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Cogeneration

Case History

Royal North Shore Hospital

Where:

St Leonards, New South Wales, Australia

Supply:

Two C2000 N5C generator gas sets operating in parallel and two C2500 D5A with QSK60 standby diesel engines

Application:

Cogeneration plant providing base load power and hot water

Sydney hospital opts for Cummins cogeneration plant to meet emission targets and improve energy efficiency

The site of the Royal North Shore hospital on Pacific Highway, St Leonards has undergone a \$950 million redevelopment. Just 10 km from Sydney's world famous Opera House, the site has considerable development potential.

The redevelopment project is a public private partnership with the public side represented by The New South Wales Department of Health (NSW Health). The parent company, InfraShore, represents the private element of the scheme. InfraShore comprises Royal Bank of Scotland and Thiess Pty Ltd - one of Australia's leading construction, mining and services contractors - plus two facilities management companies: Thiess Services (Hard FM) and ISS Facilities Management.



Emergency standby power is supplied by two 2500 kVA C2500 D5A generator sets with QSK60-G9 diesel engines



Two C2000 N5C generator sets with QSV91 engines installed at basement level

At the heart of the redevelopment project is the new hospital and community health building. The 100,000 m² hospital has 650 beds and is one of Sydney's largest and most prestigious healthcare facilities. Thiess Pty Ltd was the head contractor with the responsibility to design and construct the new hospital. With the hospital now completed, Thiess Services is providing facility management (with the exception of the provision of clinical services) for a contracted period of 28 years.

Thiess Pty Ltd took an early decision to include a cogeneration plant in the design in order to increase efficiency and lower the hospital's CO₂ footprint. The cogeneration plant provides 4 MWe of base load power during peak periods, with the balance of the electrical load being supplied by the local electricity network. It meets the cost and efficiency requirements of the project as set by NSW Health, with NO_x emissions, from the cogeneration plant being less than 250mg/Nm³.

Thiess Pty Ltd and Thiess Services found that Cummins Energy Solutions Business South Pacific offered the most competitive solution that met the specification. Cummins was the only company that could provide a one-stop-shop for design, construction and commissioning, as well as long-term operation and maintenance provided by its own in-house service department.

Cummins input to the project started even before construction began. Cummins helped decide the size, orientation and access requirements for two acoustically treated plant rooms, as well as the air flow volume and direction. The Cummins design solution also included exhaust gas flues to be installed through nine stories of the hospital building.

The cogeneration plant will provide 4 MWe of base load power. Throughout a working year, each generator set is expected to operate between 4,500 and 8,000 hours

To provide 4 MWe of base load power and the same level of diesel standby power, Cummins has installed four 2 MWe generator sets in total. Two C2000 N5C's with QSV91 gas engines, with two C2500 D5A's with a QSK60 diesel engines. Generator set control is handled by Cummins PowerCommand® 3.3. The Cummins solution also included waste heat recovery via exhaust gas heat exchangers and plate heat exchangers, HV isolators and mechanical ventilation.

The cogeneration plant starts automatically when there is sufficient building load, since its role does not include exporting excess energy to the grid. The cogeneration plant provides 4 MWe of base load power. Peak demand is expected to occur during summer periods when the hospital requires close to 5.5 MWe of electrical power. Throughout the working year, each QSV91 gas generator set is expected to operate between 4,500 and 8,000 hours.

Cummins Energy Solutions Business South Pacific will operate and maintain the cogeneration plant under a long term O&M agreement with Thiess Services, which will provide facilities management to the rest of the hospital.

For more information about cogeneration systems or other energy solutions, contact your local Cummins Power Generation distributor or visit www.cumminspower.com/energysolutions.



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