This Final Report has been prepared by Canterbury Hurlstone Park RSL (ABN 56 000 967 199) in accordance with the Final Report Guidance Material for Recipients. This report was submitted to the Department on the 15th May 2015.

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Title of the project: Canterbury Hurlstone Park RSL Trigeneration Project.

This activity received funding from the Australian Government.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
<td>1</td>
</tr>
<tr>
<td>1 Executive Summary</td>
<td>2</td>
</tr>
<tr>
<td>2 Project Objectives</td>
<td>4</td>
</tr>
<tr>
<td>2.1 Energy Efficiency</td>
<td>4</td>
</tr>
<tr>
<td>2.2 Demonstration &amp; Communication</td>
<td>4</td>
</tr>
<tr>
<td>3 Project Energy Efficiency Activities</td>
<td>5</td>
</tr>
<tr>
<td>4 Project Demonstration and Communications Activities</td>
<td>7</td>
</tr>
<tr>
<td>5 Outcomes and benefits of the Project</td>
<td>8</td>
</tr>
<tr>
<td>5.1 Energy Efficiency Outcomes</td>
<td>8</td>
</tr>
<tr>
<td>5.2 Demonstration and Communications Outcomes</td>
<td>12</td>
</tr>
<tr>
<td>6 Budget</td>
<td>14</td>
</tr>
<tr>
<td>7 Project operation, mechanisms and processes</td>
<td>15</td>
</tr>
<tr>
<td>8 Conclusions</td>
<td>16</td>
</tr>
<tr>
<td>Declaration</td>
<td>17</td>
</tr>
<tr>
<td>Appendix 1: Project Energy Efficiency Improvement Template</td>
<td>18</td>
</tr>
<tr>
<td>Appendix 2: Updated Energy Analysis</td>
<td>20</td>
</tr>
<tr>
<td>Appendix 3 Examples of communication activities</td>
<td>23</td>
</tr>
</tbody>
</table>
Canterbury Hurlstone Park Trigeneration Project:
Installation of an ENER-G 430kW cogeneration system
and a 346kW absorption chiller – CEEP 2116

1 EXECUTIVE SUMMARY

Faced with the rising cost of electricity and in response to the increasing environmental awareness of our staff, members and local community, CHPRSL commenced developing a sustainability strategy in 2011. The strategy was aimed at mitigating our cost of energy consumption and reducing the Club's carbon footprint. We started this journey with research and a number of energy audits, principally lighting and mechanical services.

In late 2012, prompted by other Clubs’ Cogen and Trigeneration installations and the availability of co-funding through CEEP, the Club engaged Simons Green Energy Pty Ltd to prepare a feasibility study in relation to a proposed trigeneration system.

The proposed system would provide electricity for the Club, heating for the Club’s domestic hot water and heating requirements and cooling to supplement the existing air-conditioning systems. The Club’s objectives included reduction of electricity costs, reduction of heating and cooling costs, reduction of carbon emissions and improved energy efficiency.

In February 2013, CHPRSL submitted an application for a CEEP Round 2 grant for the installation of an ENER-G 430kW cogeneration system and a 346kW absorption chiller at an anticipated project cost of $1,166,144 ex gst.

In May 2013, the Club was notified that its application was successful and that a grant of $583,072 or 50% of the total project value had been recommended, subject to the approval of a detailed project plan and execution of a Funding Agreement. After submitting documentation to satisfy the Department in relation to activities, costs and project plan timeframes, the Funding Agreement was executed in July 2013 and the Project Plan was accepted in December 2013.

During this period the Club engaged Engineered Environments Pty Ltd to undertake a peer review of the initial Simons’ feasibility study. This review supported the fundamental findings of the feasibility study and suggested the Club could look at upsizing the system slightly, given the Club's energy consumption profile and its master plan to expand the footprint of the Club. The Club chose to accept this advice and decided to fund the incremental cost of $51,705 for the increase in size to a 505kW Cogen unit plus the 395 kW Chiller.

In December 2013, CHPRSL signed a sales agreement with Simons Green Energy for the design, supply and installation of the plant and post implementation of the marketing and communications plans. The system was subsequently designed and the plant ordered. Some project delays were experienced due to plant room construction delays, commissioning of a new cooling tower and gas approvals. The plant was delivered in September 2014 with connection and commissioning occurring over the following six months.
While the project was delivered eight weeks late, the delay itself caused no monetary implications. However, along with the decision to upscale the plant, the budget was affected by deteriorating foreign exchange rate, by some Club initiated changes to the scope of works and a requirement to upgrade the gas meter at the Club. The additional $70,279.50 was absorbed by the Club’s contribution.

**Based on the current operating parameters and forecast energy prices, the Club expects to:**

- Save approximately $170,000 in the first year of operation (and $185,000 per year on average over the following five years) in energy costs
- Reduce carbon emissions by 1590 tonnes per annum (or 31,750 tonnes in total over the life of the system)
- Increase the efficiency with which it uses energy by 18% from an estimated 6,726 MJ / m2 / annum to 5,510 MJ / m2 / annum.

The Club saw a unique opportunity to undertake a capital project it would otherwise not be able to take on. The project would improve the Club’s financial viability through reducing energy costs and reduce the Club’s carbon footprint in line with the Club’s sustainability goals. This opportunity also freed up capital and prompted the Club to bring forward another major efficiency initiative, the replacement of the Club’s old and highly inefficient HVAC plant.

