This activity received funding from the Australian Government as part of the Community Energy Efficiency Program.
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1 EXECUTIVE SUMMARY

The main purpose of this report is to provide an overview of the Shire of York administration building energy efficiency upgrade project and how the project reduced energy consumption for the shire.

The project's objectives were to improve the energy efficiency of the Shire's main administration facility and then promote the outcomes to the broader community. The project aimed to improve the amenity of the building by improving lighting performance and general comfort levels. By upgrading with efficient and improved technology, the project hoped to reduce maintenance costs, promote the benefits of improving energy efficiency to the broader community, and reduce carbon emissions.

The project met its objectives by replacing the existing fluorescent lamps with Light Emitting Diode (LED) technology and removing the existing HVAC system and replacing them with an energy efficient suite of complimentary air handling units.

To promote the new technology, a monitoring device has been installed which live streams energy data to a visual display set up in the building's foyer. This is one of the ways the project is promoting the energy efficiency message to the visitors to the facility. Other methods of communicating the project's success include placing an article in the local newspaper with circulation in York and surrounding communities. Posters and educational flyers were also printed and placed in Shire facilities to promote the project's achievements.

The project achieved its intended outcomes by improving lighting energy efficiency of the buildings by 54%. This exceeded the predicted improvement by 6% and will save the shire $5,742 per annum. The HVAC system has also exceeded expectations after installation, once a revised saving of 40% was predicted. The system actually increased energy efficiency by 47% and will save the Shire $12,286 per annum.

The project was completed below budget with a saving of nearly $15,000 on the HVAC supply and installation. There were a number of delays to the original Milestone table, but none of the delays increased costs to the project.

The project was managed by the Shire of York internal project manager Mr Gordon Tester. Contracts Administration, lighting supply and installation, communications, and energy auditing were managed externally by Enigin Western Australia.
The energy efficiency upgrade at the Shire of York administration building has met all of its objectives and in some cases exceeded them. The promotion of energy efficiency in the community is a commitment of the Shire of York and an ongoing commitment. This project highlights the benefits of improved technologies which can provide not only cost savings but environmental and social benefits.

The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein.
2 PROJECT OBJECTIVES

The project aimed to support the Shire of York Shire to increase its energy efficiency by implementing a selection of new technologies which demonstrated and encouraged the adoption of energy management practices within the Shire and broader community.

The project targeted sustained behaviour change by making the benefits of energy efficiency visible and tangible. This included the development of simple and meaningful metrics which provided a compelling illustration of the benefits of energy efficiency. Community engagement programs were used to promote energy efficiency to the broader community.

The project also aimed to showcase the improved amenity of the Shire facilities and demonstrate to the community that local government is focused on saving energy and costs by managing total energy use and prioritising the investment in energy efficient products and services.

The objectives of the York project were designed to run in parallel with the objectives of CEEP’s. The project supported energy efficiency in regional and rural councils in non-residential council and community use buildings, facilities, lighting and demonstrated and encouraged the adoption of improved energy management practices. The Shire of York is a key member of the South East Avon Regional Organisation of Councils (SEAVROC) which provides an excellent platform to showcase the project’s achievements to other local councils. The use of local media outlets and website updates ensured broader and local communities were aware of the project and its fundamental objectives.

As the Shire of York’s administration building is a key destination building for all rate payers making building and other permit applications, the project has adequately demonstrated and encouraged the adoption of improved energy management practices in the broader community and the key target audience. The audience is exposed to the building energy efficiency upgrade first hand particularly its demonstration through the energy monitoring system public display in the foyer. This is a great way of showcasing the benefits of what can be achieved by means of informed efficiency technology decisions in their own homes or projects.

A key objective of the project was to improve the comfort and amenity of the administration building which has suffered from poor heating, ventilation and air-conditioning over recent years. A more comfortable working environment improves staff morale, adding to the overall acceptance of the project’s activities.
The knock-on effect of improved energy efficient technologies means the Shire's ongoing operational energy and maintenance costs for the administration office is minimised. It also helped to mitigate the increased cost of electricity arising from the introduction of a carbon price.

The project has injected funds into the local community by building the knowledge and capacity of local energy services and construction industry and supporting a competitive Australian energy efficiency technology, equipment vendors and installers. Of the two main project activities the HVAC supplier and installer, CDA Air and Solar, is locally based in York and Northam.

