Final Report in relation to
Community Energy Efficiency Program Funding Agreement for
Club Banora Trigeneration Project

Name: Rod Pain

Title of the project: Club Banora Trigeneration System. On site electricity generation combined with an absorption chiller

This activity received funding from the Australian Government.

This Final Report has been prepared by Club Banora (ABN 61 001 042 833 ) in accordance with the Final Report Guidance Material for Recipients. This report was submitted to the Department on the xxx.
1. Executive Summary

Club Banora commenced planning for a trigeneration system in late 2012 to provide electricity for the Club, heating for the outdoor swimming pools and the indoor kids’ pool in winter and cooling of the Club building during summer. The Club’s objectives included reduction of energy costs, carbon emissions and improved energy efficiency.

In January 2013, Simons Green Energy prepared a feasibility study in relation to the proposed trigeneration system and subsequently prepared a detailed technical quotation for their scope in relation to the proposal. In addition, civil works and electrical and gas utility requirements were identified.

In February 2013, the Club submitted a Community Energy Efficiency Program (CEEP) grant application to co-fund the implementation of the trigeneration system with an estimated project cost of $1,123,202 for the supply and installation of plant, construction of a new plant room and post implementation marketing and communications. In May 2013, the Club was notified that its application was successful and that a grant of $546,601 had been recommended subject to approval of a detailed project plan and execution of a Funding Agreement. The Club subsequently commenced preparation of additional material required by the former Department of Climate Change and Energy Efficiency to execute the CEEP Funding Agreement. After submitting documentation to satisfy the Department’s requirements in relation to activities, costs and project plan timeframes, the Funding Agreement was executed in September 2013.

The Trigeneration System designed, specified and ordered in the period leading up to the end of 2013. The system was installed during the ensuing seven months and was handed over and formally accepted in September 2014, in line with the date scheduled in the Funding Agreement.

The Club’s objectives have been met and the project was delivered within budget and anticipated timeframe. Based on the current operating parameters and forecast energy prices, the Club expects to save approximately $125,000 per year in energy costs while reducing carbon emissions by 740 tonnes per annum (or 14,800 tonnes in total over the life of the system) and increasing the energy efficiency of the Club by 13.33%.

The success of the Club’s trigeneration installation has prompted the Club to review a range of other energy efficiency practices and investments for both the Banora site as well as the much larger Twin Town’s site. Initially, the club has contracted to install voltage optimisation equipment at the Twin Towns site. In addition, the Club is promoting improved operational practices and more diligent equipment maintenance to reduce energy costs. The Club’s cogeneration experience has been shared with other local clubs and local councils at launch events and educational seminars. The Club’s board members and other influential community members have been made aware of the energy efficiency improvements and improved amenity of Club Banora (warmer pool, cooler main building and lower operating costs).

Please note that 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.
The prime contractor for the project was Simons Green Energy, based in Sydney, while local sub-contractors including Bluefrog Services, Lindsay Electrical and Rayking Concrete undertook mechanical, plumbing, trenching, electrical and civil works.

The project formally commenced in September 2013, with site preparation commencing in January 2014, equipment installation during April-May 2014 and commissioning in July 2014.

Key project activities included:

1. Establishing the project team, including roles and representatives of parties involved in the project
2. Planning the project (timescales, milestones and budgets)
3. Reviewing site data and preparing detailed scopes of works for sub-contractors
4. Appointing preferred system supplier
5. Completing preliminary system design (to enable system orders to be placed)
6. Ordering long lead time equipment (cogeneration unit, absorption chiller)
7. 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
8. Commencing applications for gas connection approval, electrical connection approval
9. Undertaking plant room construction and civil works, in particular underground pipeworks
10. Completing pre-installation work including gas supply, hydraulic connection and electrical connections
11. Placing major system components and local assembly where required
12. Completing installation of cogeneration unit and absorption chiller
13. Remediating site
14. Gaining approvals from regulatory bodies and electrical and gas authorities
15. Commissioning the installation
16. Tuning and balancing of systems
17. Training of Club staff and obtaining manuals
18. 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 particular issues, site specific or technology problems experienced during the implementation or subsequent operation. The key installation challenges involved trenching and layout of 160 metres of underground thermal pipework and integration with Club’s existing HVAC control system.

**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, staff and Board members as well as local businesses and councils. The most relevant stakeholders for the Club are its members, in particular those who use its swimming and club facilities. The Club has 43,000 members. The Twin Towns Group is one of the largest employers in the region. The Club therefore has substantial access to the local community via its membership and related local businesses and has aggressively sought to inform the community about the merits of the energy
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.

Ancillary benefits of this project include the ability to redirect savings in operating expenditure resulting from the lower energy costs into community activities and club capital improvements. Further, Club members have commented on the improved amenity of the Club’s swimming pools as a result of the higher pool temperatures. The Club also anticipates that the additional heat potential will extend the Club’s swimming season and appeal to members outside the normal swimming months, both increasing revenue to the Club and increasing its appeal while better satisfying members’ needs. It is expected that Winter use of the facilities will increase considerably. Being in a low socio-economic region, these benefits are significant to the local community.

The project involved substantial contracting by local sub-contract trades including mechanical, civil and electrical. Hence there were local industry spin-offs as a result of this project.