The trigeneration project will also support another major objective of CHPRSL, to provide support to its local community. In 2011 the Board of Directors adopted a goal of providing 20% of the Club’s net profit to its community support initiatives. This goal was achieved in 2014, with $1,063,055.00 being provided to the local community. In coming years this amount will increase due to the ongoing savings realized from this project.

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

Taking our lead from the Community Energy Efficiency Program objectives and expected benefits, the Club’s declared objectives were as follows:

2.1 ENERGY EFFICIENCY

CEEP Objective: 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.

CEEP Benefits: Better services and improved amenity of buildings and community facilities while minimising energy consumption and costs to manage the impacts of changing energy prices.

The Club’s energy efficiency objectives in undertaking this project were:

1. Improve energy efficiency and reduce electricity costs through efficiency gains
2. Utilise the waste heat of the system for space heating and cooling
3. Reduce CO2 emissions through the use of lower emitting fuel and greater efficiency of the installed equipment
4. Provide benefit to the Local Community by allowing the Club to continue to support a disadvantaged socio-demographic local community.

2.2 DEMONSTRATION & COMMUNICATION

CEEP: To demonstrate and encourage the adoption of improved energy management practices within councils, organisations and the broader community.

CEEP Benefits: Building the knowledge and capacity of the energy services and construction industry, supporting competitive Australian energy efficiency technology and equipment manufacturers & contributing to the national effort to reduce greenhouse gas emissions.

The Club’s Demonstration & Communication Objectives in undertaking this project:

1. Improving the Club’s image as a good corporate citizen with a strong emphasis on the environment.
2. Providing a successful business case for other clubs, councils and businesses interested in cogeneration technologies.

These objectives are in line with the program’s objectives of improving energy efficiency and increasing community awareness of the benefits of energy efficiency projects.
3 Project Energy Efficiency Activities

The project provides heating and cooling for the Club’s facility at 20-26 Canterbury Road, Hurlstone Park NSW 2193. The system will reduce costs, improve energy efficiency and reduce emissions. The system is located in the lower level of the club complex.

It was originally proposed to install part of the system (the absorption chiller) within an existing plant room however a more substantial, new plant room was constructed in a poorly used section of the existing car parking area which is proximate with existing plant. Both the cogeneration system and the new chiller are located within the new plant room. Heat exchangers and pumps are also located in the new plant room.

These technologies are integrated and operate seamlessly without any manual intervention. They are intended to operate 15 hours a day, 7 days a week and generate over two-thirds of the electricity required to power the Club, reducing its reliance on grid supplied power. These units are managed by a Trigeneration Controller to provide heating to the Club’s heating, hot water and domestic hot water circuit as well as providing chilled water to the existing electric chillers.

During winter, the heat is directed to the existing gas hot water boiler circuit to “pre-heat” the water (via a plate heat exchanger) thereby minimising the use of the gas hot water boilers.

During summer, when heating isn’t required, the waste heat is diverted into an absorption chiller that provides air conditioning for the Club’s main building. The absorption chiller’s chilled water output is connected to the Club’s existing electric chiller input water and “pre-cools” the chilled water system to minimise use of the electric chillers.

In tandem, as part of a separate project, the Club has invested in a major upgrade of its HVAC system. The Club invested in two new efficient electric chillers and made three very old and inefficient chillers redundant. Importantly the Club invested in joining the two main systems together so as to allow the whole club to benefit from the heating and cooling provided from the trigeneration system.

The cogeneration system utilises an efficient ENER.G 505, 8 cylinder Perkins 505kW reciprocating gas-fuelled engine operating continuously at 1500 rpm tied to a synchronous electrical generator. Heat recovery is via a fully closed primary water circuit incorporating an exhaust gas heat exchanger. A 411kW Shuangliang HSA-132H2 hot water absorption chiller is married to the cogeneration unit in a complementary fashion via a trigeneration controller to ensure that the optimum use of waste heat is obtained.

The prime contractor for the project was Simons Green Energy Pty Ltd, based in Sydney. Lakewood Electrical undertook the electrical works and Boden Projects Pty Ltd undertook the civil works on the project.

The project formally commenced in December 2013, with site preparation commencing in August 2014. Following some delays due to D.A. approvals, the plant room was completed in November 2014 and the equipment installed during September 2014 to January 2015 and commissioned in late February 2014.
Key project activities included:

- Establishing the project team, including roles and representatives of parties involved in the project
- Planning the project (timescales, milestones and budgets)
- Reviewing site data and preparing detailed scopes of works for sub-contractors
- Appointing preferred system supplier and civil contractor
- Completing preliminary system design (to enable system orders to be placed)
- Ordering long lead time equipment (cogeneration unit, absorption chiller)
- Completing detailed design including system design engineering, drawings, plant room design and specification, detailed civil works design and drawing, development application approval, gas arrangement design, electrical arrangement design, hydraulic design
- Preparing and submitting the plant room Development Application to Council
- Commencing applications for gas connection approval, electrical connection approval
- Undertaking plant room construction and civil works, in particular underground pipeworks
- Completing pre-installation work including gas supply, hydraulic connection and electrical connections
- Placing major system components and local assembly where required
- Completing installation of cogeneration unit and absorption chiller
- Remediating site
- Gaining approvals from regulatory bodies and electrical and gas authorities
- Commissioning the installation
- Tuning and balancing of systems
- Training of Club staff and obtaining manuals
- Analysing system performance

