RP1014

IMPACT OF ENERGY EFFICIENCY POOL PUMPS ON PEAK DEMAND, ENERGY COSTS AND CARBON REDUCION

Research Question

How does a residential pool pump system contribute to the peak electricity load?

What has been done in the residential swimming pool field to deal with peak demand?

What are other retrofitting measures that can be carried out to reduce pool pump system's energy consumptions and address peak demand?

Methodology

Figure 1: Research Methodology

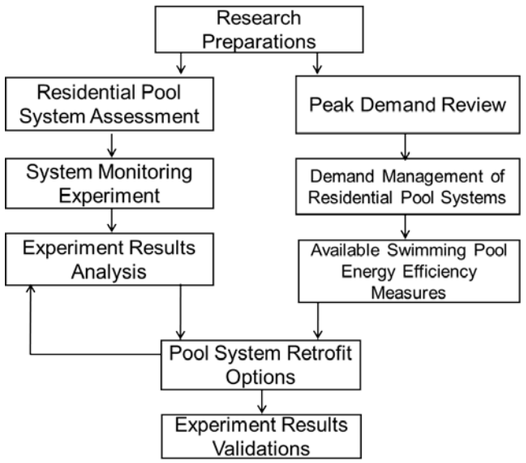

Figure 2 below shows the schematic layout of the system monitoring experiment. This experiment is currently in progress.

Figure 2: Experimental Layout

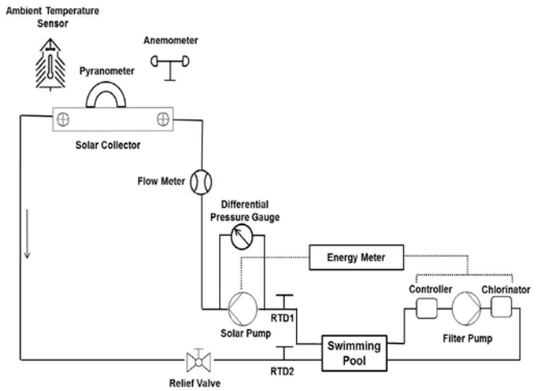

Figure 3: New Pipe Work and Data Logging System

Figure 4 & 5: Rooftop Weather Station

Results

Swimming pool pump are one of the largest electricity users in an Australian household and their contribution towards peak electricity demand is considerable. Currently available demand management strategies in Australia are:

- Dynamic Pricing
- Direct Load Control
- QLD Energex Pool Reward Program
- Pool Pump Energy Rating Labelling Program

Expected results of the system monitoring experiment are given as the experiment is in progress.

- Running pumps at reduced flow rates results in significant energy savings.
- Solar collector heat output loss under low flow could be compensated by increasing the collector area or extending operation time.
- The optimum operating flow rate will be determined which gives the highest effective heat transfer rate of the monitored solar collector.

Conclusions

It is required to have direct load control operated in conjunction with dynamic pricing. Government and utility operators should keep on rolling out more demand management programs regarding pool pumps. It is recommended to keep pool pumps operating at low speed to achieve a higher COP and significantly lower energy consumption which would be beneficial to addressing peak demand and reducing carbon emissions.

Anticipated impacts

The research would assist electricity utilities in determining the most cost effective way to control peak demand and assess need for future grid upgrades. This project could also be linked to the activities associated with NSW government's Energy Efficiency Action Plan.

Key statement

The monitored system would demonstrate to the public and industry how a low energy design of a typical residential solar pool heating system actually works in practice. This would allow more households to achieve greater energy and carbon savings and create less stress on the grid during peak demand. The associated energy efficiency retrofitting options would also be adapted to build up a long term low carbon living scenario.

Further information

For further information about this project please go to the CRCLCL website:
http://www.lowcarbonlivingcrc.com.au/

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