Energy Reduction through Voltage Power Optimisation (CEEP 2064)

This activity received funding from the Australian Government

Australian Government
Department of Industry
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Executive Summary

Energy Reduction through Voltage Power Optimisation (VPO)

Crescent Head Country Club was successful in securing a grant for $37,650 (GST exclusive) through the Community Energy Efficiency Program. This program was an initiative of the Australian Government supported by the Department of Industry.

Prior to installation the VPO technology to Crescent Head Country Club was expected to improve the incoming voltage by an estimated 6 percent. This was expected to achieve an improvement to the energy efficiency of all the electrical equipment and lighting by an estimated 9 percent at the premises. Projected energy efficiency improvement will be 77.85MJ/m² per annum (9%).

The total cost of the project was $59,800 with an expected savings of $8,500 per annum (based on electricity prices at the time of installation). Annual Carbon Savings (t) of 45 tonne. The NSW emissions factor of 1.37 kg of carbon saved per kWh saved has been used to calculated the carbon savings - Source: National Greenhouse Accounts Factors; July 10, Dept of Climate Change & Energy Efficiency

“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.”
Project Objectives

Installing Voltage Power Optimisation (VPO) will reduce Crescent Head Country Club’s electrical equipment maintenance costs and extend their life expectancy.

- The project payback, financial savings and carbon savings are calculated based on our sites current electricity consumption and costs, in the event our electricity costs rise the project payback period will reduce.

- The NSW emissions factor of 1.37 kg of carbon saved per kWh saved has been used to calculate the carbon savings - Source: National Greenhouse Accounts Factors; July 10, Dept of Climate Change & Energy Efficiency

- Savings are guaranteed (kWh’s) to 80% of the quoted savings.

Reduction in electricity consumption and carbon emissions.
- We will achieve a 9% savings at Crescent Head Country Club.
- Up to 45% Reduction in Reactive Power (Improves Power Quality).
- 6% Improvement in Power Factor (Reduction kVA Maximum Demand).
- Transient Protection; Reduction in Power Spikes (Harmonic Filtering).
- Assists 3-Phase motor imbalance
- Improves motor efficiency

The VPO project objectives:

- raise awareness and understanding of VPO as a planned or impending issue/initiative/change
- change attitudes and behaviours toward energy savings
- maximise available opportunities and compliance
- encourage use of or familiarity with other energy savings ideas, products or services
- gain the support and buy-in of the community
- boost morale
- encourage social cohesion, civic pride, community spirit; in achieving environmental sustainability
- provide a mechanism for others to act (think about sustainable initiatives in their lives)
Project Energy Efficiency Activities

CRESENT HEAD COUNTRY CLUB has one main incoming electrical supply. The club supply has a maximum demand of 110 kVA; the installation of a 175 KVA powerPerfector Plus unit was chosen. This will achieve approximately a 59% headroom (This means the Club can grow and expand comfortably).

The bulk of the electrical load is 3-phase motors; installing will reduce electrical equipment maintenance costs and extend their life expectancy (assists 3-phase motor imbalance).

This technology was chosen because it complemented the Clubs existing environmental initiatives, the equipment has a long and durable lifespan and the savings are real and measurable.

The project was completed in March 2014 after some delays; the initial installation date was November 2013 and installation could not be completed during peak trading periods as part of our Risk Management Strategy. The final installation was a smooth transition which was problem free.

Project Demonstration and Communications Activities

Stakeholders

As a community leader CHCC was well positioned to communicate sustainable practices to the community. Firstly, the community was aware of CHCC’s background and ongoing commitment; with this comes a sense of trust and honesty which is very important when communicating your beliefs ideas and practices.