The technology and its implementation proceeded according to plan and the system has been operating in line with expectations. There were no issues, site specific or technology problems experienced during the implementation or subsequent operation. Some delays were experienced due to approvals and regulatory processes. Some further delays to commissioning resulted from faulty Jemena gas metering equipment which took several weeks to address. Overall, the project was completed around 8 weeks behind schedule, however given the magnitude of the project, multiple contractors and approvals required, this delay was acceptable and did not impact adversely on the project’s outcomes or the club’s operations in general.
4 PROJECT DEMONSTRATION AND COMMUNICATIONS ACTIVITIES

The Club undertook a number of activities intended to demonstrate and communicate the energy efficiency activities and their effectiveness to Club members and staff, as well as local Schools and Councils.

While most of the communication activity was undertaken at the back end of the project, the commencement of the project was reported in the local press with a funding announcement made by the local member and the then Minister for Infrastructure and Transport, Hon. Anthony Albanese.


Throughout the progress of the project, the members and staff were regularly informed of the project’s progress and the intended energy and community benefits of the project in the wider context of the Club’s energy efficiency strategy. This communication was performed by speeches and presentations given by the CEO at member’s dinners and staff meetings, as well as articles in the Club magazine and staff newsletters.

The Club has strong ties to its local community, through its relationships with schools and through its grass roots sporting club association; The Cooks River Sports Alliance. The club has over 200 staff and 31,000 members, 80% of whom live within 18 minutes’ drive. The Club has used these relationships to inform the community of the Club’s energy efficiency initiatives including the trigeneration project as well as the other major program of upgrading the Club’s HVAC system. While emphasising the advantages of carbon abatement in response to climate change, the Club has also emphasised the direct financial benefits to the community of a financially sustainable Club, able to provide more in terms of improved facilities and more in direct community funding.

Specific activities the Club has undertaken to support these community conversations include:

- Providing PR and editorial for local media including an article in our industry magazine “Club Life” as part of a special green edition.
- Producing and publishing a Case Study available on the CHPRSL’s Website. Attachment 1
- Producing an educational and promotional video available on YouTube and the CHPRSL Website.
- As part of our engagement with local schools, some school children were invited to be in this video and attended the launch and educational seminar.
- Hosting a launch and educational seminar event on 11th March 2015. Invited and in attendance were a number of key stakeholders in the local community including members of Canterbury, Marrickville and Ashfield Councils, local sporting and community groups, school children representatives and members of related energy efficiency industries.
- The Club has already hosted a number of site visits by groups interested in the project, including one delegation from a construction group working in regenerating Christchurch NZ.
- The Club has an ongoing relationship with Simons Green Energy Pty Ltd and plan to conduct further educational seminars and site visits in the future.

NB: Please see Appendix 3 for examples of the above.
5 OUTCOMES AND BENEFITS OF THE PROJECT

The project has been successful and the Club anticipates that its objectives will be achieved over time. The planning, implementation and handover of the system took place in an acceptable timeframe given the complexities and regulatory delays experienced.

While the project budget was exceeded by 10.46%, the additional expenditure (plant room improvements, system capacity increases and exchange rate variations) was justifiable and anticipated within the Club’s contingency allowance. There were no major adverse surprises, site issues, accidents or incidents, interruptions to the business operations of the Club, adverse media or reactions from local residents or any other notable negative issues.

Early operations of the system have not revealed any installation issues or potential problems and a post implementation review indicates that the system is performing to specification. Monitoring data is being collected and will be analysed to demonstrate the financial and environmental benefits of the system and the data obtained from such analysis compared with the feasibility analysis undertaken at the commencement of the project.

5.1 ENERGY EFFICIENCY OUTCOMES
The declared objectives and outcomes of the project were as follows:

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<th>Objective</th>
<th>Outcome</th>
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<tr>
<td>1 Improve energy efficiency and reduce electricity costs through efficiency gains</td>
<td>Since commissioning and rectification of Jemena gas meter faults, the unit has been operational during the planned operating times and hence is delivering energy efficiency improvements while operating. It is apparent that the direct operating costs of the system are well below the cost of purchasing grid-based electricity</td>
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<td>2 Utilise the waste heat of the system for space heating and cooling</td>
<td>The integrated trigeneration system has been working within specifications, generating chilled water that has reduced the need for the existing electric chillers to operate and supplementing the club's existing gas boilers to provide heating, hot water and domestic hot water.</td>
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<tr>
<td>3 Reduce CO2 emissions through the use of lower emitting fuel and greater efficiency of the installed equipment</td>
<td>Whilst ever the system is operating (in line with its planned operating times) it is delivering electricity and thermal energy to the club while emitting around half the CO2 of grid-based electricity</td>
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<td>4 Provide benefit to the Local Community</td>
<td>This objective will be achieved overtime. Whilst the system is providing cheaper energy it is directly adding to the pool of financial support the Club directly provides to the community.</td>
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We believe that this project will encourage more generalised improvements in energy management within the Club as this project has become a key component of the Club’s energy master plan. This project encouraged and brought forward a further $1.9 million dollars in capital expenditure in a major upgrade of the Club mechanical plant and system.