With a reduction in energy use comes a reduction in greenhouse gas emissions by 103,900 kgCO₂ per annum.
2.1 Project Energy Efficiency Activities

The Shire of York administration building is located at 1 Joaquina Street in the central rural town of York in the Western Australian Avon district (see Figure 01). The building is located in the centre of the Shire and is accessible to all of the 4,000 residents and numerous visitors. The site has a net lettable area of 540 m² and contains areas for general public use and administration duties and amenities.

Figure 01: Location map

The site is split into 12 functional spaces, a library, Department of Transport and toilet facilities. The site is a mix of public use and Shire of York staff use. The Shire administration office houses the customer service officers who assist the community members with enquiries relating to Shire matters.

Operational hours are as follows:

Offices: 56 hours a week, 52 weeks a year (totalling 2,912 hours a year)
Library: 43 hours a week, 52 weeks a year (totalling 2,236 hours a year)
Department of Transport: 37.5 hours a week, 52 weeks a year (totalling 1,950 hours a year)

The proposed heating ventilation and air conditioning (HVAC) and light emitting diode (LED) upgrades are currently regarded as the leading cost-effective technologies in their respective
applications. The installation in this high-profile building strengthens the technologies’ reputation for local application and facilitates it becoming the standard within Shire.

**Lighting technologies**

The site’s existing inefficient fluorescent lamps were removed and disposed of in accordance with Australian standards. A site visit was undertaken to ensure all existing lights were accounted for and that they were replaced with appropriate LED lights which could provide the same or improved lux levels as the incumbent lamps. The existing lamps consisted of T8 fluorescent tubes.

The replacement of legacy lighting with the more efficient LED tube lighting was able to halve the energy consumption and have twice the life, therefore reducing the ongoing maintenance costs in the building. The new lights still provide the same lux levels as the old T8 lighting technology. An alternative option of using T5 fluorescent tubes was considered; however, this option had a higher energy demand and higher total lifecycle cost compared to the LED option.

The LED tubes that were supplied and the installation methodology that was set by the installer complied with the Electricity Regulations Authorities Council (ERAC) recommendations as specified in their November 2011 #0001 bulletin. This consisted of the installer removing the starter in the existing light fitting, de-wiring and removing the capacitor and the ballast. Due to safety concerns and self-mandated company risk and compliance procedures, the existing terminal block was replaced with a new fused terminal block. Finally a warning sticker was placed on every fitting stating, “WARNING Modified Light Fitting – Do not replace with tubes other than LED tubes”. See Figure 02 of the new technology installed in the library.

The installation was a simple retrofit of LED lighting using the existing fittings. The installation was expected to take only a week but due to accessing certain fittings in the library (fittings which hung over book shelves, for instance) progress was delayed and the installation took nearly two weeks. The project schedule allowed for possible delays which could occur on site and all of this float was used due to the accessibility problems. As the delay was duly anticipated and allowed for, there is not much which can be learned from this project delay. Overall, the lighting retrofit was successful in its delivery and outcomes.
HVAC technologies

The existing HVAC units at the administration building site were installed as part of the original building construction and were approximately 15 years old. It was not considered a viable option to upgrade the existing units as the units contained R22 refrigerant which is an HCFC and is due to be phased out. The units contained non-inverter compressors which use considerable power on start-up. The existing inefficient air handling equipment can be seen in Figure 03.

The new technology designed for the project was intended to improve the overall efficiency of the HVAC system. Due to the physical design of the building, the layout of offices and indoor ceiling conditions, a combination of HVAC technologies was incorporated. Some offices contained mainly glazing curtain walls, so split systems were not an option. These locations required multi system ceiling cassettes while other areas were able to incorporate split systems. The main areas of the building were able to be serviced by a ducted system throughout, similar to the original. This energy efficient suite of complementary technologies was designed with a new variable refrigerant system incorporating energy saving measures such as digital capacity control, inverter-driven variable speed compressors and fans as well as a full digital system management and control. The resulting efficiency improvements of the new HVAC system were greater than 47% compared to that of the incumbent.