Project Energy Efficiency Improvement Template

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Club Banora Trigeneration System</th>
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</thead>
<tbody>
<tr>
<td>Funding Recipient</td>
<td>Twin Towns Services Club Ltd</td>
</tr>
<tr>
<td>Date</td>
<td>26 November 2014</td>
</tr>
</tbody>
</table>

| Name of Building, Facility or Site 1 | Club Banora |
| Location(address) | Leisure Dr Banora Point NSW 2486 |
| Type of Building, Facility or Site | Club Banora is the community's sporting and recreational club, with an 18 hole championship golf course, tennis courts, lawn bowls greens, an Olympic size swimming pool and a children's leisure pool. |
| Activity Type and Measure | Installation of tri-generation system. The proposed measure of efficiency is MJ/square metre/year |
approximately $175,000 worth of gas per year but will offset existing expenditure of approximately $65,000 that was previously applied to pool heating. The generator will deliver around 1.1 million kWh of electricity each year, saving around $180,000 in grid electricity purchases and an estimated $50,000 in network KVA reduction. The absorption chiller will reduce electricity demand and avoid around $40,000 in electricity costs. Thus, the net reduction in energy costs will be $65,000+$180,000+$50,000+$40,000-$175,000 = $160,000. Annual maintenance for the system costs approximately $30,000 per annum for a net saving of around $130,000 per annum.

Comparison between Original Project Plan and Post Implementation Energy Efficiency Improvement Tables

<table>
<thead>
<tr>
<th>Name of Building</th>
<th>Original Project Plan</th>
<th>Post Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main Club Building and Aquatic Centre at Club Banora located at Leisure Dr, Banora Point NSW 2486</td>
<td>Per Project Plan</td>
</tr>
<tr>
<td>Energy Expenditure</td>
<td>The business as usual baseline energy usage for the period January 2012 – December 2012 approximately 27,214,000 MJ. The Club used 2,145,000 kWh of grid-based electricity per annum (with an energy value of 24,125,000 MJ) and 3,089,000 MJ in natural gas during the period. The Club spent approximately $425,000 per annum on electricity and $50,000 on natural gas during the period.</td>
<td>The trigeneration system has been operating during the months of August and September 2014. Comparing these months with a new baseline between August 2013 to July 2014 yields preliminary post-implementation energy efficiency estimates. From August 2013 – July 2014 the Club’s electricity costs were approximately $461,000 (~ $38,500 per month) compared with the reference figure in the CEEP application of $425,000 per annum. From August 2013 – July 2014 the Club’s gas costs were approximately $64,000 (~ $5,300 per month) compared with the reference figure in the CEEP application of $50,000 per annum. In August and September 2014 the monthly electricity bills were $18,170 and $12,384. Projecting these monthly figures into the future, we have estimated the annual electricity cost to be $178,000 resulting in an</td>
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4. **Budget**

The project Budget in accordance with Funding Agreement was $1,123,202 (ex GST) with CEEP providing $546,601 (ex GST) and the Club committing the remaining funds. The project was delivered on budget.

The project will deliver a Return on Investment of approximately 25% per annum on the Club’s expenditure and a payback period of approximately 4 years is anticipated.

5. **Project Operation, Mechanisms and Processes.**

In order to execute the project, the following processes and methodologies were applied:

- Up front analysis was conducted early in the project to determine the projects financial feasibility.
- Well prior to committing either CEEP or Club funds, a detailed technical quotation and specification was obtained with binding prices for specified equipment
- **Contractual documentation** (CEEP Funding Agreement, Simons Sales Contract, Civil works specifications and contracts) was prepared, reviewed and committed prior to expenditure of funds.
- A **project plan** was created (using MS Project) early in the project and progress against the plan was tracked by the Club and the nominated principal vendor, Simons Green Energy. Progress was reported frequently by email, telephone and face to face meetings
- **Detailed design work** was undertaken early in the project to enable subsequent activities such engagement of mechanical and electrical contracts, civil works, and procurement of equipment to proceed without ambiguity
- Civil works were specified and the Club’s requirements put to **competitive tender**. Tender selection was based on price as well as quality and reputation of the selected tenderer.
- A **risk analysis** was conducted prior to the commencement of the project and identified risks were identified and mitigated.
- **Expert staff** were committed by the vendors to the project. These included design, project and commissioning engineers
- **Training and familiarisation** was conducted prior to commissioning.
- A plan for **marketing** and local community communication activities was prepared.

The project was managed by Simons Green Energy on a turn-key basis. While additional periodic reporting on progress would have been desirable, on most other bases, the project management was successful and efficient and we would expect to manage similar projects in the same way again.

There were sufficient internal resources available to successfully implement the project with the bulk of the project activities undertaken by the principal contractor and its sub-contractors. There were sufficient external resources allocated to the project to ensure that it was
7. 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

[Name of organisation]

[✓] I declare that the information provided in this Final Report is true and accurate.

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

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

Authorised Officer Signature: .......................... Date: 12/12/14

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

Position: Executive Business Manager  Organisation: Twin Towns Services Club

Witness Signature: ............................................. Date: 12/12/14

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

Position: Executive Assistant  Organisation: Twin Towns Services Club

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.