**Indirect benefits of this project:**

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<th>Outcome</th>
<th>Benefit</th>
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<tr>
<td>1</td>
<td>Government support of the Trigeneration project freed up Club capital and encourage the Club to bring forward expenditure on our mechanical master plan.</td>
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<td>The Club was able to remove three very old and inefficient chillers and cooling tower and replace them with new very efficient plant, providing additional energy savings, carbon abatement and financial savings.</td>
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<td></td>
<td>The Club will make addition savings as we move from expensive reactive maintenance on old mechanical equipment to much cheaper preventative maintenance of new equipment.</td>
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<td>The new system is sized appropriately to handle hotter conditions providing better and more reliable conditions to our patrons and takes into account future expansion of the facility.</td>
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<td>2</td>
<td>Greater awareness of efficiency and carbon abatement opportunities.</td>
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<td>The Club is now looking at opportunities to install solar at its satellite facilities and potentially at the main site</td>
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<td></td>
<td>Upgrade the Clubs BMS to employ more efficient operating strategies.</td>
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<td></td>
<td>The Club is investigating rolling out the use of VSDs on air handling unit fans, refrigeration compressors etc.</td>
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We expect this project to provide strong investment returns. These will result from future cost savings, reduced impact of uncontrolled external price increases, greater efficiency and increased monitoring and scrutiny of energy production and consumption. However, it is too early to gauge the accuracy of the forecast savings and investment returns. To date the system has performed to expectations and no significant interruptions or variations have been experienced. Financial performance will be evaluated on an ongoing basis.

The Club utilised finance from **Global Rental and Leasing** to assist in defraying its portion of the capital expenditure. This facility has enabled the Club to realise ongoing significant cost reductions while freeing up capital for other important capital purposes. We believe that this innovative funding approach could be used more widely to accelerate the adoption of similar sustainable energy initiatives within the business community.
This project has been a good example of a successful project delivered under the CEEP. The Club would not have investigated this significant project in the absence of CEEP co-funding. The Club’s objectives have been met, the project has gained awareness among the local community, many of whom are members of the Club and the energy saving potential has resulted in the Club investigating other similar energy efficiency projects at its other sites.

5.1.1 Supporting information: Benefits to the local community

The Club is located in the Canterbury Local Government Area (LGA), a disadvantaged socio-demographic area in which the median weekly income for residents is significantly lower than the national average. Canterbury-Hurlstone Park RSL Club has been providing a social and support hub for local returned servicemen and women since 1947. Today the Club continues to provide a safe, modern, inclusive and welcoming facility that serves as a hub for one of Sydney’s most culturally, socially and economically diverse communities.

The Club’ sustainability objectives are not just environmental but also financial. The Board of Director’s view it as the Club’s responsibility to survive and be an integral part of this local community for generations to come. The trigeneration system will support this financial sustainability goal by greater energy efficiency and lower energy consumption costs and by doing so allows the Club to continue to support the local community.

CHPRSL Club reinvests back to the community through two main ways:

1. A commitment to 20% of annual net profit contribution to local community groups. First articulated by the Board in 2011, this goal was achieved in 2014, with $1,063,055.00. Twenty percent of every dollar in net revenue that is produced by savings through the 20 year life of the trigeneration system will be reinvested in the community.

Through the Club’s investment in trigeneration technology, the Club expects to cut its annual energy costs by up to $170,000 in its first year of operation. This outcome will result in an additional $34,000 in community spending.

The Club provides this financial support to the community in a number of ways.

- Direct sponsorship of community groups through its obligations under the ClubGRANTS program. This State government mandated program requires a minimum percentage of gaming revenue (2.25%) is reinvested into the community. The Club mandated 20% of net profit exceeds this mandated minimum community funding.

- The CHPRSLYouth Club gives members’ children access to a range of exciting activities, including tap, jazz and ballet lessons, at heavily subsidised annual rates.

- CHPRSL Club actively supports a healthier, more active local community through the Cooks River Sporting Alliance (CRSA), an alliance formed by the Club in 2013 to boost community sports
participation. It was formed in response to findings that local sporting clubs' participation rates were in a state of decline.

2. A financially viable Club will continue to be in a position to provide facilities and services to the community and continue to support initiatives such as:

- Providing members access to heavily subsidised social clubs known as ‘sub-clubs’ such as line dancing, Toastmasters, darts, indoor bowls, snooker and travel clubs.

- Providing members access to heavily subsidised lifestyle classes (such as Pilates, Yoga and Zumba)

CHPRSL Club anticipates that these significant energy savings, and the subsequent financial savings, will be achieved over the 20 year life of the plant that will be invested back into the community channels outlined above.
5.2 DEMONSTRATION AND COMMUNICATIONS OUTCOMES

Projects such as this will enhance the community's understanding of the potential for energy efficiency and CO2 abatement improvements. The implementation of the system has provided an opportunity for the Club to communicate with its members, the local community and the broader community about the benefits of energy efficiency initiatives.

We also expect that the awareness being raised within the community among local councils, businesses and individuals will realise additional energy efficiency benefits and result in new initiatives. Public events (attended by media) as well as local PR and promotion have raised the awareness among parts of the community regarding the benefits of cogeneration and trigeneration. The Club has discussed the prospect of working with local schools to promote these benefits and solutions to younger Australians within the local community.