The HVAC installation was well-implemented; however, there was considerable delay caused by initial problems accessing existing ducting and sub-standard existing wiring discovered during initial demolition. This difficulty impacted the contractors’ ongoing resourcing of the
project as other projects then influenced progress; the contractor struggled to resource specific work as the specialised labour was required on other projects. The risk of the delay was identified early in the project and the mitigation strategy involved the including penalties for delays in the contract. However, due to its having no cost to the project and the minimal length of delay, this strategy was not enforced.

The HVAC contractors have worked previously with the Shire of York and have an ongoing relationship which is very important to the Shire, and being a local council, cancelling a local contract is a sensitive issue. Considering the minimal delay window the option of finding an alternative contractor was not considered viable. For future projects the learning taken from this particular issue is to request further understandings of contractors’ current capabilities and commitments. Understanding this could have alerted the Shire to the fact the contractor is busy and may not be able to service the project as expected. It is understood that delays occur but a more stringent policy of availability would be enforced for future projects undertaken together.

**Figure 03:** Existing HVAC units - 15 year old inefficient air handling technology (top row) and new units bottom row
**Energy monitoring device**

To monitor ongoing efficiency of the new technologies the project incorporated an energy monitoring device which was installed between the lighting switchboard and the new HVAC switchboard (see figure 04). The device is connected to the three phase inputs of the devices being measured via current transformers (CTs). The readings taken by the system are fed directly to the Shire’s local area network (LAN). This is then displayed on the Eniscopes web-based platform for the Shire to access for ongoing communication requirements, reporting and monitoring.

The only issue posed by this device during the project was software-based. The device is a specialised system imported from the UK and has been previously been installed in other Western Australian locations. This particular model had software updates which conflicted with local settings and these took time and effort to resolve. At the time of writing this report the issues have been resolved and the device is monitoring as expected.

For future projects, suppliers of devices which require software implementation would be quizzed further and asked to confirm that all devices are up to date and there are no surprises lurking which could jeopardise timelines.

![Energy monitoring device](image)

*Figure 04*. Energy monitoring device installed between HVAC and Lighting switchboards.
2.2 Project Demonstration and Communications Activities

To communicate the energy efficiency activities of the project and their effectiveness, it was decided the Shire of York's communication strategy should be premised on regular and sustained engagement with building occupants (Shire staff and community) and stakeholders who would benefit from or be impacted by the energy efficiency upgrade. Consequently, the project implemented a communications and engagement program which included an awareness campaign delivered by the Shire during and after the project.

The sharing of the project's success, including energy cost savings, occurred with neighbouring and other councils through the Shire of York's participation in the Regional Organisation of Councils (ROC) and the WA local government association (WALGA) meetings and workshops. The target message was that simple, proven technologies can result in significant financial savings, and contribute to the reduction of Council's carbon footprint. The local York community and neighbouring regional community were informed of the project and its energy efficiency benefits via press releases in local and regional newspapers which circulate in the Avon region (see Figure 06). The Shire of York included an article which highlighted the project on their website with further plans to update the ongoing energy savings throughout the year. Refer link: (http://www.york.wa.gov.au/news_notices/media_releases/mediarelease2014/).
The Shire of York in its efforts to serve the local community and contribute to sustainable practices has undertaken an energy saving project on the shire’s administration building in York. The project consisted of an upgrade of the building’s heating, ventilation and air conditioning to more energy efficient technologies and a retrofit of the internal lighting to LED energy efficient technologies.

This activity received funding from the Australian Government as part of the Community Energy Efficiency Program (CEEP).

The building’s energy efficiency upgrade has reduced the operating costs and CO2 emissions of one of the shire’s main energy consumers, and a welcomes point for all visitors.

The project scope included a lighting retrofit, new air-conditioning technology to increase the energy efficiency of the climate control system and a building energy monitoring system that provides real-time energy management to ensure energy savings are achieved, sustained and consistently improved.

Prior to undertaking the upgrade project, analysis of the administration building identified that 65% of the building’s electricity consumption was attributed to the heating, ventilation, and air conditioning (HVAC) system, 26% for lighting and the remaining 9% to auxiliary appliances (e.g., printers, photocopiers, personal staff devices etc.). Therefore, the largest energy savings benefit was achieved from addressing HVAC and lighting opportunities – applications which consumed 94% of the energy in the building.

The CEEP was a competitive merit-based grant program that provided co-funding to local governing bodies and non-profit community organizations to implement projects that delivered a range of energy efficiency measures in council and community owned buildings, facilities and sites; particularly where this would benefit low socio-economic and other disadvantaged communities or support energy efficiency in regional and rural councils.

