

KITCHENER-WILMOT HYDRO

Improving Distribution System Efficiency

Capacitor Bank Program Reduces System Losses

Kitchener-Wilmot Hydro believes that in asking its' customers to become more energy efficient that it should also improve the overall efficiency of its own distribution system. With this objective in mind, a load flow analysis was performed on Kitchener-Wilmot Hydro's 13.8 kV distribution system for the City of Kitchener (Phase I of the project) in 2005. A model was subsequently developed using software called Distribution Engineering Software Solution (DESS) to investigate the opportunities for system optimization and improve phase balancing

and voltage. DESS helped Kitchener-Wilmot Hydro identify the optimum location to install capacitor banks to extract these savings.

Capacitor banks are attached to the distribution system poles to improve the voltage and power factor and reduce distribution system losses. Extensive analysis has calculated a load reduction of 3.2 % of the utility's 2005 summer peak demand or 12.7 MVA.

Kitchener-Wilmot Hydro has installed 67 capacitor banks within the City of Kitchener and completed this installation in May, in advance of the summer peak period. With the

installation of these 67 capacitor banks, it's estimated that distribution system losses will be reduced by approximately \$100,000 per annum, resulting in a future reduction on customer's electricity bills.

The planning stages for Phase II of the project are now underway. DESS will be used to model the 27.6 kV distribution system in the 100 square mile rural area of the Township of Wilmot. This model has identified the best locations to install the capacitor banks in the Township to also improve voltage and reduce distribution system losses.

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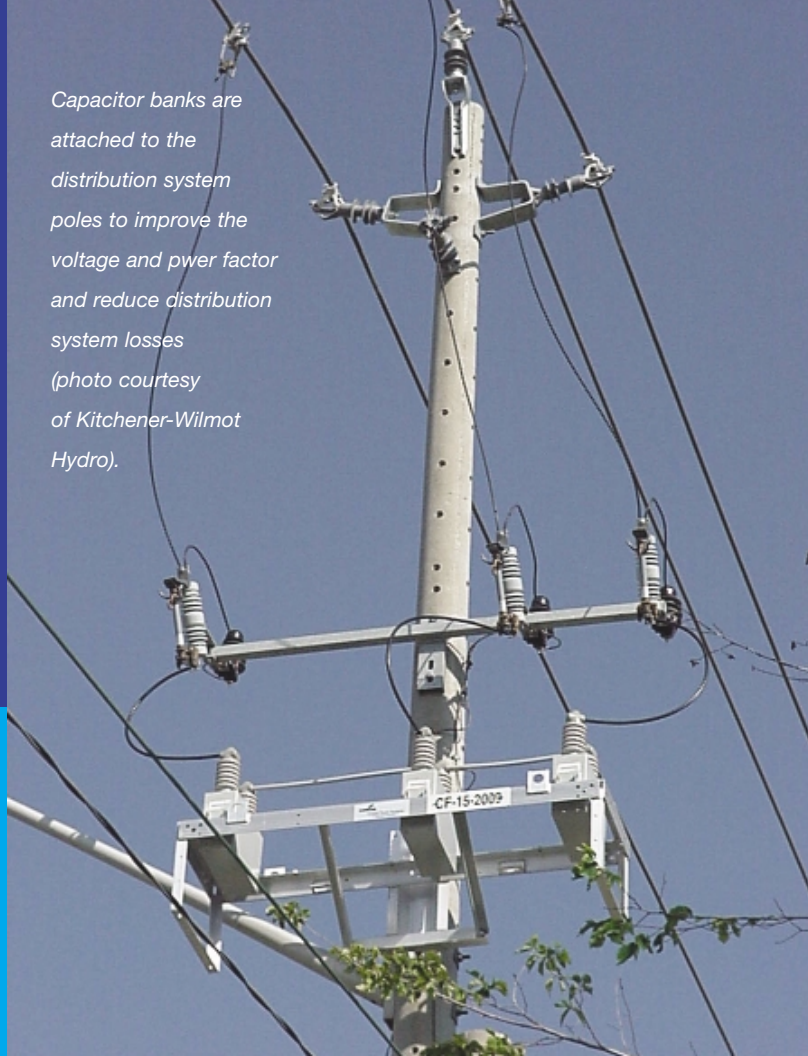
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Some important facts about Phase I, include:

- Phase I equipment cost is \$363,400 and direct program costs are \$236,600 for a total Phase I program cost of \$600,000;
- Reduction of 12.7 MVA in peak demand (3.1% of 2005 system peak);
- An estimated energy savings of 1,815 MWh per year through loss reductions;
- An estimated distribution system power factor improvement from 90.6% to 94.5%.
- The net Total Resource Cost (TRC) value is approximately \$1.2 million; and,
- The benefit to cost ratio is 3.04.

Kitchener-Wilmot Hydro Inc. is responsible for distributing electricity to 80,000 homes and businesses within the City of Kitchener and the Township of Wilmot. A wholly owned subsidiary of Kitchener Power Corporation, Kitchener-Wilmot Hydro Inc. is focused on providing a safe and reliable supply of electricity to its customers.

Capacitor banks are attached to the distribution system poles to improve the voltage and power factor and reduce distribution system losses (photo courtesy of Kitchener-Wilmot Hydro).



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