The Club's sustainability strategy was largely prompted by interest expressed by the Club membership and staff. The intended recipients of project briefings & updates together with energy efficiency educational material were primarily the 200 staff and the 31,000 members of the club. The Club also created a Case Study and an Educational Video to reach a broader community.

Increased Staff Awareness

- Since the project’s inception, the subject of sustainability and the project objectives and progress have been regularly communicated to the club’s 200 staff through newsletters, briefings and presentation. As a result, energy efficiency has become a major discussion point in staff meetings and has raised awareness and interest in the project, the benefits to the club and the community as well as awareness of broader sustainability issues, prompting ideas for further initiatives that the Club can pursue.

Increased Member Awareness

- Before the launch of the plant, 20,000 recipients of the Chevron magazine (the Club’s member magazine) had received updates of the project in 2 separate editions of the magazine, before featuring details of the launch itself.

Public Launch: Awareness for Staff, Members and the Broader Community

- The Club’s public launch of the trigeneration system and educational site visit was held on Wed March 11 with Mr. Anthony Albanese MP, Federal Member forGrayndler and Mr. Nickolas Varvaris MP, Federal Member of Barton in attendance along with a number of key stakeholders in the local community including members of Canterbury, Marrickville and Ashfield Councils, local sporting and community groups and school children representatives. There was a great deal of positive feedback and interest from those in attendance.

- The broader promotion of the system going forward (both internally and externally) will continue to reinforce the drive for improvement in energy management. In addition, public promotion of the Club’s energy savings and emissions reductions will further reinforce this message.
Energy Efficiency Education: Broader Community

• A case study of the project and the energy efficiency gains was created as a vehicle for education and ongoing awareness creation, to leverage in relevant media. The project was reported and featured in The Telegraph, Clubs NSW magazine, Canterbury Bankstown Torch & Chevron magazine. The project was also reported and featured online in the Local Newsplus website, Simons Green Energy website & Mr. Anthony Albanese’s website.

• An educational promotional video was also created to promote the project and the energy efficiency benefits of this technology. The club was overwhelmed by the willingness and engagement of our local schools to participate in the video’s production. Very positive feedback was received when this educational video was displayed as part of the CEO’s address at the Club’s annual members’ dinners attended by 900 members.

• The selection of our venue by our local federal member, Anthony Albanese, for a community town hall meeting on Climate Change was a welcome outcome. Held on October 23, 2014, Mr. Albanese referenced the Club’s track record and the Trigeneration plant to the 300 people in attendance.

The Club acknowledges that broader uptake of energy efficiency activities and energy management practices will be a result of a longer and sustained conversation with the members, staff and local community. To this end the Club is committed to continuing to monitor and report on the performance of the trigeneration system and its wider efficiency initiatives.
6 BUDGET

In February 2013 the Club made a CEEP grant application for the installation of an ENER-G 430kW cogeneration system and a 346kW absorption chiller at an anticipated project cost of $1,166,144 ex gst.

In May 2013 the Club received a funding grant of $582,073 amounting to 50% of the total budget with the Club committing the remaining funds.

The total expenditure on the project was $1,288,128.50 which was $121,984.50 over the total project budget amount.

The over-budget resulted from four issues:

1. Based on advice from a peer review of the project, the Club chose to increase the size to a 505kw Cogen unit plus the 395 kW Chiller. The incremental cost $51,720 for this increased capacity was borne by an additional contribution from the Club.

2. After being awarded the CEEP grant, the Club negotiated a fixed price contract with Simons Green Energy to supply and install the system. During this negotiation period there was some adverse movement in foreign exchange rates, increasing the cost of equipment by $29,309.

3. The Club also decided to move the Absorption Chiller to be located in a new outside plant room along with the Cogen unit. The Club made this decision to make use of an area that was much underutilised and to obtain very valuable additional space within the Club. In making this decision the Club choose fund the plant room separately to this project. However this decision did result in a change in the scope of work for Simons. The under and over amounts resulted in a net increase in the project expense of $6,797.50.

4. A requirement to upgrade the Club’s gas supply. As this requirement was unknown at the time the Funding Agreement was signed, there had been no allowance made for the supply and installation of a new meter. The total cost of $34,158.00 ex gst was funded out of the contingency amount the Club had set aside for its contribution to the project.

There were no technology issues that created any budgetary impacts, other than the need to upgrade the gas meter. There was a potential risk that the electricity connection would require modifications to the Club’s Main Distribution Board but that was not required. Because trigeneration is designed as a complete system that connects into the Club’s existing infrastructure, we were able to fix the scope and price of the system with our principle contractor.

This project has provided infrastructure that will last twenty years and the ultimate return to the Club will depend on the movement of gas and electricity prices over time and the realization of the Club’s master plan to increase its footprint over time.

Had the Club used its own capital for the project rather than financing it, a return on investment (ROI) of approximately 31% per annum on the Club’s required expenditure and a payback period of approximately 4.5 years would have been anticipated.
7 PROJECT OPERATION, MECHANISMS AND PROCESSES

This project was completed in the context of a number of other major projects undertaken by the Club in 2014.