CHCC targeted the following markets:

- Local Sporting Groups
- Local Schools
- Club Industry
- Local Council
- Local Community
- Tourist Market (predominantly families)
- Our Own Club Members (3500 people)
Key messages

The key messages that were communicated to the broader community:

- Guiding and educating – reducing electricity consumption, increasing motor performance (saving money and supporting the community)
- Reassuring and informing – informing the community about what is being done (VPO), changes that will benefit the community
- Consulting to understand – providing the community with an opportunity to respond to or participate in what the VPO will achieve

Communication methods

CHCC used a diverse array of media streams and methods to communicate the VPO project:

- Media Releases (pictures, interviews)
- Local media (Newspaper)
- Local Media (Radio)
- Website (allows 24/7 access that suits a wide audience)
- Internal Presentations & Announcements (providing 2 way communication)
- Emailing
- Facebook
- Staff Meetings provoking “word of mouth”
- In-house TV’s
- In-house newsletter – “The Chatter”
- Event: Go live day (advertising commencement/commissioning of the project) which was attended by Kempsey Mayor Ms Liz Campbell, local Federal Member for Lynne Mr David Gillespie MP, Club Members and the wider community (This event received local media coverage).
- Industry publications (ClubsNSW and Club Managers Association Australia)
- Special Needs: Indigenous people and Senior Citizens

These cost effective and appropriate communication methods were used throughout the project until the major announcement at the projects conclusion.
From left to right: Richard Curnow (CHCC Treasurer), Jodie Barsby (CHCC Director), David Gillespie MP (Member for Lynne), Colan Ryan (CHCC Secretary Manager), John Patterson (CHCC Chairman)

Outcomes and benefits of the Project

MAJOR BENEFITS

- Reduction in electricity consumption and carbon emissions
- $Dollar Savings – Money that can flow back into the community
- Improves power quality – Reduction in Reactive Power
- Improvement in Power Factor – Reduction kVA Maximum demand
- The VPO installed has a 15 year warranty and 50 year life expectancy!
### Electricity Usage by the month kVA (available data to date)

<table>
<thead>
<tr>
<th></th>
<th>09/10</th>
<th>10/11</th>
<th>11/12</th>
<th>12/13</th>
<th>13/14</th>
<th>14/15</th>
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<td>41,451.00</td>
<td>40,463.00</td>
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<td>28,761.09</td>
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<td>44,053.00</td>
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VPO was installed February 2014; in the 7 months since installation the club has used 189,160 kVA (compared to 203,657 kVA in the corresponding 7 months of the previous year). This represents a saving of 14,498 kVA (over 7 months) or 7.11%; this has exceeded the anticipated savings of 6%.

In addition to electricity savings CHCC also looks forward to ongoing savings in the areas of repairs, maintenance and insurance as a result of the VPO initiative.
Demonstration and Communication outcomes

Evaluation is a critical component of any communications campaign, as it seeks to determine whether strategies worked i.e. whether, and to what extent they achieved their outcomes, and if not, why not. The communication strategy will be flexible in this regards so that we ensure the key messages are conveyed correctly:

- Accountability for expenditure is important as CHCC is a transparent organisation and results need to be measured and reported.
- Evaluation is good management practice. Measuring, considering and improving approaches enables techniques to be tracked and changed as appropriate.

Customer responses will be measured by:

- Putting web site addresses and phone numbers on advertisements or promotional material then measuring requests for information and where they came from.
- Measuring patterns of visits to CHCC’s Website and Facebook, including who is visiting the site and when.
- Participation of Events, Presentations and Feedback

Summary

The key elements of CHCC’s communications strategy are:

1. Situation analysis
2. Objectives
3. Target audience(s)
4. Key messages
5. Communication strategies & methods
6. Monitoring and evaluation

Measurable Outcomes

- Articles were widely publicised in the Macleay Argus (a bought local newspaper); the paper has a distribution of 3,500. Additionally the Macleay Argus has an online presence.
- Articles appeared in the Observer (free local paper); the paper has a distribution of 18,000.
- The VPO announcement reached an audience of people through Crescent Head Country Clubs Facebook page. Additionally Crescent Head Country Club has a website which featured information.
- VPO information was transmitted through the Clubs in-house TV system; CHCC is visited by 60,000 people per/annum.
- CHCC has received feedback from people wanting further information on the VPO; individuals, businesses and other Clubs. Enquiries have sought information on how this system could be utilised by these community members and business operators.
Crescent Head Country Club received the following AWARDS/COMMENDATIONS which helped further communicate the project to the wider community:

