WOLLONGONG CITY COUNCIL

Southern Gateway Centre Lighting Upgrade

Australian Government Funding Agreement Number CEEP1130
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EXECUTIVE SUMMARY

Wollongong City Council is actively taking steps to protect our natural environment, reduce the use of natural resources and support a high quality of life for present and future generations. In achieving these goals, it also endeavours to reduce its operational footprint. A strategy currently being implemented is to improve the overall operational efficiency of assets.

Council received community concerns about the level of external lighting of the Southern Gateway Tourism Visitors Centre (SGTVC) resulting in further investigations and the site being nominated as a project that could help Council reduce its footprint by upgrading the lighting to achieve energy efficient savings and at the same time addressing the community concerns.

Wollongong City Council in partnership with the Department of Climate Change and Energy Efficiency provided the necessary funding to facilitate the upgrade works.

These works included the replacement of 162 existing luminaires totalling 18,043 Watts with 154 luminaires totalling 6,791 Watts. This substantial reduction is due mainly to better technologies of current luminaires, including LED technology.

The reduction in energy achieved was 45,025 kWh per annum or an annual consumption saving of $6,303 excluding maintenance financial benefits which equated to an additional $8,359 per annum, therefore a total financial saving of $14,662 per annum.

Apart from the financial savings achieved the other key objectives of the project such as over-lighting, glare and obtaining a reduced carbon footprint were also successfully met through the adoption of the new lighting scheme developed by the lighting designer.
PROJECT OBJECTIVES

The key objectives of this project were to benefit the environment by having a reduced carbon footprint, reducing the glare and over-lighting of the site and obtaining energy savings providing economic benefits to the Council and community.

Summary of key Project Objectives:

- Produce a regionally significant demonstration site for best practice sustainability open space lighting
- Reduce greenhouse gas pollution through energy efficiency
- Improve the visitor experience through reduction of glare and over-lighting
- Address community concerns regarding light pollution

The objectives of the Community Energy Efficiency Program are to:

- support a range of local councils and community organisations increase the energy efficiency of different types of non-residential council and community-use buildings, facilities and lighting; and
- demonstrate and encourage the adoption of improved energy management practices within councils, organisations and the broader community.
PROJECT ENERGY EFFICIENCY ACTIVITIES

Project Details:
Site: Southern Gateway Centre
Princess Hwy Bulli Tops
Principal/ Client Wollongong City Council
Lance Hazel
Project Manager NSW Public Works
Tony Donovan

A lighting audit was undertaken on the SGTVC to provide short and long-term strategies to reduce the glare concerns and the unnecessary lighting consumption. From this audit, an industry-leading lighting consultant was engaged to provide design documentation to address the key objectives of the project.

An energy efficient lighting scheme was developed with calculated energy savings of 64% to be achieved.

The lighting audit concluded that the site is substantially over lit noting ‘spill light emanating from the SGTVC creates an aura over the facility by illuminating low level clouds which can be seen miles away’.

The proposed replacement energy efficient lighting scheme addressed issues including:-

- Glare (in particular the car park);
- Safety and Security;
- Energy Reduction;
- Maintenance Issues.

Strategies to address these issues included Energy Conservation Measures (ECM's) such as:

- Replacing existing lighting systems with more efficient luminaires which enable a reduction in unnecessary energy consumption with little compromise to original lighting design concepts;
- The use of energy efficient LED (Light Emitting Diode) lamps lasting up to 7.5 times more than fluorescent lamps;
- Redesigning lighting to specific areas removing luminaires responsible for sky pollution, glare issues as well as reducing energy costs;
- Ultrasonic/Infrared sensors installations to control lights more effectively for security CCTV monitoring as well as achieving long-term savings;
- Modify existing light switching arrangements to achieve optimum energy savings.
Council was successful in an application for co-funding through a Community Energy Efficiency Program and committed to upgrading the current lighting scheme.

Council engaged the services of NSW Public Works and a local electrical contractor to facilitate the delivery of the project.

The specific project energy efficiency activities carried out can be found at Appendix A. The main light fittings that were replaced were:

- T8 fluorescent light fittings with T5 fittings;
- 250 Watt Metal Halide fittings with 16 Watt LED spot lights;
- 250 Watt Carp park fittings with 120 Watt LED fittings;
- 50Watt Halogen down lights with 8 Watt Led fittings

As can be seen from the above fittings that were replaced, a mixture of technologies and different type luminaires were used to achieve the energy efficiency objectives.

