

Off the Grid, On the Money

New Micro CHP Systems Make Cogeneration a Viable Option for Apartment Owners

By Erin Ruddy



Cogeneration in Canada is no longer just for hospitals and industrial facilities—multi-residential property owners are beginning to take note of this energy savings technology, too. Defined as “the simultaneous production of electrical and thermal energy from a single fuel source,” cogeneration is a reliable way to produce power while redirecting ‘waste heat’ back into the building as useful energy.

Though Europe has been a widespread user of CHP (Combined Heat and Power) for decades, grid limitations and rising energy costs here in Canada are prompting residential building owners to expand their options and look at alternative energy savings solutions. According to Mike Mulqueen, Lead - CDM Business Development, Multi-Residential Sector at Toronto Hydro, CHP is emerging as a viable option.

“We’ve been seeing a lot more interest in CHP lately,” he says, noting a recent meeting with a consultant who has completed over 300 assessments for interested multi-residential customers across southern Ontario. “Advancements in technology have made cogeneration more accessible for most properties. There are now small-scale solutions

that can follow the thermal loads, meaning even buildings with as few as 50 suites could be suitable for a CHP system.”

Right now in Canada, seven percent of electricity is produced using cogeneration. Alberta has the largest capacity, with the majority going to serve the oil and gas industry. Ontario is the second largest producer, serving a broader range of industries—from manufacturing, forest and hospitals to universities and entertainment complexes.

But implementation continues to expand. Aside from increased efficiency, reduced greenhouse gas emissions (compared to traditional separate heat and power production), and significant cost savings for users, CHP also promises improved security of supply as it

reduces the risk of consumers being left without electricity during power outages.

“Under normal operating conditions, a CHP plant generates electricity behind the meter, matching the thermal load of a facility drawing some power from the grid,” explains Mulqueen. “But during emergency situations when grid power is not available, a CHP system can operate as an electrical island to power essential requirements, like elevators, lighting, heating, ventilation, and hot and cold water distribution equipment.”

Paul Ruth, president of DBS, a certified HVAC mechanical contractor and cogeneration supplier, is a huge advocate of CHP and believes the benefits greatly outnumber the risks. “It is a proven, reliable technology,” he says. “It can

be installed on your rooftop, in your garage or somewhere else on the property. Once the equipment is up and running, your building's Net Present Value increases as your energy reduces. Systems have a long lifespan of 20 to 25 years, and thanks to predictive maintenance, the equipment is straightforward to operate."



Gaining favour in Ontario

Ruth, whose team has been immersed in the CHP movement for the past three years, says the road to acceptance hasn't been without its challenges. From determining equipment specifications and adapting standards for Canadian consumption, to educating policy-makers and getting utilities on side, the results of the group's collective efforts are finally coming to fruition.

"Our customers are about to realize some very substantial gains," he says. "It's still early days and the data is limited, but we know that systems can offer up to 90% energy efficiency. And now with incentives available to offset the cost of installment, it's a solution many residential building owners will be seriously looking at."

One notable entity embracing CHP technology is Skyline Group of Companies, based in Guelph, Ontario. Since 2015, Skyline has been working closely with DBS to install micro CHP systems in a handful of its residential buildings—but the commitment won't end there. With approximately 200 sites currently undergoing assessment, Skyline is primed to be an industry leader using cogeneration

technology to reduce both its energy usage, and its carbon footprint.

"Skyline has assembled a team of about 12 specialists to determine the most effective way to incorporate CHP technology at our properties," says Roy Jason Ashdown, Co-Founder & Chief Operating Officer, Skyline Group of Companies. "To date we have completed dozens of studies and the list of suitable sites continues to grow. We have installed several systems in St. Catharines and the real time data is being measured and verified by our engineers. The initial numbers look very promising."

According to Ashdown, the driving force behind his company's recent shift to cogeneration was the mounting cost of energy. "Reducing consumption at a property is the most effective way to hedge against rising energy costs," he says. "But CHP offers a new solution that complements other energy conservation initiatives. It allows property owners to generate cost-effective, on-site power, and the by-product is hot water that is reclaimed and used for a multitude of heating purposes. The potential islanding if the grid goes down is also a bonus."

Thermal Energy Metering: Rewards and Risks

Thermal energy (which includes district energy utilities, hydronic systems, geothermal and CHP), is becoming an increasingly popular way to heat and cool multi-tenant buildings. When implemented with sub-metering technology, it provides a way to accurately measure consumption and encourage conservation.

One challenge these systems face is the ability to effectively measure and bill thermal energy consumption to end users. The Canadian market sees growing demand for sub-metering thermal energy and appears to be following recommendations from groups, such as The Pacific Institute for Climate Solutions, who have recommended thermal sub-metering as a means to achieve energy conservation and cost control.

Challenges and risks

There are challenges and potential risks for real estate developers, however, because of a lack of government standards for measuring thermal energy. Thermal energy is more complex to measure than other utilities and requires specialized equipment and expertise. Further, it is currently not regulated by Measurement Canada—although they have indicated their awareness and potential support for best practices adopted from Europe and elsewhere. Real estate developers need to be aware that best practices, technology, and expertise from Europe is available in Canada. If the right methodology is not adopted, developers run the risk of using technologies that won't enable equitable cost allocation and billing practices for a user-pay system.

To minimize potential risk in investments, here are four factors developers and other stakeholders must consider:

1. Will the measurement methodology selected meet current and future regulations within Canada?
2. Is the methodology utilized by more mature thermal energy markets, such as Europe?
3. Can the methodology stand up to scrutiny if an end-user (tenant) disputes their bill? What international standards or hardware can you direct them to that will ease their concerns?
4. Will the methodology be delivered by an appropriate provider who will correctly specify, deploy, manage, and bill from the system in the long-run?

QMC, a leader in sub-metering solutions, recently published a White Paper examining the requirement and challenges for effectively measuring thermal energy consumption in Canada. Visit www.qmeters.com for more info.

