

CASTLE HILL RSL CLUB

Stage 2: Trigeneration Project



Background

The origins of Castle Hill RSL Club can be traced back to 1932, when the “Hills District Returned Sailors and Soldiers Club” was formed to assist World War 1 veterans and their families. In 1974 the club moved to the present site of nearly 5 hectares, offering members entertainment, gaming, food, beverages, functions, sporting and fitness/aquatic needs. Since 1974, there have been ongoing renovations and alterations to the premises to maintain and enhance member services.

Castle Hill RSL Club is a step ahead in sustainability matters within the industry, and in recognition of its environmental strategies, the club has been awarded the 10 Year Achievement Certificate as part of the 2012 NSW Green Globe Awards. Its integral approach to sustainability includes BMS systems on lighting, air conditioning and chillers, heat exchangers, power factor correction units and water, paper, and cardboard recycling.

In September 2011, Castle Hill’s C2K Aquatic Centre launched its 142 kW Cogeneration system, a cutting edge technology that provides low-cost and low-carbon electricity, heating for the swimming pools and domestic hot water to the facilities. Since then, the Club has reduced its electricity bill by approximately \$80,000 per year and cut carbon emissions by 540 tonnes per year, which is the equivalent to removing 120 cars off the road.

With a major focus on improving energy efficiency and supporting environmentally friendly practices, Castle Hill RSL Club successfully applied for a \$495,500 Community Energy Efficiency Program (CEEP) grant which provided co-funding for the installation of a new 378 kW Trigeneration System.

With an estimated payback period of 2.5 years, future energy costs savings are expected to be an average of \$250,000 per year over the first 5 years of operation, taking into account assumed electricity and gas prices increases. A key benefit is a carbon emissions reduction of 49%, which is equivalent to removing 268 cars a year off the road.

Simons Green Energy previously installed the first Cogeneration System at Castle Hill RSL’s C2K Aquatic Centre back in 2011 and were subsequently re-engaged to supply and install the new Trigeneration System at the Club in 2013.

Project Name: Castle Hill RSL Club Trigeneration Project

Site owner: Castle Hill RSL Club

System supplier: Simons Green Energy

Trigeneration system components

Cogeneration system details:

ENER-G Model 375 - 378kW_e Cogeneration Unit

- Total electrical output: 375 kW (e)
- Total thermal output: 400 kW (t)

Absorption Chiller details:

Shuangliang Model HSB99H2 - 300kW_{th} Absorption Chiller

- Total chilled water output: 300 kW

Estimated payback period: 2.5 years

Carbon emissions reductions: 1208 Tonnes per annum

Average cost savings: Approximately \$250,000 per year over the first 5 years.

Commissioning Date: August 2013

System applications:

- Electricity base load for Castle Hill RSL Club’s main building.
- Heating, cooling and domestic hot water production



Australian Government

Department of Resources, Energy and Tourism

This activity received funding from the Department of Climate Change and Energy Efficiency as part of the Community Energy Efficiency Program



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Castle Hill RSL Club – Trigeneration Project

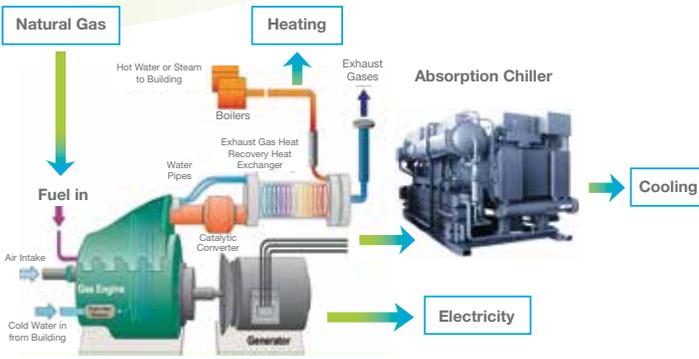


Diagram: Trigeneration system



What is Trigeneration?

Cogeneration, also known as Combined Heat and Power (CHP), is the simultaneous production of two forms of energy - electricity and heat - from a single fuel source. Cogeneration 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, process heat for manufacturing, domestic hot water, heating for swimming pools and similar applications. On site Cogeneration Systems have a total efficiency of up to 85%, as compared to the 30% efficiency of coal-fired grid-supplied electricity.

Trigeneration is the combination of a Cogeneration system and an Absorption Chiller which converts gas into electricity, heating and cooling. The waste heat from the Cogeneration system is converted into chilled water for air conditioning, refrigeration or other cooling purposes.

On site electricity generated by a Cogeneration and Trigeneration system is cheaper and cleaner than coal-fired grid-supplied electricity. Cogeneration and Trigeneration thereby provides substantial cost savings, significantly improved energy efficiency and up to 50% lower carbon emissions.

Project Delivery

Installation works commenced in mid June 2013, with the Absorption chiller, adiabatic cooler, dump radiator and loose items delivered and the mechanical plumbing installed before the Cogeneration unit arrived to fast track progress. The Cogeneration mechanical and electrical installation was complete within a timeframe of eight weeks to comply with the CEEP milestones requirements.

Successfully commissioned in early August 2013, the new Trigeneration System was launched in September 2013. With a government grant contribution of approximately 50% of the total costs, the estimated payback period is 2.5 years. The expected return on investment is 29% per annum.

Grid-based electricity consumption will be down by 40% from current levels which will benefit the Club's members and the community through lower expenses and increased profits that will be re-invested into the Club and the local community. Castle Hill RSL Club is expected to reduce its energy costs by an average of \$250,000 a year.

The Trigeneration System is cutting the club's CO2 emissions by 1208 tonnes per year which is equivalent to removing 268 cars a year off the road.

Castle Hill RSL Club has enhance its commitments towards environmentally friendly practices by producing sustainable and cost effective electricity on site and by dramatically reducing its carbon emissions for over 20 years.

Benefits

- Reduces energy cost by an average of \$250,000 a year.
- Estimated return on investment of 29% per annum.
- Results in a payback period of approximately 2.5 years.
- Reduces carbon emissions by 1208 tonnes per annum which is equivalent to removing 268 cars a year off the road.
- Provides 378 kW of electricity.
- Produces 400 kW (t) of thermal output in the form of hot water as a "free" by-product from the engine's waste heat stream.

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