These grants improved the energy efficiency and amenity of council and community use buildings and facilities. The Shire of York was fortunate enough to receive this funding for the project which promised to be extremely beneficial. A new energy monitoring system has recently been installed and current results indicate that energy use will decrease by approximately 49%. The main savings will be in lighting, with a predicted 32% decrease due to the efficient LED globes, and the HVAC system, which will operate on 41% less energy than before.

In monetary terms this will save the local community approximately $17,000 per annum, and the building’s total consumption is forecast to drop from 138,149 kWh to 74,539 kWh – equivalent to 42% savings of CO2.

The project was approved in January 2014, commenced in February 2014 and completed in May. Shire President for the Shire of York, Matthew Raff, believes, “…having the Australian Government contribute to this project has assisted greatly in achieving the desired long-term energy saving goals for the Shire of York’s administration building. To operate a building as efficiently as possible not only reduces energy consumption, which translates into dollar saved, but reduces CO2 emissions. The staff using the facility have noticed the immediate benefits especially with the LED lighting upgrade…”

A visual display of the building’s energy consumption will be permanently set up in the building’s main foyer. This will enable the community as well as the Shire team to constantly track the efficiencies being achieved by these projects.

For more information about these projects please contact Gordon Lester on records@york.wa.gov.au.

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Figure 05: Flyer and Posters distribution locations

Figure 06: Community Matters press release
The local community and in particular the Shire staff were kept regularly informed of the project’s progress with an initial staff meeting to announce the arrival of contractors, highlighting the proposed changes and their benefits, and a subsequent staff meeting to highlight the actual benefits. Posters were hung in the administration building advertising the project, its objectives and the contributions made by CEEP. Flyers were circulated which reinforced the posters’ message before the project began to inform anyone entering the facility. On completion of the project, posters and educational flyers were also circulated which paid particular attention to promoting the project’s successes and how they were achieved (see Figure 05). The printed paraphernalia aimed to instantly identify with the Shire of York’s unique building façade and the simple energy efficiency activities and savings achieved. As per Appendix 1 the simple light bulb graphic with an arrow indicating the rise in efficiency of the LED retrofit is combined with an arrow indicating the rise in efficiency of the HVAC system and cool waves of air emanating. This visual cue cleverly expresses a basic “sum”, “equalling” a decrease in energy costs.

A monitor has been set up in the building foyer which links directly to the energy monitoring device. This streams the energy consumption data from the HVAC and lighting circuits live from the device’s website (see Figure 05 & 07). The benefit of this form of communication is twofold: it provides a way of displaying to the staff and building’s visitors the live consumption
of the building’s two main project activities (and energy consumers). The visual display is also a way of monitoring the HVAC and lighting for any anomalies. For example, if there is an unexpected spike in consumption during out of office hours, the relevant system can be checked for problems ensuring no ongoing energy wastage continues.

Finally, the Shire have also committed to an annual review of the energy usage to ensure that the efficiency gains are being sustained into the future. These results will be further published in local newspapers to update the local community and region.
2.3 Outcomes and benefits of the Project

The Shire of York energy efficiency upgrade has successfully contributed to the CEEP objectives by improving the energy efficiency of the regional town of York's administration building.

When the CEEP Application was submitted, the baseline energy and electricity costs for the Shire of York were calculated and measures were proposed to deliver quantified efficiency improvements. For both the LED lighting and HVAC upgrades, actual energy savings have been shown to exceed or deviate acceptably from these forecast improvements. See Appendix 2 for Project Energy Efficiency Improvement Reports.

For the LED lighting upgrade, a forecast improvement of 29.8MJ/m² per annum (48% improvement from baseline) was set, corresponding to an absolute efficiency value of 31.2MJ/m² per annum from a baseline of 61.7MJ/m² per annum. This was outstripped by actual efficiency levels of 28.4MJ/m² per annum (54% improvement) although both are reasonably close. There were no changes of scope to the original upgrade on which the forecasts were based. Figure 08 shows the comparison of before and after LED upgrade.

