJ/yr (approx.)	Possibly 2019	To be investigated and funding to be sought if found to be viable
McRobies Gully WMC – Storage Battery (Investigation)	Not known	Not known	Not known	Investigation by 2019	To maximise use of solar power and manage maximum demand at the site
McRobies Gully WMC – Transfer Station walking floor review	Not known	Not known	Not known	Investigation by 2019	To review impact of walking floor motor operation on maximum demand and power factor

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Depots and Nursery					
McRobies Gully WMC – Transfer Station walking floor review (Investigation)	Not known	Not known	Not known	Investigation by 2019	To review impact of walking floor motor operation on maximum demand and power factor
McRobies Gully WMC – Lighting and Hot Water Upgrade (Investigation)	Not known	Not known	Not known	Investigation by 2018	Lighting to LED and hot water tap unit to replace hot water electric cylinder
Mornington Nursery – Additional Solar Panels	\$10,000 (approx)	\$1,500 (approx.)	50GJ/yr (approx.)	Possibly 2019	To be investigated and funding to be sought if found to be viable
Mornington Nursery – Battery Storage (investigation)	Not known	Not known	Not known	Investigation by 2019	A significant portion of energy use is at night time. Battery storage could be used for excess solar power to be available at that time.
Mornington Nursery – Review of Air Tightness of Greenhouse	Not known	Not known	Not known	Investigation by 2019	Air leaks can allow cold air into the greenhouse and result in higher energy use
Bushland Depot – Building Energy Efficiency Works	\$5,000	\$1,500	20GJ/yr	2018	Includes lighting, heating and hot water service changes
Buildings - General					
Lifts – Potential Energy Efficiency Upgrades (Investigation)	Not known	Not known	Not known	Investigation by 2019	Lifts can consume significant amounts of energy and many of the City's lifts have been in place for a long time. Review of motors and controls to be undertaken.

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>BUILDINGS</b>					
Buildings - General					
Insulation (Investigation)	Not known	Not known	Not known	Not known	Buildings with significant heating/cooling energy use to be inspected to confirm whether insulation is installed
Lighting Sensor Controls (Investigation)	Not known	Not known	Not known	Not known	Identify buildings where daylight and/or motion sensor controls would be cost effective
Hot Water Service Improvements (Investigation)	Not known	Not known	Not known	Not known	Identify further buildings where energy efficient changes to hot water services would be cost effective
Exit Signs – Upgrade to LED (Investigation)	Not known	Not known	Not known	Not known	Replace emergency exit signs with LED powered units, if cost effective. Audit of sites would then be required to identify lights which should be replaced
Energy Efficient Whitegoods and Appliances (to be investigated)	Not known	Not known	Not known	Not known	Investigate the setting of minimum standards for purchases of appliances such as refrigerators
Electrical Sub-Metering – Installation of additional meters	Not known	Not known	Not known	Investigation by 2018	Investigate installing additional sub-meters in DKHAC, Council Centre, Town Hall and Clearys Gates Depot to better monitor energy use and identify areas for savings

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>PUMPS AND FOUNTAINS</b>					
Franklin Square – Fountain Pumping Review	Not known	Not known	Not known	Investigation by 2018	Fountain and pumping operations to be reviewed to identify energy saving opportunities, including power factor correction and variable speed drives.
Other Fountains – Review of pumps and pump controls for efficiency gains	Not known	Not known	Not known	Investigation by 2019	Check of pump and motor efficiencies and control systems for energy reduction measures
<b>PUBLIC AND STREET LIGHTING</b>					
Tas Networks Lighting					
Replace major category street with LED technology	Not known, but likely >\$1 million	\$150,000	4,000GJ/yr	Possibly by 2020	Subject to negotiations with TasNetworks
Tas Networks unmetered flood lighting and signage – Upgrade to LED	Not known	Not known	Not known	Not known	A range of flood lights are provided by TasNetworks such as at Salamanca Place. Discussions to be held to identify energy efficient upgrades
Public Space Lighting					
Elizabeth St Mall – Lights to LED (Investigation)	Not known	Not known	Not known	Investigation by 2018	Some lights in the Mall have been replaced with LED. The remaining lights are of a different type and need investigation to determine suitable LED replacement at reasonable costs.

DESCRIPTION	ESTIMATED COST	PROJECTED COST SAVINGS	PROJECTED ENERGY SAVINGS	EXPECTED COMPLETION	COMMENTS
<b>PUBLIC AND STREET LIGHTING</b>					
Public Space Lighting					
North Hobart Bollard Lights – Upgrade to LED	Not known	Not known	Not known	Investigation by 2018	To be investigated to identify cost effective LED alternative replacement lights
Castray Esplanade Lights – Upgrade to LED	Not known	Not known	Not known	Investigation by 2018	To be investigated to identify cost effective LED alternative replacement lights
Wellington Court – Lights to LED	Not known	Not known	Not known	Investigation by 2018	To be investigated to identify cost effective LED alternative replacement lights





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