Final Report

BANKSTOWN CBD PARKING LIGHTS PROJECT
Bankstown City Council

Community Energy Efficiency Program Round 2
2nd March 2016

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“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.”

Report prepared by:

Bankstown City Council
PO Box 8
Bankstown NSW 1885

www.bankstown.nsw.gov.au
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1. Executive Summary

In May 2013 Bankstown City Council (BCC) received a grant under the second round of the Community Energy Efficiency Program (CEEP2014) to upgrade existing lighting in five multi-level CBD car park to LED lights. The project was the “Bankstown CBD Parking Lights Project” and it was the first time Bankstown Council had installed LED lights across an entire site. The objectives of the project were to:

- Save energy and improve lighting
- Improve monitoring of electricity use
- Build knowledge and understanding of energy efficiency and LED lighting among the community and BCC

This was the second CEEP grant that BCC had received. BCC was also awarded a CEEP grant under Round One (CEEP1104). As this grant also included a lighting upgrade component for the Council’s Civic Tower (primarily to more efficient fluorescent lighting), it was decided to manage the two lighting upgrades together in order to save resources and achieve better value for money. Council engaged the same lighting engineers to complete the lighting designs and tender documentation for both projects. The communications activities for both projects were also combined so that larger events could be hosted (such as a Lighting Expo), a wider audience reached and joint branding could be used.

The CEEP2014 grant was for $248,654. As a low socio-economic status area, the grant to Bankstown Council was for two thirds of the total project cost. The estimated budget for the project was $373,097 which included a Council contribution of $124,443. Design commenced in 2014 with construction taking place in April – August 2015. Due largely to a change in the scope of the project (which was reduced from five car parks to three) the final project cost was just over $320,000 which was an underspend of $53K.

There were several delays to the start of the project and signing of the Funding Agreement which resulted in a shortened time frame to complete the project. This delay in conjunction with early delays in the CEEP1104 project and the decision of BCC to sell two of the carparks, resulted in a change of scope in the second CEEP project (CEEP2014). The scope of the project was originally to upgrade lighting in five car parks. This was amended to three car parks.

As well as replacing existing lighting, the detailed site assessments found that all of the car parks had sub-standard lighting throughout which no longer met Australian standards. The old fluorescent and metal halide light fittings were in poor condition with many broken, missing or non-operational. As a result, additional light fittings and more powerful lighting than originally proposed was required to bring the car park lighting up to current Australian lighting standards. As a result, the projected cost of the project increased and projected energy efficiency savings were reduce from 65% to about 30%. Based on this, the payback for the project was estimated to be 3.9 years (taking account of the CEEP grant and energy and maintenance savings).

Savings on maintenance, however, are estimated to be substantial as the new LED lights have an operational life of about 50,000 hours compared to about 12,000 for the old fluorescent lights. As
a result, the new lights will need replacing every 5.7 years compared to replacing the old T8 fluorescent lights every 1.3 years.

As a result of this project, the lighting throughout the car parks now complies with Australian standards and is fully operational. The quality of the light has also improved visibility and safety in the car parks. Movement sensors have enhanced safety as drivers are alerted to movements by pedestrians and other vehicles; and pedestrians are alerted to movements by other vehicles as well as anyone near their own vehicles. The quality of lighting, particularly at night, has also improved with the replacement of old and (some) non-functioning spotlights with LED lights on the top levels of the car parks which are used by many rail commuters. These areas are now better lit when commuters return to their cars in the evening.

In the first few months after works were completed, the actual energy savings recorded at all three sites is 45 – 62%. However, these results are only for the first 3-5 months. Also, as daylight sensors were installed and works were completed by July, these savings may also reflect the longer daylight hours in the subsequent months leading up to summer. These energy savings are expected to moderate over the rest of the year.

One of the consequences of managing the tender process for both CEEP projects together was that any delays to one project had the effect of delaying the other project. As a result of the delays to CEEP1104 and a change of scope to CEEP2014 Council decided to separate the tender processes for both projects to reduce further delays. To make up lost time, Council decided to include preparation of a detailed lighting design in the tender for supply and installation of lights for CEEP2014. This was a successful strategy which streamlined the tender process, reduced the project time frame and enabled the project to be completed on time.

Electrical switchboards were also upgraded. It was intended to capture live daily electricity data and incorporate this into Council’s energy reporting software (Envizi). This proved to be one of the more complex aspects of the project as obtaining daily electricity data through the electricity retailers in an appropriate format was not possible. Data loggers were installed, however their data was also not accessible in a usable format. Eventually, BCC obtained the interval (NEM12) data from Ausgrid and was able to set up a daily automated data feed to Envizi. Although the data is delayed by 24 hours, this was a good compromise. BCC has now used this method to capture 15 minute interval data for a number of other high energy-using sites.

The communication activities were combined with those of CEEP1104 with joint branding around saving energy, money and the environment proving cost effective. The communications also promoted the energy and the cost-savings of LED lighting plus the improved technology of LED lighting (i.e. lights that incorporate daylight and motion sensors, long life of the lights).

Council ran a number of successful activities aimed at the business community and Council staff. These included the Energy Efficiency and Lighting Expo, staff workshops and access to professional development by attending conferences on energy efficiency. Engaging the community, however, was more difficult. Despite a concerted effort, the planned film competition was unsuccessful. Instead, Council hosted a Photo Booth at a local Children’s Festival. Families engaged with this much more and their photos were branded with the “Save Energy, Save Money, Save the Environment” branding.
An important objective of this project was to build knowledge of energy efficiency and LED technology within Council. This has been one of the most successful outcomes with a number of staff undertaking courses in energy efficiency and subsequently identifying ways in which they can improve the energy efficiency of facilities they manage. The electrical team has also successfully persuaded management to establish and fund an annual $50,000 LED lighting upgrade program for Council facilities. Under this program the exterior lighting at Council’s two works depots and the Bankstown Arts Centre was upgraded. Lighting upgrades at other high energy-using sites is currently being assessed.

Council is considering developing a City wide lighting strategy which will identify lighting requirements across all assets, including parks and facilities, and processes for assessing and selecting energy efficient technologies. The objective is to ensure that all Council officers who are responsible for installing any lighting do so in a consistent manner and install the most energy efficient and appropriate lighting available.
2. Project Objectives.

The objectives of the Community Energy Efficiency Program were to:

- support a range of local councils and community organisations to increase the energy efficiency of different types of non-residential council and community-use buildings, facilities and lighting; particularly where this would benefit low socio-economic and other disadvantaged communities or support energy efficiency in regional and rural councils; and
- demonstrate and encourage the adoption of improved energy management practices within councils, organisations and the broader community

Bankstown City Council (BCC) saw this as an opportunity to demonstrate leadership in innovation and sustainability. The project consisted of the following three (3) components which were intended to contribute to CEEP’s objectives. This included:

**Project Objective 1 – Save energy and improve lighting in the multi-level car parks by:**

- replacing all existing lighting with energy efficient Light Emitting Diodes (LEDs)
- ensuring the new lighting in the car parks met current Australian standards
- incorporating daylight sensors to maximize energy savings
- selecting lights with motion sensors to improve safety by alerting customers to movement near their vehicles

**Project Objective 2 – Improve monitoring of electricity use by:**

- upgrading switchboards to more effectively separate light circuits
- bringing switchboards up to current Australian standards
- removing asbestos in one switchboard
- incorporating data loggers to capture daily interval data
- incorporating this data into Council’s existing carbon/energy management software

**Project Objective 3 – Build knowledge and understanding of energy efficiency and LED lighting among the community and BCC through:**

- Engagement of BCC Asset Management staff on energy efficiency and LED technology
- Banners and community notice boards at car parks
- E-newsletters and updates to Council’s website
- Deliver a Bankstown Lighting Expo (including workshops) at a local venue
- Provide case study information to other councils
3. Project Energy Efficiency Activities

**Overview of Activities**

BCC prides itself as a leader in innovation and sustainability. As LED lighting is a proven lighting technology providing superior light quality and longevity, BCC saw this an opportunity to reduce its carbon footprint while also improving the quality of light in heavily utilised multi-storey car parks. The project would also reduce the energy and maintenance costs associated with the car parks.