![Shire of York Lighting - Energy Consumption (MJ per annum)](image)

**Figure 08:** Energy consumption levels before and after LED light upgrade

For the HVAC upgrade, the efficiency improvement was 256.4MJ/m² per annum with the upgraded equipment operating at 295.0MJ/m² per annum compared to the 551.3MJ/m² per annum baseline level. This represents a 47% improvement from the building's baseline efficiency (see figure 09). Despite the forecast 59% improvement, the actual improvement is
nonetheless an excellent result as early forecasts were on the ambitious side and the units implemented were deemed a better fit to size, ensuring the performance requirements of the Shire of York site will always be met.

![Bar chart showing energy consumption levels before and after the HVAC upgrade.](image)

**Figure 09:** Energy consumption levels before and after the HVAC upgrade.

The Shire of York has not only improved its energy efficiency performance and will enjoy the associated cost savings, but the quality of lighting and HVAC services has been significantly improved by the new equipment. Substituting fluorescent lighting for LED lights prolongs the life of luminaires and reduces maintenance costs, and the new lights provide illumination at an appropriate level and colour temperature. Shire staff have been commenting since the retrofit that the LED lights have improved the overall amenity of the working environment. Fluorescent light dissipates more easily compared to LED lights which generates brighter more directional light making reading of documents easier. The positive comments from the users of the building further reinforces the success of the CEEP project on the facility.

The upgrade of the two old HVAC units with various smaller units also means that the building's HVAC requirements can be met on an individual heating/cooling-region basis. Any potential breakdowns or service requirements of the units will cause less disruption now that the units are distributed rather than centralised. The installation of ducted types such as cassette units also reduces replacement and maintenance costs. Distributed units also mean that heating/cooling is targeted exactly where it is needed, reducing wastage of resources. Furthermore, heating/cooling levels can be adjusted in response to spatial and thermal load
factors in different rooms and the subjective preferences of occupants, creating a more comfortable environment (see Figure 10).

The replacement of the HVAC system has also improved the working environment of the administration building aurally. The existing system generated approximately 69dB compared to the ducted Daikin system with a rating of 50dB. The lowest noise levels of the newly installed HVAC system are as low as 29dB for the ceiling cassettes. This significant noise drop has, again, been commented on by the users of the facility.

It is anticipated that the real-time energy monitoring system connected to a public dashboard, complemented by the awareness posters and publications, will further increase community awareness and mindfulness of the importance and possibility of energy efficiency. This sets the path for behaviour change, a crucial aspect of energy conservation that compounds the improvements brought by the equipment retrofits. The Shire of York understands that sustainable energy efficiency outcomes can only arise from the dual approach of technological and social efforts.

The impact of the energy efficiency upgrades on the community was not evaluated because it is considered too soon after the project’s completion to fully gauge. Instead as part of the ongoing annual energy review the shire will conduct a survey of certain community groups to understand how the project has been received.

How much of the community has been reached in the communications and demonstration activities is difficult to gauge as the press release on the project’s outcomes has been circulated in two local papers which not only are freely delivered into every home and business in York, but also in the Avon region encompassing York, Northam, Beverley, Quairading, Cunderdin, Meckering, Bakers Hill, Clackline, The Lakes, Wubin and Dalwallinu. This close to the end of the project and the publication of the local newspapers, there has

The project aided the local community of York by employing local HVAC contractors by way of a competitive tender process to supply and install the system. This meant the profits of the contract stayed local and have fed back into the regional Shire.

The Shire of York is not a low-socioeconomic area. However, the Shire of York’s census data records estimate a resident indigenous population of 3.1% with 17% of residents over 65 years of age and 18.1% of the population under 14 years of age (Census Data 2010). The Shire of York provides 6 accommodation units over for aged or disadvantaged residents over 55 years of age.
These segments of the population are higher-than-average users of the library which is housed in the building for which the energy efficiency upgrade was implemented. This means they will benefit directly when using the Shire library and facilities.

**Figure 10:** Distributed units can be targeted to where necessary (units can be turned off when certain areas are unused) and individual controls can be set to individual preference.
3 BUDGET

The project was achieved within budget with nearly $15,000 of the HVAC budget unspent, mainly the result of the tender process for the HVAC system; the lowest tenderer chosen was able to provide the equipment required to achieve the anticipated savings at a price below the budget. It was also the result of the revised efficiency improvement targets discussed in Section 2.3, which recognised that significant efficiency improvements could still be achieved without greater expense.

