PROJECT CORRESPONDENCE

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To:	Suters Architects
Attention:	Steven Donaghey
From:	Paul De Gabriele
Project Name:	West Pymble Pool
Project No:	SSUT0102
Email/Fax No:	s.donaghey@sutersarchitects.com.au

Umow Lai

Umow Lai Enginuity Pty Ltd
Consulting Engineers
ABN 99 150 174 782
L1, 360 Pacific Highway
Crows Nest NSW 2065
PO Box 1053 Crows Nest
NSW 1585 Australia
T: +61 2 9431 9431
F: +61 2 9437 3120
ulsyd@umowlai.com.au
www.umowlai.com.au

Sydney Melbourne Brisbane

DISTRIBUTED GENERATION OPTIONS

GENERAL

The following is a brief synopsis of options that are available for cogeneration and/or trigeneration for Ku-Ring-Gai Council.

COGENERATION AT WEST PYMBLE POOL

Cogeneration (Combined Heat and Power) has been considered for implementation within the West Pymble Pool site, to exclusively serve the Pool site. The option would involve the parallel grid connection of an 81kWe/121kWt gas generator, serving part of the Pool electrical load and utilising the waste heat for the heating of pool water. The proposed generator rating has been reduced during design development in order to maximise the daily run time of the unit and hence the return on investment. Cogeneration units are available at the proposed rating with a total efficiency (electricity and heat) of 84.9%.

Consultation with EnergyAustralia is required to implement the parallel connection of the generator with the electricity distribution network.

The cogeneration set would be located adjacent to the pool plant area near the eastern end of the site. Submains would need to be run to the new main switchboard, which will be located within the new indoor pool building. The cost of upgrading gas mains to support cogeneration is to be confirmed.

The total capital cost is estimated to be of the order of $375,000.

The payback period is estimated as seven (7) years, based on indexation of 15.0% for electrical costs, 8.0% for gas costs and 8.0% for maintenance costs. The implementation of a carbon tax or trading scheme would reduce the payback period and increase the net present value of the proposed installation.

The estimated reduction in carbon dioxide emissions replacing electricity generated from the burning of black coal is 341 tonnes per annum. The cogeneration set would enable significant carbon emission reductions to be demonstrated to members of the public in real time via an information display within the building.

TRIGENERATION FOR KU-RING-GAI COUNCIL BUILDINGS

Due to the relatively small size of generator that would suit cogeneration on the West Pymble Pool site, the Council may consider implementing gas cogeneration or trigeneration on other sites. Trigeneration (Combined Cooling, Heating and Power) is an option that may be feasible in other council buildings. Trigeneration involves supplementing combined heat and power with an absorption chiller, which utilises waste heat to provide cooling. The system therefore generates electricity, heating and cooling for the building. Generally, the feasibility of trigeneration increases with the size of the cooling and electrical loads.

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Office and library buildings are well suited to trigeneration, as they have a significant and steady cooling and electrical load through the day. Where multiple buildings served by trigeneration are in close proximity to one another, they can be served with electricity, heated and chilled water by the same trigeneration plant. This substantially improves the return on investment through economies of scale and by diversifying the loads, which reduces the total load variance through the day.

We understand that within the Council's portfolio, there are at least five medium-sized sites with electrical energy consumption of greater than 160MWh per annum. However, as these sites are not colocated, this option does not appear to be viable.

DISTRICT TRIGENERATION

District trigeneration involves the generation of electricity, heating and cooling, and their export to multiple customers within a given district. District trigeneration has been successfully implemented in Surrey, UK, and planning consent has been given to more than 600MW of trigeneration and cogeneration in London. The City of Sydney has expressed an intention to enact similar initiatives in Sydney.

This option would generally require the sale of part of the generated electricity to neighbouring non-Council properties. While district trigeneration can increase the scale of the plant, it should be noted that this has not yet been implemented in NSW and that the regulatory system, which was designed for centralised electricity generation, presents a significant barrier to district trigeneration. District trigeneration in this case would require either the payment of network charges to EnergyAustralia for the use of their network to export electricity or the installation by Ku-Ring-Gai Council of "private wires" for the sale of electricity directly to other customers. The former would be uneconomic and the latter is outside the Council's core expertise.

CONCLUSION

If the Council wishes to install distributed generation, then we recommend that cogeneration be installed at West Pymble Pool. The provision of cogeneration would be a clear demonstration of ecologically sustainable development and will have a payback period in the order of seven (7) years.

Yours faithfully,
UMOW LAI

Paul De Gabriele
Senior Electrical Engineer