**Activity 1 – Upgrading Lighting in CBD car parks**

**Lighting assessment and site audits**

This project upgraded old fluorescent and other lighting (including some metal halide lights) in three CBD multi-storey car parks with LED technology. The project was also the first time that BCC had undertaken a major deployment of LED lights across an entire site. The sites were:

- Marion St car park
- Brandon Avenue car park
- Meredith St car park

BCC engaged consultants Haron Robson Pty Ltd to undertake the lighting design for the car parks and prepare all relevant documentation for the tender process. Haron Robson also conducted a review of suitable lighting technologies, made recommendations and prepared a report which was submitted to the Department for approval.

In the original grant application submitted in February 2013 we estimated potential energy savings of up to 65% at each car park site. This was based on replacing the existing lighting on a one-for-one basis with a multi-function LED light called a Chamaeleon. At the time, this light was recommended for car parks and fire stairs as it had an inbuilt movement sensor and two light settings which provided a low level of light when these areas were unoccupied but a higher level of light when movement was detected. Energy savings were also based on an initial Level 1 audit of the Marion St car park by Haron Robson which indicated that these energy savings were achievable.

However, when the project began in earnest and a more detailed assessment of all sites was undertaken by Haron Robson, they identified that:

- Replacing the existing lighting with the Chamaeleon light fitting (i.e. one-for-one) would not provide sufficient light to meet the current Australian standard under AS1680 as there was an insufficient number of existing light fittings;
- If the Chamaeleon fitting was used, the number of fittings would need to be almost doubled which would exceed the budget substantially;
- An alternative fitting was recommended which used more energy than the Chamaeleon but would still result in energy savings of about 30%;
- The car parks did not have sufficient light fittings to meet Australian standards which meant that it was necessary to install additional light fittings; and
• At least one car park did not have any emergency lighting, which would necessitate installing additional emergency light fittings as part of the project.

As a result, the anticipated energy savings were revised downward by Haron Robson to around 25-30% across all sites. This is the estimate used in Attachment A.

**Review of scope of the project**

Originally, BCC planned to upgrade lighting in all five CBD multi-storey car parks. In early 2012 Council commissioned Haron Robson to complete an audit of one multi-level car park. The audit showed there was substantial potential energy savings by replacing old fluorescent lighting with LEDs on a one-for-one basis. Using the results of this audit, Council prepared the CEEP grant application for a total of five multi-level car parks.

The project commenced with a detailed audit and review of each site as part of the lighting design phase of the project. BCC was then advised by Haron Robson that the car parks would need to have around 30% more light fittings and emergency lighting installed as replacing the existing lights with LEDs on a one-for-one basis would not provide sufficient light to comply with current Australian lighting standards (AS/NZS1680). As a result the current budget was going to be insufficient and the energy savings reduced.

During the site audit process, Council made a separate decision to sell two of the sites within two years. Consequently, it was necessary to remove those two sites from the project scope.

The outcome was that the project was reduced from five sites to three with additional light fittings included to ensure the project met current Australian lighting standards. The reduction in sites and the additional lighting was completed within the original budget.

**Lighting Upgrade Tender**

Initially, BCC had planned to include this project in the tender for another lighting upgrade project (CEEP1104). However, the decision by BCC to sell two car park sites meant there was a delay to this project. As we did not want to delay the lighting upgrade component of CEEP1104, we decided to tender for the CBD car park lighting upgrade project separately.

BCC also initially intended to have lighting designs prepared by Haron Robson and then go to tender. However, after the delay resulting from the change in scope, BCC decided to save time and reduce the complexity of the tender process by going to tender for design as well as supply and installation of lights in the car parks. This also ensured that BCC received the widest possible choice of LED light fittings to meet the project objectives and budget.

BCC went to tender on 17 February 2015 and the tender closed on 10 March 2015. The evaluation was completed within two weeks in order to ensure the recommendation went to the March Council meeting and the project could commence in April.
Designs and installation

BCC selected Total Energy Solutions (TES) from the tender process. Haron Robson Pty Ltd provided assistance in assessing the lighting designs for the car parks to ensure they met current Australian lighting standards. They also assessed the proposed light products to ensure they were of a high standard.

Originally, Council was not intending to replace existing metal halide spotlights on the roof and exterior areas of the car parks as we had been advised that they were the most energy efficient light choice. However, during the installation, the contractors were able to identify suitable LED products to replace these flood lights within the available budget. Consequently, Council decided to include these lights in the project.

The installation was carried out largely after hours to reduce disruption to car park users. All of the car parks are heavily used by commuters and shoppers and are open 24 hours per day every day. The installations were without incident and were completed within 6 weeks. Haron Robson completed an assessment of the car parks to ensure the installations were in accordance with the agreed designs and to a high standard.

Activity 2 – Upgrade to switchboards

Electrical Switchboard installation

The old switchboards were also found to be non-compliant with one having a wooden backing board and another containing asbestos. All needed replacement as part of the lighting upgrade. The installation of the new switchboards was done by TES and occurred without incident.

Monitoring electricity data

Monitoring daily (interval) energy use at these sites to more accurately demonstrate the energy savings was also part of the project. However, obtaining this data at each site proved difficult. The current electricity meters at two sites (Brandon Ave and Meredith St) are analogue and only read quarterly. Initially, BCC intended to install smart meters to enable daily energy consumption to be captured electronically. However, the energy provider for these sites advised that upgrading them to smart meters would change the electricity tariff for these sites (which are part of a contract negotiated through Local Government Procurement). Furthermore, they were not able to make the interval data available in a useful format, making it difficult to incorporate the data into Council’s Envizi software. While we were able to obtain interval data for the third car park site (Marion St) for the period prior to and after the installation, it was necessary to undertake considerable manual manipulation of this data to incorporate it into the Council’s Envizi software.