These included a number of internal renovations including a hospitality training facility, group fitness studio and a circuit training room as an extension to the Club’s existing gym; a major upgrade of the Club’s mechanical services involving the implementation of the HVAC master plan to connect the Club’s two separate systems, as well as the construction of a cooling tower platform and the replacement of the Club’s chillers and cooling towers; and, finally, the addition of a new deck to the multi storey car park, including the upgrade of the car park facade and a new ANZAC Memorial.

The project was managed internally by the Club’s Facilities and Projects Manager who coordinated the two principle contractors, Boden Projects and Simons Green Energy to undertake the two key aspects of the project; to build the required plant room and to design, supply, install and commission the trigeneration system. Fixed price contracts were obtained for both activities. The project required the management of a number of other consultants involved in the mechanical services master plan upgrade to ensure the two projects were coordinated and complemented each other.

The trigeneration project was specifically chosen for the purposes of applying for the CEEP grant. This was because it addressed two of the Club’s sustainability objectives, of reducing the cost of electricity consumption and carbon abatement. It was a project that would otherwise not have occurred without the level of funding CEEP provided.

Nevertheless, it was a project that could be readily presented in a feasibility study and grant application. As a result the conception and planning of this project occurred in conjunction with the grant application process. This approach presented a degree of uncertainty at the beginning of the project, which thankfully did not result in any significant budgetary issues but did result in establishing time frames that turned out to be marginally unrealistic. For example, the final decision of where to locate the plant was not made until after the funding was granted. The Club chose to build a new plant room.

While the result is a far more satisfying outcome allowing a purpose built room for the plant and freeing up valuable space within the Club, the requirement of Development Application approval and the subsequent construction works did delay the project by eight weeks and require the Club to use money from its main capital budget. Additionally, with very little experience in the workings of the gas market, the Club underestimated the process, time frames and difficulties in obtaining a large market gas contract. This inexperience resulted in delays to obtaining the contract and approvals to install a new larger gas meter. Again this inexperience delayed the commissioning and final tuning of the system.

With every project there are matters and issues that arise during the course of the project and while all efforts are made to identify these risks at the beginning of a project, more time at the beginning of this project may have assisted in developing strategies to eliminate these delays.

The lesson the Club has learned from this experience is to include sustainability projects in its master plan strategy so that the Club is better researched and ready to take advantage of opportunities such as government incentives or grants when they occur.
8 CONCLUSIONS

Overall the installation and implementation of the Trigeneration system at Canterbury Hurlstone Park RSL Club has been successful.

Given the size and complexity of the project the delay of eight weeks in completing the project was acceptable and the increase in budget was due to identifiable causes and decisions made by the Club for reasons in some cases, outside the scope of the project. One key learning for the Club has been to development energy efficiency and capital projects so that they are ready and holistically planned to take advantage of opportunities as they arise. The other key learning is not to underestimate the time required when dealing with regulatory bodies.

While too early to judge at this point in time the plant is operating to expectations and the Club is confident that the energy efficiency, financial and additional community funding objectives will be realised over time. As part of the Club’s community directive 20% of every dollar in net revenue generated by savings through the Trigeneration plant, will be provided in direct support to the local community.

The Club would most likely not have considered this project without the co-founding of the CEEP grant. Not only did this grant and the use of a finance arrangement open up this major opportunity to address the issue of rising electricity prices and energy efficiency, but it also kept the Club’s capital free to undertake another major energy efficiency project. The Trigeneration project inspired the Club’s Board to bring forward $1.9m in expenditure on the Club’s air conditioning plant and resulted in replacement of three very old and inefficient chillers and a cooling tower with the latest and very efficient plant.

These projects were very significant steps in a longer sustainability journey for the Club. The Club will continue to demonstrate and promote its adoption of energy efficient strategies and technologies through its staff, membership, links to local government and the local community. It is hoped that by example other stakeholders in the community will adopt and support efficiency strategies appropriate to their businesses and households. The interest and feedback to date has been encouraging.

On behalf of the Club, I would like to thank the CEEP project staff at the Department of Industry for their support, advice and encouragement throughout the project.

Nathaniel Taylor
Facilities and Projects Manager
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 Canterbury Hurstone Park RSL Club Ltd .................................................. (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: ........../.05/..2015

Name: Dean Thomas...........


Witness Signature: ................................................................................ Date: ........../.05/..2015

Name: .Nathaniel Taylor....... 


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

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

<table>
<thead>
<tr>
<th>PROJECT TITLE</th>
<th>Canterbury Hurlstone Park RSL Club Trigeneration Project - installation of an ENER-G 505 kW cogeneration system and a 390 kW absorption chiller</th>
<th>PROJECT ID</th>
<th>CEEP2116</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUNDING RECIPIENT</td>
<td>Canterbury Hurlstone Park RSL Club Ltd (&quot;CHPRSL&quot;)</td>
<td>DATE</td>
<td>16 May 2014</td>
</tr>
</tbody>
</table>

### Building, Facility or Site 1

<table>
<thead>
<tr>
<th>Name of Building, Facility or Site 1</th>
<th>Main Facilities building at CHPRSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (address)</td>
<td>20-26 Canterbury Road, Hurlstone Park NSW 2193</td>
</tr>
<tr>
<td>Type of building, facility or site</td>
<td>The Club building is a multi-level structure with a total floor space of 7,900 square metres.</td>
</tr>
<tr>
<td>Activity Type and Measure</td>
<td>Installation of Trigeneration system. The proposed measure of efficiency is MJ/m²/year</td>
</tr>
</tbody>
</table>

### Energy Efficiency Estimate Method

Baseline energy usage and efficiency was measured broadly in accordance with a Level 1 assessment according to AS/NZS3598. We have used over 12 months of energy usage data to identify the existing baseline energy use. This baseline energy use reflects normal operating conditions.

