Effective provision of electricity is a finely tuned balancing act on the part of the grid operator, always trying to ensure that electricity generated matches user demand as closely as possible. The Peaksaver and subsequent Peaksaver PLUS programs empowered individual residents to play their part in achieving this balance.

“Over the last ten years, the Peaksaver PLUS program has provided Ontarians a unique opportunity to contribute to grid reliability. The program allowed the IESO, as grid operator, to curtail energy demand during hot days, reducing the need to rely on power plants to produce more energy.”

-Independent Electricity System Operator (IESO).

By 2017, program was equipped to reduce peak demand by up to 180 megawatts
The Peaksaver program, launched in Toronto in 2005, and active throughout Ontario between 2007 and 2017, was an electricity demand response program designed and administered by the Ontario Power Authority (OPA) and co-ordinated by the Independent Electricity System Operator (IESO)[1].

Demand response programs focus on incentivizing electricity users to make short-term reductions in their energy demand.

Throughout Ontario, peak annual demand for electricity occurs during the summer time, on the hottest weekdays of the year when central air conditioning systems are running constantly and at full power. By allowing the grid operator, IESO, to install and remotely manipulate smart devices in resident’s homes, the Peaksaver program enabled individual residents to help reduce the demand for electricity on these peak days.

This program offered different smart devices to participants: from programmable thermostats for central air conditioning, to load control devices for residential water heaters and pool pumps. During a handful of hot and humid days each year when peak electricity demand was approaching the total generating capacity of the system, a signal was sent to these smart appliances to reduce the amount of electricity they were using at that time. A Peaksaver activation reduced the proportion of time that air was actively cooled down or water was actively heated up, and increased the time that previously cooled air/heated water was simply maintained at a steady temperature[3].

While the focus in the Peaksaver program (2007-2011) was on demand response through these remotely controllable devices, the later Peaksaver PLUS program (2011-2017) also incorporated a social behaviour change component by additionally offering free in-home energy display devices to participants so they could track their real-time energy consumption. All Peaksaver program contracts expired in 2017. IESO is now considering integrating these resources into a broader Demand Response Auction, selecting providers of future demand response services in a more transparent and cost-effective way[4].

Over the course of the last decade, the Ontario-wide program supplied smart thermostats to approximately 327,000 homeowners, or just under 10% of Ontario’s energy customers, at a total cost of $270 million[1]. Of these, 34,000 were Hydro Ottawa customers, corresponding to almost 20% of Hydro Ottawa’s eligible customers.

By actively responding to demand, programs like this are able to reap numerous benefits in terms of energy conservation, capital expansion cost savings, increased grid reliability and lowered emissions. Focusing first on energy conservation, by 2017, the program was theoretically equipped to reduce peak demand by up to 180 megawatts[1]. In practice, previous documented activations of the peaksaver program resulted in demand reductions of 110 megawatts, equivalent to the power needed for a medium city[3].
A 2015 study estimated that a Peaksaver activation could reduce total electricity demand by around 18%[5].

Reducing peak demand in this way resulted in direct cost savings and emissions reductions due to the reduction in necessary electricity generation. In fact, a 2015 IESO report estimated the benefit/cost ratio of the program at 1.38, with benefits clearly outweighing costs[5]. There were also substantial indirect cost savings because this program eliminated the need to build additional generating capacity to meet these infrequently occurring peak demands. Lowering or entirely eliminating these peaks in the demand contributed to a more reliable grid that does not suffer from supply shortfalls or outages.

Additionally, most participants in the program confirmed that there was no noticeable difference in the temperature of their hot water or of the ambient air in their homes, confirming that these demand reductions did not occur at the expense of consumer satisfaction. Finally, those involved with administering this program considered it a success if for no other reason than that it raised consumer awareness of smart devices, and the role that they as individuals can play in managing their electricity usage[1].

Despite the large potential of this program to temporarily reduce demand, critics of the program are quick to point out that in its ten years of existence, only 21 province-wide peaksaver activations occurred[1]. Furthermore, on a provincial level, this particular program was only responsible for 0.1% of all residential energy savings from all ongoing conservation initiatives[6]. While these numbers may call into question the success of this program, it is important to remember that peak demand response initiatives of this kind are effectively a kind of insurance against relatively rare but high consequence events. One can liken a program of this kind to purchasing life or home insurance: assuming the price of purchasing such worst-case coverage is appropriate, people rarely complain when they never need to use it.

REFERENCES