Consequently, BCC decided to install data loggers into all of the switchboards to capture energy consumption data. This was completed in August 2015. However, again, the data was not able to be incorporated into the Envizi software due to incompatibility with the software that the data loggers used. Also, it was not possible to set up an automated data exchange process between the data loggers and the Envizi software.
In the end, BCC went to Ausgrid which owns all the electricity meters and the distribution network. It was fortunate that the meters were of a type that could provide daily 15 minute data readings. For a small annual fee, Ausgrid were able to provide the daily interval data in an appropriate format via an automated daily email to Envizi. Furthermore, the data was available for a period prior to the lighting upgrade works. As a result, BCC was able to see the results of the lighting upgrade works at all three of the car parks. This method of capturing daily interval data is now the standard method BCC uses as it is easy and cost effective.
4. Project Demonstration and Communications Activities

BCC received a two grants under the CEEP program – one for CEEP1104 and one to upgrade lights in multi-level car parks (CEEP2014 “Bankstown CBD Parking Lights Project”). BCC combined the CEEP grant resources from both projects in order to get better value for money ($10,000 from CEEP1104 and $39,500 from CEEP2014) and created a communications programme which combined the requirements of both projects. In this way, BCC was able to achieve better value for money and undertake a broader communications program.

The objectives of the communications for CEEP2014 specifically was to inform local residents, businesses and industry about actions Council was taking to save energy and the environment (including installing energy efficient lighting); demonstrate LED lighting technology (through the Lighting Expo and workshops); and show how local businesses, industry and residents could also save energy, money and the environment through energy efficiency. BCC undertook a number of communication activities to meet these objectives, including:

Activity 1 - Develop communications plan
Activity 2 – Install an interactive kiosk in the Bankstown Library and Knowledge Centre (BLaKC)
Activity 3 - Schools film competition/photo booth
Activity 4 – Energy efficiency and lighting expo
Activity 5 – Signage at Car Parks
Activity 6 – Staff Training and engagement with Management and Councillors
Activity 7 – Final Case Study

Activity 1 - Develop communications plan

BCC held an in-house workshop to develop the communications plan for CEEP2014. The overall goals of the communication plan were to:

- Encourage improved energy management practices across various sectors and within the council
- Educate and build capacity and knowledge about energy efficiency, particularly LED lighting, across the community and council
- Share outcomes and lessons with the community, other councils and organisations

The aim of the Communications Plan was to showcase BCC’s actions to lead and empower our community to become more energy efficient. Multiple target audiences were identified and priority communication strategies were developed to assist in developing materials, assigning actions and measuring outcomes.

The following stakeholders were identified in the Communications Plan:

- Community of Bankstown (residents / householders/ ratepayers)
- Media
- Businesses and business groups
- Educational Institutions
- Council Staff
Councillors / Elected Officials
Other Councils and Government agencies.

Activity 2 - Interactive kiosk

Development of an interactive Kiosk was identified early in the project planning as a way of sharing information with the general community and youth in particular via a learning resource. In line with the grant communication priorities, content for the interactive kiosk focused on building community capacity about sustainability and energy efficiency.

The opening of the new Bankstown Library and Knowledge Centre coincided with this phase, so it was decided that the ideal location for the kiosk would be in the foyer of the new building.

The identified outcomes for the Generation project kiosk were:
- Improved accessibility of quality information relating to energy efficiency
- Information platform easy to access and well used by site visitors

By installing this interactive kiosk and targeting predominantly youth including, students, teenagers and general community, this technology delivered an interactive experience which is user friendly, uses technology which is considered leading edge and at the forefront of internet technology, engages with and informs audiences on; sustainability, energy and provides an interactive game which educates children how to be more energy efficient.

Library staff promote and demonstrate the interactive kiosk to all School groups who visit the library. All new BCC Staff inductions are shown the Kiosk. Additionally, BCC have promoted usage through Council quarterly community newsletters. Between 1/4/14 to 30/7/15 we recorded 11,954 interactions (views and/or game playing).

Number of videos views: 466
Number of PDF pages viewed: 1126
Number of times games completed: 3167

Figure 1: Community members Interactive Energy Saver Game
Figure 2: Community member using the Interactive Kiosk

The Generation Project videos are available on the Kiosk. Additionally BCC obtained approval from the Climate Commission to use the videos and information posters produced as part of their community education program. This material (with original branding) is now able to be viewed at the Kiosk, or a link can be emailed and accessed on the web later.

The following are accessible via the Generation Project Interactive Kiosk:

**Interactive Energy Saver Game**
- Choose the most energy efficient activity / appliance / transport mode etc. (27 randomly generated options)
- Race against a clock
- Energy rating STAR is achieved for every correct answer
- Top 5 scores invited to put initials on the Leader board for current month
- Option to sign up for the library newsletter
- Option to email link to videos and documents to self or others
- Connect with Council - View Tweets

**Documents available to view and email**

<table>
<thead>
<tr>
<th>Available via Kiosk</th>
<th>Available via Kiosk</th>
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<tbody>
<tr>
<td>Sea Level Rise</td>
<td>The Critical Decade 2010- 2020</td>
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<tr>
<td>The Angry Summer</td>
<td>Urban Heat Island Effect</td>
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<tr>
<td>Solar Energy</td>
<td>Climate Change in NSW</td>
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<tr>
<td>Climate change and the water Cycle</td>
<td>Climate Change and Rain</td>
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<tr>
<td>Greenhouse Effect</td>
<td>Ocean Acidification</td>
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<tr>
<td>Climate Change Risk</td>
<td>Effects of Climate Change</td>
</tr>
<tr>
<td>Climate Change Feedback Loop</td>
<td></td>
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</tbody>
</table>

**Available Videos**

- Australia’s future; Solar Energy
- The impacts of Climate Change
Figure 3: Examples of images, videos and screen shots from the interactive kiosk.

Urban Heat Island effect

Greenhouse Effect

Climate change and the Water Cycle

Ocean Acidification

Australia’s future Solar Energy

Climate Change Fueling Wilder Weather

https://www.youtube.com/watch?v=AR9XbAJ1c0U

https://www.youtube.com/watch?v=MNdF-eVRWX4

Energy saver game screen shots

Learn and connect screen shots
The Generation Project video

BCC also created a video demonstrating Council’s actions to save energy by upgrading lighting in the car parks to LEDs as well as other actions the Council is taking to improve environmental sustainability. The video is shown at the BLaKC as well as during the induction of new staff.

Figure 4: Stills from the “Generation Project” video

Activity 3 - Schools film competition / photo booth

Students and local educational institutions were identified as a specific target group for the project who could be engaged in energy efficiency through a short film competition. The Switch Flicks Film Competition was developed in conjunction with a number of officers across Council including children and youth specialists, school education specialists, Corporate Social Media and IT.

The Switch Flicks Film Competition was promoted to young people (9 to 24 years) in Bankstown via Councils website, posters at libraries, arts centre, community centres, Council buildings and also electronic images emailed directly to school by library members youth officers. Additionally, librarians contacted school teacher contacts directly to promote the competition.
Unfortunately, despite a concerted effort on behalf of the project team, the film competition failed to attract entries. The deadline for entries was extended by two weeks, with additional promotion via libraries, and repeating promotions to schools and contacting all school contacts. At the conclusion of the extension period the project team recommended that the Film Competition be abandoned and an alternative method for engaging youth be sought.

With approval from the grant provider, an alternative activity was held to engage youth in Bankstown with energy efficiency messages via a Photo Booth at the Annual Bankstown Children’s Festival on 13 September 2014. There were numerous exciting activities for children including scout adventures, lantern making, costume parades, arts and craft, rides, animal petting zoo and more.