- Ambassador of the year in community spirit (ClubsNSW Award 2013)
- Awarded Silver level in Sustainable Advantage Program (2013), CHCC was 1 of only 4 clubs in NSW awarded Silver level status and the only club in the North Coast Region.
- Finalist Clubs NSW Clubs and Community Awards 2014 – Environment Category & People’s Choice
- Finalist Green Globe Awards 2014 – Small Business Award

Budget Discussion

The CHCC VPO project was achieved within budget. This was due in part to the initial quotation process and the selection of a reputable supplier for the purchase and installation of the unit. The Project Manager (Colan Ryan) has had vast experience in managing much larger and more complex projects, so this one was completed easily and effectively. Similarly Club Promotions staff are highly experienced in their roles relating to advertising, promoting and co-ordinating Club events through various media types. They were easily able to use the established mediums for the purpose of promoting the VPO project and engaging the Community in the venture. Other tradespeople engaged were regularly used by the Club in the past and were known for their standard of workmanship and reliability.

There were no major budget changes and no unexpected costs to deal with. This again was due to the simplistic nature of the project and the proper planning and management of the project in the initial stages. There were slight variances to the labour costs resulting in the project being slightly under budget overall.

The nature of the technology has not caused any budgetary issues during the project installation period.

The measure of a successful project is whether it achieved its goals, within budget and within a reasonable time frame. The CHCC VPO project achieved these goals. Early indications are that the project has exceeded the estimated energy savings.
<table>
<thead>
<tr>
<th>VPO Project Summary</th>
<th>Project Actuals</th>
<th>Project Budget</th>
<th>Variance</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Revenue</td>
<td>$55,935</td>
<td>$59,800</td>
<td>($3,865)</td>
<td>$3,765 due on final Milestone</td>
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<td>Funding Breakdown</td>
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<td>Funding CEEP 2064</td>
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<td>$37,650</td>
<td>($3,765)</td>
<td>Due on Final Milestone</td>
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<td>CHCC Contribution - VPO</td>
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<td>CHCC Contribution - Other</td>
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<td>$4,800</td>
<td>($100)</td>
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<tr>
<td>Expenditure</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Exact Energy - Purchase &amp; Installation of VPO</td>
<td>$55,000</td>
<td>$55,000</td>
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<td>Budget as per actual quotations</td>
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<td>Project Management &amp; Administration</td>
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<td>$2,000</td>
<td>($100)</td>
<td>Budget overspend of $100</td>
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<td>Promotions, Activities &amp; Community Awareness</td>
<td>$1,800</td>
<td>$2,000</td>
<td>$200</td>
<td>Budget saving of $200</td>
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<td>Energy Audit &amp; Assessments</td>
<td>$800</td>
<td>$800</td>
<td>$0</td>
<td></td>
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<td>Total Expenditure</td>
<td>$59,700</td>
<td>$59,800</td>
<td>$100</td>
<td>Budget surplus $100</td>
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<td>Net Project Balance</td>
<td>$3,765.00</td>
<td>$0.00</td>
<td>$3,765.00</td>
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</table>
Project operation, mechanisms and processes

CRESCENT HEAD COUNTRY CLUB has one main incoming electrical supply. The club supply has a maximum demand of 110 kVA and our recommendation is to install a 175 kVA powerPerfector Plus unit. This will achieve approximately a 59% headroom. The bulk of the electrical load is 3-phase motors.

The project was managed internally by Club Management who have a wide range of experience in dealing with similar projects (and more detailed projects). The project was relatively straightforward and without incident.