The baseline energy use data includes energy imported to the site, specifically electricity and natural gas and energy (natural gas, LPG, diesel) that is consumed by stationary equipment on site (but not by mobile equipment).

The baseline analysis was completed using electricity half hour interval data and gas bills for the calendar year 1st January 2013 to 31st December 2013. A prior baseline analysis was conducted in August 2013, using data from calendar year 2012.

Our energy profile has not substantially changed from 2013.

The system was commissioned in late March 2015 and electricity bills for the month of April have been used to estimate the projected energy efficiency improvement. Gas consumption data for April is not yet available and the commissioning period is not yet representative of actual operating performance.
<table>
<thead>
<tr>
<th><strong>Baseline Energy Usage</strong></th>
<th>For the baseline period (Jan – Dec 2013) the Club spent $730,000 on electricity and $119,000 on natural gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53,132,403 MJ / annum</td>
</tr>
<tr>
<td><strong>Baseline Energy Efficiency</strong></td>
<td>6,726 MJ / m² / annum</td>
</tr>
<tr>
<td><strong>Energy Efficiency Improvement</strong></td>
<td>Reduction by 982 MJ/m²/annum to 5,743 MJ/m²/annum or 14.6%</td>
</tr>
<tr>
<td></td>
<td>We expect the efficiency improvement to increase once the system has been properly harmonised with the Clubs existing HVAC system.</td>
</tr>
<tr>
<td><strong>Reporting Data (Measuring Energy Efficiency and Additional Data)</strong></td>
<td>The Club building is a multi-level block and concrete structure with a total floor space of 7,900 square metres over three floors - lower floor, main trading floor and mezzanine. It houses 3 restaurants, a bar, a fitness centre and various live entertainment venues. It is regarded as one of Sydney’s premium social entertainment venues.</td>
</tr>
<tr>
<td></td>
<td>The building located on Canterbury Road in Hurlstone Park was opened in 1954, while the existing building opened in 1970. It is primarily built of masonry. The building has been extended and renovated over the years.</td>
</tr>
<tr>
<td></td>
<td>The Club’s operating hours are 8am – 6am 365 days per year. The Club is occupied by staff and contract cleaning staff outside the trading hours. As a result the building has a significant energy requirement for lighting and HVAC almost 24 hours per day.</td>
</tr>
<tr>
<td><strong>Cost of Activity</strong></td>
<td>$1,204,155</td>
</tr>
<tr>
<td><strong>Estimated Cost Savings</strong></td>
<td>$170,000 in year 1.</td>
</tr>
</tbody>
</table>
APPENDIX 2: UPDATED ENERGY ANALYSIS

The following analysis was performed to compare actual energy production and consumption data before and after the harmonised operation of the trigeneration system. This analysis reveals that the cogeneration system has satisfied a significant majority of the Club’s electricity demands between the hours of 7am to 9.30pm (over a continuous period of one month) despite issues with gas supply continuity (due to Jemena’s gas meter) and in-operation over a 2-3 days period for unscheduled maintenance. These interruptions are reported to be commonplace within the first few months of commissioning.

The following chart shows the Club’s daily electricity consumption for the period prior to and following the system’s commissioning and harmonization.
The following chart shows an expanded view of the trigeneration system’s operation following the harmonization period based on 24x7 interval records.

![Chart 24x7 Consumption](chart24x7.png)

The following chart shows an expanded view of the trigeneration system’s operation following the harmonization period based on 15x7 interval records.

![Chart 15x7 Consumption](chart15x7.png)
When the interval data is analysed by sorting instantaneous energy usage from highest to lowest over the period considered (12 months x 15 hours x 7 days per week) the following “duration curve” results. This curve is for the period leading up to the commissioning of the trigeneration system.

Similar analysis of NMI data post commissioning of the trigeneration system has resulted in a substantial reduction in the average grid-based demand during the same operating period (15 x 7). It has also resulted in a reduction in peak demand by around 300kW.
Canterbury Bankstown Torch Wed March 18, 2015

Appendix 3 Examples of Communication Activities

At the official launch last week of Canterbury Hurstbourne Park RSL's Trigeneration Energy System, were Club CEO Dean Thomas (from left), Barton MP Nick Varvaris, CEEP's Gene McFlynn, Simons Green Energy's Allan Aaron the club's Nathaniel Taylor.

CANTERBURY Hurstbourne Park RSL Club is set to slice its greenhouse gas emissions by one third, cut annual energy costs by up to $185,000 and reinvest the savings back into the community, following the installation of its Trigeneration Energy System.

Trigeneration is the simultaneous production of three forms of energy: electricity, heating and cooling from a single system. It is nearly three times more energy efficient than a coal-fired power station.

The club will reinvest savings from the newly installed Trigeneration System into the club's facilities.

"From an energy cost savings point of view, we can invest even more funds into real benefits for members and the community," Canterbury Hurstbourne Park RSL Club CEO Dean Thomas says.