A “Generation Project” photo both was hired and placed in the foyer of the New Bankstown Library adjacent to the park. The photo booth was equipped with props to promote energy efficiency and personal action. Over 4 hours there was a constant queue and 380 photos were taken, all participants received photos to take home - printed with project branding and the message “save energy, save money and save the environment”. BCC Staff attended and promoted energy efficiency through displays, discussions with participants and parents and distributed Council brochures and flyers about a range of energy efficiency options for households and individuals.
Figure 6: Photos of activity at the photo booth on Saturday 13 September 2014 at the Bankstown Children’s Festival:
Figure 7: Examples of photos taken on the day and posted online
@http://politeinpublic.com.au/11248_0021
Activity 4 – Energy efficiency and lighting expo

The Energy Efficiency and Lighting Expo was held on 8 October 2014. BCC used to Expo to promote the CEEP2014 project and the benefits of LED lighting, as well as other general energy efficiency actions which businesses and the community could take. BCC ensured that the exhibitors at the Expo included LED lighting suppliers, energy auditors and lighting designers.

Over 10,000 Bankstown businesses were invited via the Bankstown Business Advisory Service (BBAS) email data base. Bookings for workshops, networking session and Q&A could be made through Council’s website. BBAS staff also made personal invitations to local businesses to ensure they were aware of the Expo.

- Approximately 200 people from over 120 businesses attended the Expo
- Attendees from 24 businesses attended energy efficiency workshops on the day.
- Approximately 50 businesses attended the networking session and the Q&A session.
- 36 Energy Specialists exhibited at the Expo, including LED & lighting manufacturers and suppliers, solar specialists, energy auditors, NSW energy certificate certifiers and energy trainers

Figure 8: Invitation emailed to the BBAS Businesses Database and the large banner displayed on the Bankstown Library and Knowledge Centre.
Figure 9: Bankstown City Council website shots and booking page for expo and workshops
Figure 10: Advertisements were run in the local newspapers in the weeks leading up to the Expo. Digital media was also used to encourage businesses to attend.

Figure 11: EXPO “Passport” to encourage attendees to move around the Expo and engage with stallholders.
Figure 12: Images from the Energy Efficiency and Lighting Expo
Activity 5 – Signage at Carparks

In order to communicate information about the lighting upgrades to the users of the car parks temporary banners were displayed over 6 weeks during the works. At completion of all works permanent signs were installed. All artwork was approved by the grant provider prior to production and installation.
Activity 6 – Staff Training and engagement with Management and Councillors

Another important component of the program was extending the knowledge and capability of Council property management and maintenance staff. The starting point was building awareness about energy consumption and annual costs from lighting which amount to over $800,000 for Council facilities alone. As well as workshops about efficient lighting technology and practices, staff benefited from the opportunity for professional development through attending conferences on energy efficiency.

All new staff joining Council are run through a comprehensive induction day – which includes a comprehensive overview of Council’s commitment to sustainability and current projects. New staff are also shown the “Sustainable Bankstown” video which explains all of Council’s environmental sustainability actions.

Council and senior staff have been kept informed of the project in its entirety through reports, briefings and presentations. Additionally senior staff and Councillors were encouraged to attend community engagements activities such as Lighting Expo, where the Mayor gave a short presentation during the Business Networking session. Elected representatives from Bankstown City Council and neighbouring councils in Southern and Western Sydney were encouraged to take part in community workshops and forums.

Activity 7 - Case Study

A case study of the car parks lighting project was prepared by Blue Sky Green (see Attachment B). The case study was shared with Council colleagues through the Southern Sydney Regional Organisation of Councils (SSROC) and the Western Sydney Regional Organisation of Councils (WSROC). It has also been placed on Council’s own website and intranet for all staff to see.
5. Outcomes and benefits of the Project

Project Objective 1 – Save energy and improve lighting in the multi-level car parks by:

- replacing all existing lighting with energy efficient Light Emitting Diodes (LEDs)
- ensuring the new lighting in the car parks met current Australian standards
- incorporating daylight sensors to maximize energy savings
- selecting lights with motion sensors to improve safety by alerting customers to movement near their vehicles

The project has resulted in energy savings at all three sites. Most of the light installation work commenced in early-mid June and were completed by the end of July. Table 1 below compares the energy consumption in the month before works commenced (May) with the latest monthly account data available. Energy savings achieved in the 3-6 months since works were completed range from 45% - 62%. These figures reflect the significant energy efficiency gains by changing from fluorescent to LED lighting as well as incorporating movement and daylight sensors. The savings are higher than forecast annual savings but this probably reflects the increasing daylight hours of the first few months of operations as we move into spring and summer. It probably also reflects the improved power factor of the new LED lights. These savings are likely to move closer to the predicted forecast savings of 30% over the rest of 2015/16 as days become shorter and the lights operate for longer.

Section 6 contains a more comprehensive analysis of data.

Table 1: Energy, emissions and cost changes, prior to and after works

<table>
<thead>
<tr>
<th></th>
<th>Prior to works</th>
<th>After works completed (latest available data)</th>
<th>Actual savings</th>
<th>Forecast annual savings*</th>
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<tbody>
<tr>
<td>Marion St</td>
<td>May 2015</td>
<td>December 2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kWh</td>
<td>9,266</td>
<td>5,036</td>
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<tr>
<td>tonnes CO2e</td>
<td>8</td>
<td>4</td>
<td>-50%</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
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<td>$864</td>
<td>-45%</td>
<td></td>
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<tr>
<td>Meredith St**</td>
<td>May 2015</td>
<td>November 2015</td>
<td></td>
<td></td>
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<tr>
<td>kWh</td>
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<tr>
<td>Cost</td>
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<tr>
<td>Brandon Ave***</td>
<td>May 2015</td>
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<td></td>
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<td>kWh</td>
<td>15,431</td>
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<td>Cost</td>
<td>$1,474</td>
<td>$663</td>
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</table>

Source: Council electricity accounts
Notes:
* Based on advice from Haron Robson contained in email advice to the Department (Milestone Report 5 Attachment A - Email re_amendment to scope of project (DWS Doc No 6429105))
** Meredith St car park works commenced in mid-June and completed in mid-July 2015.
Brandon Ave car park works commenced in late June and were completed by mid-July 2015.

Light levels in the car parks have also increased and now meet current Australian standards. The new LED lights are a marked improvement on the previous fluorescent light fittings, many of which were the original fittings and in very poor condition. Fluorescent lights also produce a more yellow-coloured light whereas the LEDs produce a light closer in colour to daylight. This improvement in light quality means that visibility and safety within the car parks has also improved. Movement sensors have also enhanced safety as drivers are alerted to movements by pedestrians and other vehicles; and pedestrians are alerted to movements by other vehicles as well as anyone near their own vehicles.

**Project Objective 2 – Upgrade switchboards and improve monitoring of electricity use by:**

- upgrading switchboards to more effectively separate light circuits
- bringing switchboards up to current Australian standards
- removing asbestos in one switchboard
- incorporating data loggers to capture daily interval data
- incorporating this data into Council’s existing carbon/energy management software

Switchboards have been upgraded and now comply with Australian standards. One existing switchboard containing asbestos has been removed.

Improving the monitoring of energy consumption proved to be one of the most challenging aspects of this project. As part of the project, Council wanted to demonstrate how live daily data could be captured and incorporated into the Council’s energy and carbon management Envizi software. This would then give facility managers a powerful and easily accessible tool for better managing energy use in Council facilities.