Issues faced during the procurement of these fittings, was that they were sourced from overseas manufacturers and lengthy time frames were applicable. To over-come this construction commenced on other areas while these fittings were in transit.
PROJECT DEMONSTRATION AND COMMUNICATIONS ACTIVITIES

Project Stakeholders:

Wollongong City Council (client)
Department of Climate Change and Energy Efficiency (co-funding authority)
NSW Public Works (project manager)
Tenants
Community

Media Notices were issued via
- Facebook
- Twitter
- Council Website
- Media Releases

The key challenges of the project are summarised as follows:

- Compliance with the funding agreement in regards to the reporting and time frame requirements;
- Local Government Regulations, procurement policy compliance;
- Works being carried out on an occupied site;
- Completion within budget;
- Achieving the Energy Efficiency savings.

OUTCOMES AND BENEFITS OF THE PROJECT

All key objectives of the project were met. The Lighting project yielded consumption savings of 45,025 kWh resulting in the abatement of 48 tonnes of CO2-e and yearly financial savings of $6,303. This represented 62% savings from the pre activity data.

The benefits of the project can be summarised as follows:

- A regionally significant demonstration site for best practice sustainability open space lighting has been created;
- Reduction of greenhouse gas pollution through energy efficiency;
- Improvement to the visitor experience through reduction of glare and over-lighting;
- Community concerns regarding light pollution have been removed.

The final energy efficiency and cost savings achieved were in close comparison to the forecast improvements. 62% energy efficiency savings against the forecast savings of 64%.
Actual savings associated with the project are understated, as they do not include the savings associated with the reduced maintenance and replacement frequency of the luminaires and globes, or current electricity pricing. These additional annual savings have been calculated at $4,359 for material maintenance costs and $4,000 for the applicable labour component. Therefore, an additional $8,359 per annum of savings will be achieved.

BUDGET

Forecast Expenditure for the total project was $300,000.

The project was delivered under budget with a total project cost of $200,672.00. The Project was jointly funded by the Australian Government Department of Infrastructure to 50% of the costs totalling $100,336.00. This achievement can be credited to the compilation of concise tender and design documentation.

The total capital cost for the project including all project phases such as initiation, development, implementation and finalisation including project reporting.

The total return on investment has been calculated at $14,662 per annum. Taking into account these savings the payback period is anticipated to be 14 years not including the actual cost benefit Council received due to the project being co-funded.

Additional to the above savings, further savings were achieved by the installation of a day light sensor and motion detectors for the lighting located underneath the rear of the centre (11 double fluorescent 28Watt T5 fittings). These works were not included as part of the original contract but issued as a variation towards the end of the project. In total an estimated additional 2,657kWh or $372 per annum of savings will be achieved.

No budgetary issues or unexpected costs outside contingencies were encountered during the project.
PROJECT OPERATION, MECHANISMS AND PROCESSES.

Delivery of the lighting upgrade was assigned to NSW Public Works for the total project management under supervision of a Council officer.

NSW Public Works are a department of the NSW State Government and is an industry leading project management firm.

Consultation was carried out on regular basis with monthly project reporting submitted.

The following Project Management process was implemented;

- **Project initiation**
  - Administration
  - Project Governance
  - Risk Assessment

- **Development/ implementation**
  - Project Plan
  - Project Budget
  - Program
  - Project Methodology

- **Tendering- (Design Consultant)**
  - Procurement planning
  - Pre tender Estimate
  - Tender/ Contract Documentation
  - Tender Panel establishment
  - Approval to Proceed to Tender
  - Call Tenders
  - Pre-Tender meeting
  - Review, assess, evaluate and recommendation to Client
  - Letter of Acceptance/ Contract Award

- **Design Development**
  - Design Development and Documentation by Design Consultant
  - Design review

- **Request for Quotations- (Construction) by WCC assisted by NSW PW.**
  - Procurement planning
  - Pre tender Estimate
  - Tender/ Contract Documentation
  - Tender Panel establishment
  - Approval to Proceed to Tender
  - Call Tenders
  - Review, assess, evaluate and recommendation to Client
  - Letter of Acceptance/ Contract Award
Construction
• Start-up workshop
• Construction activities
• Commissioning and Testing
• Project Documentation

Finalisation
• Defect management
• Handover Documentation

**Project Program**

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- Completed
- Remaining

**Milestones**

- M1- Design Completion
- M2- Main Works Tendering
- M3- Letter of Acceptance
- M4- Practical Completion
- M5- Project Reporting
- M6- Project Finalisation
CONCLUSION