Prior to undertaking the project CHCC completed:
- Risk Management Report
- Milestone Table
- Implementation Schedule
- Specifications and Technical Detail
- Budget
- Communications Plan
- WHS Policy
- Waste Management Plan
- Funding Agreement Schedule

Power Perfector were the external contractors who were chosen to deliver the project.

Conclusion

Crescent Head Country Club is committed to sustainability and being a leader in our community in this direction. We embrace the principles of sustainable development and the triple bottom line of social, environmental and economic factors (people, planet and profit). We want members, guests and the community to be impressed and inspired by our environmental performance.

Directors, Management and Staff will make decisions with sustainability and the environment as key considerations. Our environmental performance is measured and reported through tracking of resource consumption data. We have made significant improvements in recent years which have reduced our environmental impact while also reducing costs, and we have established ambitious targets for further efficiencies.

- Reduction of electricity use by 8% each year, with a total reduction of over 40% by 2016/17
• Reduction of water use by 10% each year, with a total reduction of over 50% by 2016/17

The VPO project was identified as a way of helping CHCC reach our sustainable goals; indications thus far indicate that we are achieving what the project was designed to do. Reducing energy consumption, reducing costs, educating and helping the community.

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

Crescent Head Country 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: 13/1/15

Name: COLAN ILYAN

Position: Secretary Manager Organisation: Crescent Head Country Club Ltd

Witness Signature: ................................................................. Date: 13/1/15

Name: michelle simms

Position: Office Manager Organisation: Crescent Head Country 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.
Attachment A

Project Energy Efficiency Improvement Template

Voltage Power Optimisation

<table>
<thead>
<tr>
<th>PROJECT TITLE</th>
<th>Energy Reduction through Voltage Power Optimisation</th>
<th>PROJECT ID</th>
<th>CEEP2064</th>
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<tr>
<td>FUNDING RECIPIENT</td>
<td>Crescent Head Country Club</td>
<td>DATE</td>
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Building, Facility or Site 1

<table>
<thead>
<tr>
<th>Name of Building, Facility or Site 1</th>
<th>Crescent Head Country Club</th>
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</thead>
<tbody>
<tr>
<td>Location (address)</td>
<td>1 Rankine Street Crescent Head NSW 2440</td>
</tr>
<tr>
<td>Type of building, facility or site</td>
<td>Not-for-Profit Community Club</td>
</tr>
<tr>
<td>Activity Type and Measure</td>
<td>Installation of Voltage Power Optimisation</td>
</tr>
</tbody>
</table>

Energy Efficiency Estimate Method

The base energy usage was obtained through the calculation of the last twelve months power bills kWh converted to MJ. Baseline energy efficiency units of measurement have been calculated using mega joules per square metre (1,605 square metres of floor space).

Baseline Energy Usage

385,598 kWh per annum (2012-13)
385,598 kWh x 3.6 = 1,388,153 MJ per annum (2012-13)

Baseline Energy Efficiency

1,388,153 MJ/1,605 m2 = 865 MJ/m2 per annum (2012-13)

Energy Efficiency Improvement

VPO was installed February 2014; in the 7 months since installation the club has used 189,160 kWh (compared to 203,657 kWh in the corresponding 7 months of the previous year). This represents a saving of 14,498 kWh (over 7 months) or 7.11%; this has exceeded the anticipated savings of 6%. A technology to Crescent Head Country Club will improve the incoming voltage by an estimated 6 percent.

Reporting Data (Measuring Energy Efficiency and Additional Data)

The building size of 1,605 m2 is unlikely to change in coming years but energy efficiency data will be updated to reflect any changes that do occur. Energy consumption is monitored continuously through a detailed resource tracking spreadsheet, which also tracks other resource use (water, waste, etc).
An annual sustainability report documents resource consumption, costs and savings.

<table>
<thead>
<tr>
<th>Cost of Activity</th>
<th>$59,800.00</th>
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<tr>
<td>Estimated Cost Savings</td>
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