Both the HVAC and lighting upgrades were simple activities which did not cause any unexpected costs to the budget.

Further information can be seen in Appendix 3 - Financial Report.
4 PROJECT OPERATION, MECHANISMS AND PROCESSES

The project was project-managed internally by Gordon Tester, the Manager for Health and Building at the Shire of York. The project plan, communications and energy auditing was managed externally by Enigin Western Australia. The actual site works were managed by CDA Air and Solar and Enigin WA. CDA Air and Solar were the primary installers of the HVAC system and Enigin WA completed the lighting retrofit and contributed to the HVAC testing and commissioning including contracts administration of the project. The project ran smoothly from beginning to end and the Shire of York would not hesitate to run future projects in a similar fashion, as outsourcing a significant amount of the project freed up the over-stretched internal resources.

As the Shire project manager oversaw the contractors on site and the contracts administration was outsourced, it is considered that there was enough internal resources to successfully implement the project. The Shire believes the experience gained by undertaking this CEEP project means it is better equipped to undertake future similar projects of its size and scale.

There were no difficulties in managing the project apart from delays by contractors which is expected not only in rural areas but on any project which involves contractors. This was managed by co-ordinating trades on site to minimise further time delays. Some delays could not be overcome contractually or by enforcing penalties as ongoing relationships were at risk. A certain amount of flexibility was required in regard to scheduling, especially in rural areas where large distances and minimal access to staff can mean delays to projects are inevitable. For future projects the Shire would consider requesting further understandings of contractors’ current capabilities and commitments. Understanding this could have alerted other stakeholders to the fact that the contractor is busy and may not be able to service the project as was expected.
5 CONCLUSION

In conclusion, the Shire believe that the jointly funded CEEP energy efficiency upgrade project was a success from a delivery, quality and financial perspective. The benefits of this project are important to the local community of York and to the local region, as it highlights the importance of collaborative thinking in relation to energy efficiency and is a stand-alone example of how simple changes in the built environment can provide not only a reduction in ongoing costs but also reduce the communities impact on the environment. The Shire wish to thank the Federal government for their support of such a valuable initiative.

The Shire are very proud of their leadership in the Energy Efficiency arena and hope that through their project other Shires and the community at large will step up and become more Energy efficient and Energy aware.
6 DECLARATION

The Authorised Officer of the organisation makes the following declarations:

☑️ I declare that I am authorised to submit this Final Report (including any attachments) on behalf of …………………Shire of York………………………………………………. (Name of organisation)

☑️ I declare that the information provided in this Final Report is true and accurate.

☑️ I understand, and acknowledge that giving false or misleading information in this Final Report is an offence under the Criminal Code Act 1995.

☑️ I understand that final payment will only be made in accordance with the Funding Agreement including on satisfactory completion of Milestones.

Authorised Officer Signature: .......................... Date: 12/06/2014

Name: ..........Gordon Tester............................................

Position: ......Manager Health / Building......... Organisation: ...Shire of York.........................

Witness Signature: ........ .................................................. Date: 12/06/2014

Name: ........Paul Malcolm..................................................

Position: ......Project Manager.................... Organisation: ....Enigin WA...............................................

The use and disclosure of information provided in this Final Report is regulated by the relevant provisions and penalties of the Public Service Act 1999, the Privacy Act 1988, the Freedom of Information Act 1982, the Crimes Act 1914 and the general laws of the Commonwealth of Australia.

Information contained in the Final Report may be disclosed by the Department for purposes such as promoting the program and reporting on its operation and policy development. This information may also be used in answering questions in Parliament and its committees. In addition, the selected project information will be made publicly available. Public announcements may include the name of the grant recipient and of any project partners; title and description of the project and its outcomes; and amount of funding awarded.
Appendix 1 – Communication poster example

The Shire of York in its efforts to serve the local community and contribute to sustainable practices has undertaken an energy saving project on the shire’s administration building in York. The project consisted of an upgrade of the building’s heating, ventilation and air conditioning to more energy efficient technologies and a retrofit of the internal lighting to LED energy efficient technologies. This activity received funding from the Australian Government as part of the Community Energy Efficiency Program (CEED).