CHPRSL Club anticipates complete cost recovery from the Trigeneration System within four years.

Designed and installed by Simons Green Energy, the energy system will provide the club with cleaner electricity while converting waste heat into space heating and cooling.

The energy system will deliver annual average savings of $185,000 with a carbon emissions reduction of 1,590 tonnes per annum - equivalent to taking 352 cars a year off the road.

With $583,072 received in grant funding from the Federal Government, the expected return on investment for the Trigeneration System is 35 per cent per annum.

The 505kW Trigeneration System is part of CHPRSL club's $15 million, five-year master plan that includes a major upgrade of the club's Canterbury Rd carpark, a new club façade and heating and cooling system upgrades including new chillers and a centralised air conditioning loop.
Canterbury Hurlstone Park RSL Club
Trigeneration Project

Key Facts
Project name: Canterbury Hurlstone Park RSL Club - Trigeneration Project
System supplier: Simons Green Energy
Commissioning date: 11 March 2015
System details:
E500 Cogenration Unit:
- Total electrical output: 506kWe
- Total thermal output: 527kWth
Absorption Chiller:
- Total Cooling Capacity: 411kWth
- Chilled Water Capacity: 73,600 Litres/h
Fuel Source:
- Natural Gas
Application:
- The Trigeneration System will provide over 50% of the electricity to the Club
- HVAC Heating to the building
- HVAC Cooling to the building
Carbon emissions reduction:
Cut carbon emissions by 30%, equivalent to planting 15,900 new trees each year
Average cost savings:
Reduces energy costs by an average of $185,0000 per annum
Payback period: 4 years

Background
Responding to its members’ demand for sustainable facilities, Sydney’s Canterbury Hurlstone Park RSL Club has undertaken a 5-year Energy and Facilities Master Plan. Designed to deliver sustainable and energy efficient facilities as part of an industry-leading entertainment, dining, hospitality and recreational experience for members and guests, the $15 million plan includes the installation of a state-of-the-art Trigeneration System, plus upgrades to gym and entertainment facilities, parking infrastructure and air conditioning systems.

Master Plan at a glance
Stage 1 included the construction of a new gymnasium, commercial kitchen, refurbished food and beverage outlets, and indoor and outdoor areas. Stage 2 sees the construction of a new multi-storey Canterbury Rd carpark and a upgraded Club façade. The installation of a 505 kW Trigeneration Energy System and a HVAC upgrade that includes new chillers and a centralised air conditioning loop. The Club’s air conditioning upgrade will increase members’ comfort, deliver new standards of energy efficiency and improve reliability and year-round performance.

What is the Trigeneration Energy System?
Trigeneration is a form of Combined Heat and Power (CHP). It is the simultaneous production of three forms of energy – electricity, heat and cooling – from a single fuel source. The Club’s Trigeneration Energy System uses a natural gas-powered engine to generate electricity on-site and converts the waste heat from the engine into usable heat for space heating, domestic hot water and similar applications. A refrigeration unit, known as an Absorption Chiller, also uses the waste heat to provide cooling. The waste heat is converted into chilled water for air conditioning, refrigeration or other cooling purposes. The Trigeneration Energy System has a total efficiency of up to 85%, as compared to just 30% efficiency for coal-fired grid-supplied electricity.
How will the Club benefit from Trigeneration?
The Trigeneration Energy System will provide Canterbury Hurlstone Park RSL Club with cleaner electricity while converting waste heat into space heating and cooling. It will operate 15 hours a day, 7 days a week, generating 50% of the Club’s electricity needs.

The Trigeneration Energy System is expected to deliver annual average savings of $185,000 while reducing carbon emissions by 1,580 tonnes per annum, which is equivalent to taking 352 cars off the road each year. The expected return on investment is 35% per annum. This initiative was made possible with a $583,072 grant provided by the Australian Government.

Project overview
The Trigeneration Energy System has been installed in a custom-built plant room located on the basement level behind the main club building. This location provides easy access to the Club’s HVAC plant and facilitates cost-effective integration with heating and cooling services. The new plant room was specially designed to house the Trigeneration plant and incorporates acoustic attenuation in the walls, doors, and ventilation system to prevent noise from impacting on neighbouring residents.

Installation required specialist movement engineers to locate the 12-tonne Cogeneration unit and 7-tonne Absorption Chiller. The plant room was then completely enclosing the new equipment. The new plant operates automatically, controlled by a sophisticated control system, which monitors the Club’s electrical consumption and space heating and cooling loads. It ensures maximum benefit is derived from the available thermal energy. The control system feeds into the Club’s building management system to provide visibility to operations staff and connects to the Simons Green Energy’s remote monitoring system to alert maintenance personnel, should issues arise.

Summary
The Club’s Master Plan will deliver increased member comfort and sustainable, energy efficient facilities. Thanks to the funding received from the Australian Government, the project’s estimated return on investment is 35%, resulting in a payback period of 4 years.

The Trigeneration Energy System alone will:
- Reduce energy costs by an average of $185,000 per annum
- Deliver an estimated return on investment of 35% and a payback of just 4 years
- Cut carbon emissions by 30%, equivalent to planting 15,900 new trees each year
- Generate 505 kW(e) of electricity at peak capacity and produce up to 927kW of heat and 390 kW of cooling.

The Trigeneration System was commissioned in February 2015.

For further details contact us:
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