However, it has been extremely difficult to obtain this data from the energy providers without changing the tariff for the project sites. Data loggers were installed in the switchboards to overcome this but it was not possible to obtain the data in an appropriate format and incorporate it into the Envizi software.

Consequently, Council approached Ausgrid to obtain the interval (15 minute) data directly from the electricity meter. This data is now sent directly from Ausgrid to Envizi every day via an automated email and was also backdated to May 2015 - prior to the lighting upgrade works being carried out. Although it is not live data it is a significant improvement on the monthly or quarterly energy bills and has allowed Council to identify any issues at these sites in a timely manner. For example, we identified that exterior floodlights at the Marion Street car park were staying on during the day. The timer switch was adjusted accordingly.

Section 6 contains more analysis of the daily data which is now available.
Project Objective 3 – Build knowledge and understanding of energy efficiency and LED lighting among the community and Council through:

- Engagement of BCC Asset Management staff on energy efficiency and LED technology
- Banners and community notice boards at car parks
- E-newsletters and updates to Council's website
- Deliver a Bankstown Lighting Expo (including workshops) at a local venue
- Provide case study information to other councils

Council has achieved this objective beyond original expectations. As a result of the information at the Lighting Expo, the staff training funded by this project and persistent engagement of Council’s Asset Management staff on the benefits of LED lighting, our electrical team proposed that an annual LED light upgrade program be established and funded. Management agreed and now sets allocates $50,000 annually to progressively upgrade lighting at Council facilities to LEDs. Under this program the exterior lighting at Council’s two works depots and the Bankstown Arts Centre was upgraded. A further upgrade of all theatrical lighting at the Bankstown Arts Centre to LEDs has also been completed. Lighting at other high energy-using sites is currently being assessed.

Furthermore, Council is considering development of a Council-wide lighting strategy which will identify lighting requirements across all Council assets, including parks, and processes for assessing and selecting energy efficient technologies. The objective is to ensure that all Council officers who are responsible for installing any lighting do so in a consistent manner and install the most energy efficient and appropriate lighting available.

Members of the public have also benefitted from the lighting upgrade. Prior to the works, Council received several complaints about the lighting in the fire stairs at these car parks being very dark, inadequate and/or non-functioning. Since the works there have been no complaints. There was also a small article in the Torch (see Attachment C) complimenting the Council for the lighting upgrade. The quality of lighting, particularly at night, has also improved with the replacement of old and (some) non-functioning spotlights with LED lights on the top levels of the car parks which are used by many rail commuters. The LED lights mean these areas are now better lit when they return to their cars in the evening.

Finally, the Bankstown community as a whole are benefitting from the reduced costs of electricity and maintenance of the lighting.
6. Energy Efficiency outcomes

Energy savings

In the original grant application we estimated potential energy savings of up to 65% at each car park site. This was based on replacing the existing lighting on a one-for-one basis with a multi-function LED light called a Chamaeleon which had an inbuilt movement sensor and used significantly less energy than the existing T8 fluorescent lights. It was also based on an initial Level 1 audit of the Marion St car park by Haron Robson which indicated that these energy savings were achievable.

The project required a more detailed assessment of all sites as part of the lighting design process. During this audit by Haron Robson, they identified that most of the car park sites did not have sufficient light fittings to meet current Australian lighting standards and at least one site had no emergency lighting. This meant that it was necessary to install additional light fittings. Consequently, the projected cost of using the Chamaeleon increased beyond the available budget. An alternative, cheaper fitting was recommended by Haron Robson but the projected energy savings were reduced to 25-30%.

This is the estimated energy saving used in subsequent reporting and the Project Energy Efficiency templates and Attachment A.

Results for Marion St car park

The interval data for Marion St (see Figure 14) shows the change in energy demand immediately before and after installation of LED lights. The daily peak demand fell from about 15kW to about 10kW. Much of this fall in demand is the result of movement and daylight sensors which mean that many lights now go off when they are not required.

Figure 14 also shows how demand across the day prior to the lighting upgrade was very uniform. The only variation is the daily fall in demand as a result of the exterior spotlights (which were on timers) going off each morning and coming on each evening. After the upgrade electricity demand across the day has become more variable. This reflects the fact that lights not required during daylight and times of low activity now go off rather than all lights remaining on.

The red line in Figure 14 shows the power factor which has improved significantly as a result of the lighting and switchboard upgrade. Prior to the works the power factor was quite variable and fell as low as 0.8. After the works, power factor is more stable and consistently well above 0.9.

The large fall in demand on 15th June occurred because power to the site was turned off while the new switchboard was installed.
Figure 14: Daily electricity demand, Marion St car park, before and after light installation

Figure 15 also shows total *daily* electricity consumption for a typical week in May prior to the lighting upgrade works. Daily demand for electricity is very consistent across each day at around 280kWh per day on average.

Figure 15: Total daily energy consumption (kWh) *pre*-lighting upgrade, Marion St car park, May 2015
Figure 16 shows a typical week after the lighting upgrade works. Daily demand for electricity has fallen to 170 - 200kWh (28% - 39%) with more variation as a result of the installation of movement and daylight sensors. Again, this is consistent with Haron Robson’s revised estimated energy savings of about 25-30%.

Figure 16: Total daily energy consumption (kWh) post-lighting upgrade, Marion St car park, July 2015
Results for Meredith St car park

The figure below (see Figure 17) shows the change in energy demand immediately before and after installation of LED lights at the Meredith Street car park. The daily peak demand fell a quarter from about 8kW to just over 6kW. Demand across the day prior to the lighting upgrade was very uniform with the daily changes in demand occurring as a result of the exterior spotlights (on timers) going off/on each morning/evening. The change in demand profile across the day after the upgrade electricity demand demonstrates the effect of movement and daylight sensors which have been installed across the site.

Figure 17: Daily electricity demand, Meredith St car park, before and after light installation
Figure 18: Daily energy consumption pre-lighting upgrade (kW), Meredith St car park, May 2015

Figure 18 (above) also shows *daily* electricity consumption for a typical week in May prior to the lighting upgrade works. Daily demand for electricity is very consistent across each day at around 190kWh per day on average.

Figure 19 (below) shows a typical week *after* the lighting upgrade works in August. Daily demand for electricity has fallen to around 90-105kWh with more variation across the week as a result of the installation of movement and daylight sensors.

Figure 19: Daily energy consumption **post**-lighting upgrade (kW), Meredith St car park, August 2015
Results for Brandon Avenue car park

The installation works at Brandon Avenue were completed in mid-July 2015. The graph below (Figure 20) shows electricity demand prior to and during the works.

Prior to the lighting upgrade, electricity demand was pretty constant across the day. After the installation demand across the day has become much more variable. Maximum demand has also fallen from about 10kW to about 7kW.

Figure 20: Daily electricity demand, Brandon Ave car park, before and after light installation
Figure 21: Daily energy consumption pre-lighting upgrade (kW), Brandon Ave car park, May 2015

Figure 21 (above) also shows daily electricity consumption each day for a typical week in May prior to the lighting upgrade works. Daily demand for electricity is very consistent across each day at around 240kWh per day on average. However, after the works (Figure 22 below) daily demand for electricity has fallen to 140 - 170kWh per day with more variation across the week as a result of the installation of movement and daylight sensors.