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8 APPENDIX 2 – Project Energy Efficiency Improvement Report
# Project Energy Efficiency Improvement Report

<table>
<thead>
<tr>
<th>PROJECT TITLE</th>
<th>The Shire of York Administration Office Energy Efficiency Upgrades</th>
<th>PROJECT ID</th>
<th>CEEP2035</th>
</tr>
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<tr>
<td>FUNDING RECIPIENT</td>
<td>Shire of York</td>
<td>DATE</td>
<td>19 June 2014</td>
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## Building, Facility or Site 1

<table>
<thead>
<tr>
<th>Name of Building, Facility or Site 1</th>
<th>Shire of York Administration Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (address)</td>
<td>1 Joaquina Street, YORK WA 6302</td>
</tr>
<tr>
<td>Type of building, facility or site</td>
<td>Office administration building</td>
</tr>
<tr>
<td>Activity Type and Measure</td>
<td>HVAC system upgrade (Feb 2014)</td>
</tr>
<tr>
<td>Energy Efficiency Estimate Method</td>
<td>The simulation used to provide the estimates is based on the 2012 Building Code of Australia from JV3. Baseline energy use is calculated knowing the rated wattage of the original HVAC equipment and operational hours. Forecast energy use is calculated knowing the rated wattage of the proposed HVAC equipment and operational hours. Actual energy use data of the HVAC system is calculated knowing the rated wattage of the actual equipment (from suppliers) and operational hours. In future, actual energy use data is to be supplied by the Eniscope monitoring system.</td>
</tr>
<tr>
<td>Baseline Energy Usage</td>
<td>297,723MJ per annum</td>
</tr>
<tr>
<td><strong>Baseline Energy Efficiency</strong></td>
<td>551MJ/m² per annum</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------</td>
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<tr>
<td><strong>Energy Efficiency Improvement</strong></td>
<td>295MJ/m² per annum</td>
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<tr>
<td></td>
<td>Energy use: 159,278MJ per annum (47% reduction)</td>
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<tr>
<td><strong>Reporting Data (Measuring Energy Efficiency and Additional Data)</strong></td>
<td>Total area: 540m²</td>
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<td></td>
<td>Comprises a library, 12 functional spaces and toilet facilities (general public use and Shire staff use)</td>
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<td></td>
<td>23 staff (permanent occupants of building)</td>
</tr>
<tr>
<td></td>
<td>Average operational occupancy: 130%</td>
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<tr>
<td></td>
<td>Accessible to 4,000 residents and numerous visitors</td>
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<td></td>
<td>Operational hours:</td>
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<tr>
<td></td>
<td>Offices: 56 hours a week, 52 weeks a year (2,912 hours a year)</td>
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<td>Department of Transport: 37.5 hours a week, 52 weeks a year (1,950 hours a year)</td>
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<td><strong>Estimated Cost Savings</strong></td>
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</tr>
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</table>
### Energy Efficiency Estimate Method

The simulation used to provide the estimates is based on the 2012 Building Code of Australia from JV3.

Baseline energy use is calculated knowing the rated wattage of the original fluorescent lights and operational hours.

Forecast energy use is calculated knowing the rated wattage of the proposed LED lights and operational hours.

Actual energy use data is calculated knowing the rated wattage of the actual LED lights (from suppliers) and operational hours.

*In future, actual energy use data of specific areas is to be supplied by the Eniscope monitoring system.*

### Baseline Energy Usage

- **119,927MJ per annum**
- NABERS rating: 0 stars (whole building)

### Baseline Energy Efficiency

- **222MJ/m² per annum**
| Energy Efficiency Improvement | 102MJ/m² per annum  
Energy use: 55,225.50MJ per annum (54% reduction) |
|-------------------------------|----------------------------------------------------------|
| Reporting Data (Measuring Energy Efficiency and Additional Data) | Total area: 540m²  
Comprises a library, 12 functional spaces and toilet facilities (general public use and Shire staff use)  
23 staff (permanent occupants of building)  
Average operational occupancy: 130%  
Accessible to 4,000 residents and numerous visitors  
Operational hours:  
Offices: 56 hours a week, 52 weeks a year (2,912 hours a year)  
Library: 43 hours a week, 52 weeks a year (2,236 hours a year)  
Department of Transport: 37.5 hours a week, 52 weeks a year (1,950 hours a year)  
Building construction date: approx. 1999 |
| Cost of Activity | $30,640 |
| Estimated Cost Savings | $5,742 per annum |
Appendix Removed for Publication