Before

![Before Image 1](image1)

![Before Image 2](image2)

After

![After Image 1](image3)

![After Image 2](image4)

**Modelling carried out by Haron Robson**

The success of the project has been measured by achieving the following project objectives;

- Achieved energy efficiency savings
- The glare and over lighting of the site has been addressed and significantly reduced;
- Completion within agreed budget;
- Completion within agreed Timeframe;
- Minimising impact on Council operations during execution of the works;
- Satisfied Safety and security standards;
- Reduced Maintenance costs.
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Total (714.1, 11251.9) | 30962                 | 14062               | 45025                   | $ 6,305.44
Wollongong City Council – Southern Gateway Centre Lighting Upgrade

Summary

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<th>Energy Savings - based on historical consumption data</th>
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<td>Total Theoretical Consumption of new lighting (Total new Watts x Hours p.a.)</td>
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<td>Estimated Reduction in Energy Use (%)</td>
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Notes:
1. Specific pricing and peak/off-peak details have not been included in the savings calculation.
2. kWh per kWh has been used for the purpose of the calculation.
3. Lighting locations and quantities sourced from the following documents:
   - Existing design drawings – June 2008
   - New design drawings – August 2013
4. Historical consumption data provided by client

Southern Gateway Centre

Historical Consumption Data

Wollongong City Council – Southern Gateway Centre Lighting Upgrade
Final Report (Z14/213747)
DECLARATION

The Authorised Officer of the organisation makes the following declarations:

☐ I declare that I am authorised to submit this Milestone Report (including any attachments) on behalf of Wollongong City Council (Name of organisation).

☐ I declare that the information provided in this Milestone Report is true and accurate.

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

☒ I understand that progress payments will only be made in accordance with the Funding Agreement including on satisfactory completion of Milestones.

Authorised Officer Signature: ........................................ Date: 28/05/2014

Name: DAVID FARMER

Position: GENERAL MANAGER  Organisation: WOLLONGONG CITY COUNCIL

Witness Signature: ........................................ Date: 28/05/2014

Name: ELIZABETH GORST

Position: PERSONAL ASSISTANT TO THE GENERAL MANAGER

Organisation: WOLLONGONG CITY COUNCIL

The use and disclosure of information provided in this report is regulated by the relevant provisions and penalties of the Public Service Act 1999, the Privacy Act 1988, the Freedom of Information Act 1992, the Crimes Act 1914 and the general laws of the Commonwealth of Australia.

The information contained in this report will be regarded as private and confidential and will be treated as such by the Department. This is subject to the operational need to provide reports to assessors, and any statutory or legal requirements to provide information to the Commonwealth Parliament and other organisations, for audit, law enforcement, investigative or other legitimate governmental purpose.

As part of the assessment process for this report, the Department may need to consult with, and provide material from this report to, other government agencies or bodies, other organisations and/or relevant individuals, in order to substantiate any claims or statements made in this report, or to otherwise assist in the assessment of this report. If this occurs, the Department will endeavour to ensure that the parties who are consulted observe appropriate confidentiality provisions.

If this report is approved, the broad details of the 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 successful recipient and of any project partners, title and description of the project and its intended outcomes, and amount of funding awarded.
## PROJECT TITLE
Southern Gateway Centre Efficient Lighting Retrofit Project

## FUNDING RECIPIENT
Wollongong City Council

## PROJECT ID
CEEP1130

## DATE
5th June 2014

### Building, Facility or Site 1

<table>
<thead>
<tr>
<th>Name of Building, Facility or Site 1</th>
<th>Southern Gateway Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (address)</td>
<td>Princess Highway, Bulli</td>
</tr>
<tr>
<td>Type of building, facility or site</td>
<td>Function Building</td>
</tr>
<tr>
<td>Activity Type and Measure</td>
<td>Retrofit Lighting Project</td>
</tr>
</tbody>
</table>

### Energy Efficiency Estimate Method
The simulation used to provide the estimates is based on the Lightpoint Consultant Report

### Baseline Energy Usage
92,144 kWh per annum

### Baseline Energy Efficiency
45,025 kWh x 3.6 = 162.09MJ per annum

### Energy Efficiency Improvement
47,119 kWh per annum

### Reporting Data (Measuring Energy Efficiency and Additional Data)
Data Monitoring with previous and current usage comparison supplied as per Final Report

### Cost of Activity
$200,672.00

### Estimated Cost Savings
$14,662 per annum