Figure 22: Daily energy consumption post-lighting upgrade, Brandon Ave car park, August 2015
Cost savings for energy

The estimated annual cost savings were revised down (see Attachment A) to reflect the reduced energy savings as a result of Haron Robson’s detailed audits which estimated energy savings of 25-30% at each site. Cost savings from maintenance are unchanged from those in the original grant proposal.

Table 1 (see Section 5) shows the actual energy cost savings achieved at each site in the months since the lighting upgrade works were completed.

For Marion St the revised estimated cost savings are $9,509 per year which is lower than those proposed in the original grant application of $17,924 per year (see Attachment A). This is still a good result, considering the reduced energy savings. However, the actual results after six months (see Table 1) show that the electricity cost in December 2015 are 45% lower than in May prior to the lighting upgrade works. This very high result demonstrates:

- the combined benefits of the LED lighting, movement and daylight sensors,
- improved power factor for the new lights and new switchboard
- a reduction in maximum daytime demand (see Figure 1) which in turn reduces network charges for the site.

It probably also reflects the longer days during this period of spring and early summer. As the results for the full year become available, however, the electricity savings figures are likely to moderate as we move towards the winter months.

Estimated annual cost savings for Brandon Ave were revised down to $8,551 (from $14,752). Table 1 shows that the actual electricity costs in October 2015 (the latest data available for this site) are 55% lower than in May prior to the lighting upgrade works. Again, as with the Marion St site, this result reflects only a short period and it will probably moderate over the remainder of the financial year for the same reasons as stated above.

Estimated annual cost savings were revised down for Meredith St to $7,967 (from $12,232). Table 1 also shows the actual electricity costs in November 2015 (the latest data available for this site) are 50% lower than in May prior to the lighting upgrade works. As with the other two sites, this result is likely to be an over-estimate and savings are likely to moderate as the year progresses.

Payback periods

In the original grant application the payback period for this project with the Commonwealth grant was calculated using both energy cost savings and savings from reduced maintenance requirements. The old T8 fluorescent lights had an operational life of about 12,000 hours whereas the LED tubes which were installed have an operational life of up to 50,000 hours. As a result, the new lights will need replacing every 5.7 years compared to replacing the old T8 fluorescent lights every 1.3 years. Therefore, taking energy savings and maintenance savings into account, we originally estimated the payback on this project for BCC with the CEEP grant to be 2.2 years.
However, as a result of the changes to the scope of the project, the number and type of lights installed and the resulting reduced energy savings (see Section 3 for details), the revised payback for Council (taking account of the CEEP grant) across the three sites has been revised to 3.9 years. Although this is nearly double the original estimate it is still an outstanding result. It is also based on the estimated savings provided by the Haron Robson Level 3 audit of the car parks which estimated the energy savings to be 25-30%. Early actual results show savings of 45-62% (see Table 1 for details) although this is likely to moderate.

7. Other benefits

All of these car parks are around 30 years old and had sub-standard lighting throughout which no longer met Australian standards. The old fluorescent and metal halide light fittings were also in poor condition with many broken, missing or non-operational. As a result of this project, the lighting throughout the car parks now complies with Australian standards and is fully operational. The quality of the light has also improved from a yellowish colour to a colour closer to daylight. This improvement in the colour rendition also assists to improve visibility and safety in the car parks.

The switchboards were also old and in need of upgrading. One switchboard was known to contain asbestos. This has now been removed. Another had a wooden backing board, which is no longer compliant. All switchboards now meet current Australian standards.

By replacing all of the fluorescent and metal halide lighting with LEDs, the project has significantly reduced maintenance costs at these sites. Whereas a fluorescent tube lasts around 12,000 hours (1.3 years), the LED lighting products installed in the car parks have a lifespan of 50,000 hours (5.7 years). This means that our maintenance teams’ workload to replace lamps in the car parks has effectively been reduced by nearly 75%. This is a significant financial saving for Council and also means that the lighting in the car parks will remain of a high standard for longer.

The overall reduction in energy consumption, particularly during the day, is already having a positive impact on Council’s peak energy demand and network costs for these sites and has resulted in higher than anticipated cost savings. These savings are expected to improve over time as peak energy prices and network charges per kWh increase.

8. Budget

The total value of the CEEP2014 grant for this project was $248,654 which was equivalent to two thirds of the total project budget of $373,097 (see Table 2). The project was underspent by $53K. This is largely due to the change in scope to the project i.e. upgrading the lighting in three car parks instead of five. The only component of the budget which exceeded expected costs was the upgrading of the switchboards. Details of the budget are discussed in more detail in Table 2 below.
Impact on the budget of delays to commencing the project

The budget was impacted by the delays to commencing the project. The original CEEP grant application was prepared in February 2013 and was based on cost estimates obtained from suppliers at the end of 2012. After Council was awarded the grant in May 2013, there were delays in signing the funding agreement, due to delays by Council signing the funding agreement for the CEEP Round One grant for the Bankstown Trigeneration project (CEEP1104). By the time the project went to tender in March 2015 the costs of products and installation had increased, putting pressure on the available budget.

Changes to the original budget

When the project was proposed, it was assumed that the existing lighting met current standards and could simply be replaced on a one-for-one basis. However, after more detailed investigations, Council was advised that a significant number of additional light fittings and emergency light circuits would be required to bring the lighting in the car parks up to current standards. Council was also advised that it was necessary to install a number of powerful lights near entry and exit points to meet current standards. It became clear at this point that there would not be sufficient funds to upgrade lights at all of the car parks.

However, in a separate decision Council then decided to sell two of the five sites. As a result, the scope for the project was reduced to three sites with the additional lighting and the budget was sufficient for the reduced scope of the project.

Outcome of the tender

Council went to a single public tender for the light design as well as supply and installation in order to give Council the widest possible choice of cost effective and energy efficient lighting products. The result was that the tender prices for the lighting were well below the estimated costs provided in the detailed site audit. Council also avoided the additional cost of a separate lighting design by the lighting consultants. By including this element in the tender, the cost of the design for the car parks was substantially lower than what the lighting consultants had originally proposed. The tender process demonstrated that many of the companies tendering for project had invested in lighting design software and had the capability to do lighting design in-house.

Table 2: Budget and expenditure

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<td>$320,090.03</td>
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In addition, the contractors were able to identify suitable LED products to replace some of the existing non-fluorescent pole-mounted floodlighting in the car parks within the available budget. At the time of applying for the original grant in February 2013, Council had been advised that these lights were metal halide, were the most energy efficient light choice and that there were no suitable LED products to replace them. By the time the tender went to market in March 2015, suitable LED products had become available and were a reasonable cost.

The costs of the switchboard upgrades were higher than expected. This was partly due to price increases between the time of the original grant application and the tender going to market. It also became necessary to include data loggers in the switchboards in order to obtain the daily electricity consumption data.

Other costs, particularly the communication costs, were lower than expected. Council had originally planned to hold the Lighting Expo in a privately owned venue, the Bankstown Sports Club. This was the only locally available venue which would have been suitable at the time of preparing the original grant. However, in April 2014 the Council’s new Library and Knowledge Centre was completed and was used instead. As a result, the costs for the venue were much lower than originally budgeted.


