

# The Toronto Star

## You can't drive this hybrid electric

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There's a lot of talk about time-of-use pricing for electricity now that residential smart meters are becoming more commonplace around southern Ontario.

Smart meters make it possible for local electric utilities to know the time of day your home is drawing power from the grid. With this knowledge, utilities can charge higher rates during peak times to encourage people to shift their electricity use to off-peak periods, which are priced at a discount.

Time-of-use prices, and the shifting of demand it encourages, is supposed to make Ontario less dependent on expensive, dirty power from inefficient natural gas plants or imported from U.S. coal plants.

At the same time, they make us bigger users of less expensive, cleaner nuclear and hydroelectric power that fulfils a lion's share of our needs during off-peak times, or wind energy that may go unused overnight because we might not need it. It makes a whole lot of good sense.

But there are other ways to use that off-peak electricity and reduce carbon dioxide emissions and they shouldn't be overlooked. Many big industrial, institutional and commercial power users - for example, greenhouse operations, hospitals and office buildings - use fossil fuels such as natural gas to provide heating around the clock.

As a general rule, using electricity for such heating applications has always been considered more expensive and dirtier. But that's not always the case. A hotel, for example, could benefit by seamlessly switching from natural gas to electricity for all its heating during off-peak times, when power from the grid tends to be cheaper and comparatively cleaner.

It's an approach Vancouver-based Sempa Power Systems is promoting in provinces, such as Ontario and British Columbia, which have a steady flow of low-carbon electricity when power demand is at its lowest.

Big power users don't pay for electricity the same way homeowners and small businesses do. Many are on plans in which rates change hourly, depending on the wholesale price on the spot market. These big electricity customers can also avoid power delivery charges if they can smooth out their demand, making the load on the system more even over the course of a day. Grid operators like that kind of predictability.

Sempa installs an electric boiler next to an existing fossil-fuel boiler, creating a hybrid heating system. Proprietary software connects to the two boilers and

at the same time monitors electricity, natural gas, oil and propane rates every minute. When electricity rates fall below the cost of the fossil fuel being used, the software automatically switches over to the electric boiler.

"The good news for Sempa is that most delivery charges are based on peak demand use, so additional electricity delivered at night is not subjected to most of the delivery charges," explains founder and chief technology officer Malcolm Metcalfe. "At the same time, the spot market prices can be quite volatile. In recent days, we have seen some time periods where price has been relatively constant, while at other times it has been low, almost zero."

Unlike residential time-of-use pricing, this isn't about shifting when we use electricity. Rather, it's about switching from one energy source to another based on price, and it just so happens that at lower prices electricity generation tends to get cleaner in certain provinces.

Now, this approach doesn't make sense for every operation. Sempa, on its website, says its hybrid heating system is ideal for buildings "where people sleep" - hotels, university residences, hospitals, nursing homes, prisons and apartment buildings.

That's because heat is needed even when you're sleeping and water can be warmed up overnight for use in the morning. "Larger commercial office buildings are also often good candidates and many industrial process buildings are outstanding candidates," the company says.

"We can make a lot of places work because of the intelligence in the switching," adds chief executive Ron Dizey.

The end result? Customers that have installed the system so far, mostly B.C. hotels, have cut their energy bills by 10 per cent to 30 per cent and reduced greenhouse-gas emissions by between 20 per cent and 50 per cent. Those emission savings, by the way, also hold value on carbon-trading markets.

The company claims the system pays for itself in three years and if a customer doesn't want to shell out the upfront capital, Sempa will install and own the system and get paid by sharing the customer's energy savings.

Natural gas and heating oil prices have been volatile, and while they've fallen from record highs recently, they won't stay there for long. That, along with the potential for building owners to reduce greenhouse-gas emissions, makes it clear that hybrid

energy systems aren't limited to cars.

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