Delays to commencing the project

In May 2012, Council won a grant under round 1 of the CEEP to build a Trigeneration Plant in Council’s Civic Tower (CEEP1104). A major lighting upgrade was included in this project. When Council won a second CEEP grant in Round 2 in May 2013 (CEEP2014) for a lighting upgrade of the multi-level CBD car parks, it was planned to combine this project with the lighting upgrade component of CEEP1104 into a single tender and construction process to save resources and achieve better value for money.

Council engaged the same lighting engineers to complete the lighting designs and tender documentation for both projects. The communications activities for both projects were also combined so that larger events could be hosted (such as a Lighting Expo), a wider audience reached and joint branding could be used.

There were several delays to the start of CEEP2014 and signing of the Funding Agreement which resulted in a shortened time frame to complete the project. Further delays occurred over February – June 2014 in preparing the lighting design for CEEP1104 which impacted on the timing for the CBD car park lighting project (CEEP2014). Council eventually decided not to complete the Trigeneration part of CEEP1104 although the lighting upgrade and communications components of that project were completed.

When Council decided to sell two of the car park sites it was decided to separate the tender process for both projects. After consultation with the Department, it was agreed that the scope of the project could be reduced from five to three sites with the additional lighting required to be
compliant with Australian lighting standards. The project was completed within the original budget.

**Tender process and evaluation**

The tender documents for CEEP2014 were prepared internally by Council staff using outside expertise in relation to the electrical switchboard specifications. The documents were put out to public tender on 17 February 2015 and closed 3 weeks later on 10 March 2015.

After the significant delays experienced with the lighting upgrade of the Civic Tower (CEEP1104) as a result of having lighting designs prepared separately, it was decided to include lighting design in the tender for CEEP2014. This proved to be a successful approach which saved a lot of time and money. By including in the tender a requirement that the lighting design be compliant with Australian standards, Council ensured that the quality and quantity of lighting products in the tender were a true reflection of what was required.

It was necessary to complete the evaluation, select a contractor and make a recommendation to Council in time for the 24th March Council meeting if the project was to be completed in 2014/15. Council staff met this deadline.

**Quality control**

Council engaged lighting consultants Haron Robson to assist in the evaluation of the tenders. As part of the tender process, Council required a short-list of candidates to prepare a sample lighting design for one floor of one car park. Haron Robson then reviewed the proposed sample designs to confirm that tenderers had the required qualifications to prepare appropriate lighting designs. They also conducted a desktop review of the proposed lighting products to ensure the lighting products tenderers were proposing were of an appropriate quality. After works were completed Haron Robson signed off on the installation works themselves to ensure the installations were as per the approved designs and were of a high standard.

**Project and contract management**

This project was managed internally as Council has extensive expertise in managing projects.

The initial stages of the project – management of the CEEP grant, initial engagement of Haron Robson, lighting audits of sites, preparation of the tender documentation and evaluation of the tender – was managed by Council’s Sustainability Officer. Regular meetings were held with Council’s lighting consultants, Haron Robson, and the project management team to review progress on the initial investigations of the sites.

After the tender for design, supply and installation of lights was awarded, management of the construction phase of the project and the contract was managed by Council’s Project Management Team. The Project Manager held weekly meeting on site with the contractor to discuss progress, any issues and upcoming actions and requirements.
The communications aspects of the project were combined with the communications activities under Council’s Trigeneration project (CEEP1104). This was also a successful way of managing this part of the project as it meant that the communications for both projects were larger and able to reach a greater audience than if these activities had been split. It was also a more efficient use of Council resources.

Outcomes

This was the second major lighting upgrade project undertaken by Council and the first where only LED lighting was installed. Compared to the lighting project under CEEP1104, the process followed for this project was much smoother due to the design being included in the tender for supply and installation. By doing so, the contractor was able to select lights which met the budget and performance requirements and then prepare a design using those lights.

The installation process itself was smooth and there were no major issues. There were also few complaints from the public as most of the works were done after hours in order to minimise disruption to the public.

The lighting at the three car parks now meets current Australian standards and is of a superior quality to the old fluorescent lighting. The first few months of post-upgrade data shows that energy savings are exceeding forecasts although these figures may moderate over the remainder of the year (see data analysis in Section 6).

The improved monitoring of data which is now in place in the car parks can demonstrate how energy is being used across each day and evening. Unexpected fluctuations can be investigated quickly. For example, by monitoring the data after installation works were completed it was found that the timers for exterior lights in one car park (Marion St) were remaining on during the day. This issue was rectified by adjusting the timer controls for these lights. Furthermore, the process used to obtain the daily interval data for these sites (using NEM12 data from Ausgrid) has now been used by BCC to obtain interval data for several other sites across Council. BCC Management can now see how much energy is being used in our large facilities each day and overnight.

The installation of LED lights in the car parks has also had the effect of demonstrating to other Council staff the effectiveness and efficiency of this technology. As a result Council has now established an annual LED lighting upgrade program. See Section 5 for more detail.

The Bankstown community has also been engaged through a variety of communications activities which are discussed in Section 4. These activities have focussed on a message that energy efficiency generally, and using LED lighting in particular, can save energy, money and the environment. BCC made several media releases during the project specifically noting the amount of energy and money to be saved by changing the car park lights to LED. The community is now benefitting directly from the improved lighting quality in the car parks and benefitting indirectly by the cost savings to Council. The community is also able to see the LED lighting in action.

Lessons for Council
One major lesson for Council is that, given the age of BCC’s infrastructure, it is likely that much of the existing lighting may not comply with current standards. Consequently, any electrical upgrade is likely to require more than simple replacement of existing equipment.

Another lesson from this project is to include lighting design in the tender for supply and installation of lighting. It is now clear that lighting technology, the variety of products on the market and costs are changing very rapidly, particularly in relation to LEDs. Council learned that when a lighting design is prepared, it is based on specific lighting products. When that design is then put out to tender it is highly likely that that a tenderer will select different light products. This can create a conflict between the lighting designer and the contractor who may want to use different products to those used in the design. This was the case for Council during the lighting upgrade of the Civic Tower (CEEP1104). Council was able to avoid this conflict by including lighting design in the same tender as supply and installation.

Capturing and monitoring data from the car parks proved to be one of the more difficult aspects of the project. After a number of attempts a solution was found to incorporate data into Council’s ENVIZI carbon management software.

10. Conclusion

This project was the first time BCC installed LED lighting exclusively across an entire site. It has been useful as a demonstration of the technology as well as reducing energy consumption and bringing the lighting in these car park sites up to current Australian standards. The project has directly resulted in Council creating a new LED lighting program to replace old, exterior lights at high energy-using sites (such as depots) with LED lights. Council is also considering developing a Strategic Lighting Plan which will ensure that future lighting installations and replacements place a high priority on energy efficiency as well as performance.

The objectives of the CEEP were also achieved through the implementation of the car parks lighting upgrade as well as a communications strategy that has showcased Council’s actions to encourage the adoption of improved energy management practices within BCC, other organisations and the broader community. Lessons learned through streamlining the tender process mean that BCC is now better equipped and more experienced to undertake future similarly sized projects.

The business case for LED lighting has been established with the early energy savings results proving promising and the estimated payback of 3.9 years being a good result, considering the substandard lighting in the car parks to begin with. The lighting in the car parks now meets current Australian standards and the Bankstown community are able to see LED lighting in action. The lighting is also expected to last nearly four times as long as the old fluorescent lighting and will deliver a substantial saving in maintenance costs to BCC. The benefits of LED technology in terms of energy savings, maintenance savings and improved lighting outcomes are now better understood and accepted.

Monitoring the energy use in the car parks proved challenging but ultimately the method used in the car parks for this project has been implemented for many of Council’s high energy using sites.
BCC has gained a lot of experience in planning, evaluating and undertaking this project. BCC are better positioned to undertake similar projects in future particularly in relation to understanding the technology, the energy efficiency opportunities and the financial payback for such projects.
11. Financial Declaration

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 Bankstown City Council (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: 13/8/15

Name: .........................................................................................

Position: General Manager ............................................ Organisation: Bankstown Council

Witness Signature: ................................................................. Date: 13/8/15

Name: Heidi Wenham

Position: EA ................................................................. Organisation: Bankstown Council

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.
### 12. Attachment A - Project Energy Efficiency Improvement

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<th>Bankstown CBD Parking Lights Project</th>
<th>PROJECT ID</th>
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<tr>
<td>FUNDING RECIPIENT</td>
<td>Bankstown City Council</td>
<td>DATE</td>
<td>15 January 2016</td>
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**Building, Facility or Site 1**

| Name of Building, Facility or Site 1 | Marion Street Car Park |
| Location (address) | Marion Street, Bankstown, NSW, 2200 |
| Type of building, facility or site | Car park lighting |
| Activity Type and Measure | Outdoor Lighting upgrade |
| Energy Efficiency Estimate Method | Energy consumption derived from Council accounts; area of car parks calculated from Council Assets Register; estimated energy efficiency based on year to June 2014 data and derived from the Level 3 audit of all car park sites by Haron Robson Pty Ltd in July 2014. |
| Baseline Energy Usage | 106,048 kWh per annum |
| Baseline Energy Efficiency | 106,048 kWh x 3.6 = 36.4 MJ per m2 per annum |
| Energy Efficiency Improvement | Reduction 31,814 kWh x 3.6 = 10.9 MJ per m2 per annum |
| Reporting Data (Measuring Energy Efficiency and Additional Data) | Outdoor area covered: 10,500 sq.m |
| Category of site: Car park | Average hours of operation per day: 24 hours |
| Cost of Activity* | $102,165 |
| Estimated Cost Savings** | $9,509 per annum |

**Building, Facility or Site 2**

| Name of Building, Facility or Site 2 | Brandon Ave Car Park |
| Location (address) | Corner Brandon and Northam Ave, Bankstown, NSW, 2200 |
| Type of building, facility or site | Car park |
| Activity Type and Measure | Lighting upgrade |
| Energy Efficiency Estimate Method | Energy consumption derived from Council accounts; area of car parks calculated from Council Assets Register; estimated energy efficiency based on year to June 2014 data and derived from the Level 3 audit of all car park sites by Haron Robson Pty Ltd in July 2014. |
| Baseline Energy Usage | 87,802 kWh per annum |
### Baseline Energy Efficiency

**Energy Efficiency Improvement**

87,802 kWh x 3.6 = 47.9 MJ per m² per annum

### Reporting Data (Measuring Energy Efficiency and Additional Data)

<table>
<thead>
<tr>
<th>Category of site</th>
<th>Outdoor car park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average hours of operation per day</td>
<td>24</td>
</tr>
</tbody>
</table>

### Cost of Activity*

$99,871

### Estimated Cost Savings**

$8,551 per annum

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### Building, Facility or Site 3

<table>
<thead>
<tr>
<th>Name of Building, Facility or Site 4</th>
<th>Meredith Street Car Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (address)</td>
<td>Meredith Street, Bankstown, NSW, 2200</td>
</tr>
<tr>
<td>Type of building, facility or site</td>
<td>Car park</td>
</tr>
<tr>
<td>Activity Type and Measure</td>
<td>Lighting upgrade</td>
</tr>
</tbody>
</table>

#### Energy Efficiency Estimate Method

Energy consumption derived from Council accounts; area of car parks calculated from Council Assets Register; estimated energy efficiency based on year to June 2014 data and derived from the Level 3 audit of all car park sites by Haron Robson Pty Ltd in July 2014.

<table>
<thead>
<tr>
<th>Baseline Energy Usage</th>
<th>65,370 kWh per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Energy Efficiency</td>
<td>65,370 kWh x 3.6 = 34.1 MJ per m² per annum</td>
</tr>
<tr>
<td>Energy Efficiency Improvement</td>
<td>Reduction 19,611 kWh x 3.6 = 10.2 MJ per m² per annum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reporting Data (Measuring Energy Efficiency and Additional Data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor area covered: 6,900 sq.m</td>
</tr>
<tr>
<td>Category of site: Outdoor car park</td>
</tr>
<tr>
<td>Average hours of operation per day: 24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost of Activity*</th>
<th>$102,470</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Cost Savings**</td>
<td>$7,967 per annum</td>
</tr>
</tbody>
</table>

---

* Cost of Activity from actual cost of works data
** Estimated cost savings include electricity and maintenance savings
13. Attachment B – Case Study
CONGRATS to one of Bankstown’s elite basketballers, Alex Opacic, who has won the 2015 Victorian Women’s Basketball Most Valuable Player Award for the Championship Men’s division. Opacic also led the league in scoring, with an average of 23.4 points per game.

THE Revesby Ladies Group will hold a morning tea to raise funds for Bankstown Hospital from 9.30am on Wednesday August 19, in the Macarthur Room on the corner of Dixon Lane and Macarthur Avenue in Revesby (behind Federal MP David Coleman’s office). Entry is $3 and includes a morning tea, and there will also be raffles, an auction, good for sale and plenty of fun.

THE University of Western Sydney, with a campus at Bankstown, will launch a new identi-
ty on August 30. To be known as Western disc. Research Institute. They still get to take part in fun experiments such as extracting DNA from fruit and making elephant toothpaste to help celebrate IMS Bank’s 125th birthday. Register at imb.com.au/good.

THERE will be more support for ‘ice’ addicts, with the Government to spend $11 million on new stimulant treatment services and the expansion of existing services. Over the past six years, there has been a seven-fold increase in emergency departments where the use of methamphetamine, including ice, was a factor. To seek help, call 1800 659 467 or go to yourroom.com.au.

A MAJOR emergency management exercise was carried out at Hurstville on Saturday to test the arrangements in case of a fire on a train. Those who live, work or travel through Hurstville can take a level of comfort in the knowledge we do have plans, but more importantly, we test them to make sure they work.” Superintendent Dave Donovan said.

A CALLER said: “How can they do away with the $2.50 paper ticket for pensions in Sydney when they are still operating in Queensland and Victoria What about inter-state visitors or those from overseas? How will they get around? The two countries where Opal originated, China and France, 30 and 25 years ago respectively, still have paper tickets for the reason mentioned above.”

REVESEY resident Norma wants to warn others of a frightening scam doing the rounds: “They ring to say that unless you pay your tax bill, and I haven’t worked for 40 years, the police will issue a warrant for your arrest. I rang the police and they confirmed it was a scam. I might be old but I’ve still got my wits about me!”

A BANSHHOWN call-