How do you measure energy savings during and after the COVID-19 pandemic?

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Energy use has changed dramatically since the onset of COVID-19. Office buildings have sat vacant and residents have been sequestered at home for months. The ANB Systems summary of the Covid-19 EIA Energy Consumption Forecast For 2020 estimates that electricity consumption will decrease 5.7% and daily average natural gas usage will decrease 3.6% compared to 2019. For more on how COVID-19 has affected residential energy usage, read the SaveOnEnergy, an electricity provider marketplace, article Pandemic shifts energy usage for residential customers.

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The first step is to set a new energy-consumption baseline to compare program operations before and after the pandemic, and to forecast new energy goals down the road. By isolating activity before COVID-19 in the first quarter of 2020, comparing it to operations during the stay-at-home orders, and then measuring energy-consumption trends in the third and fourth quarters of 2020, you can segregate the effects of this stoppage on energy programs. To calculate a property's baseline usage, use tools such as the US Environmental Protection Agency's ENERGY STAR Portfolio Manager, which documents each building type's energy usage.

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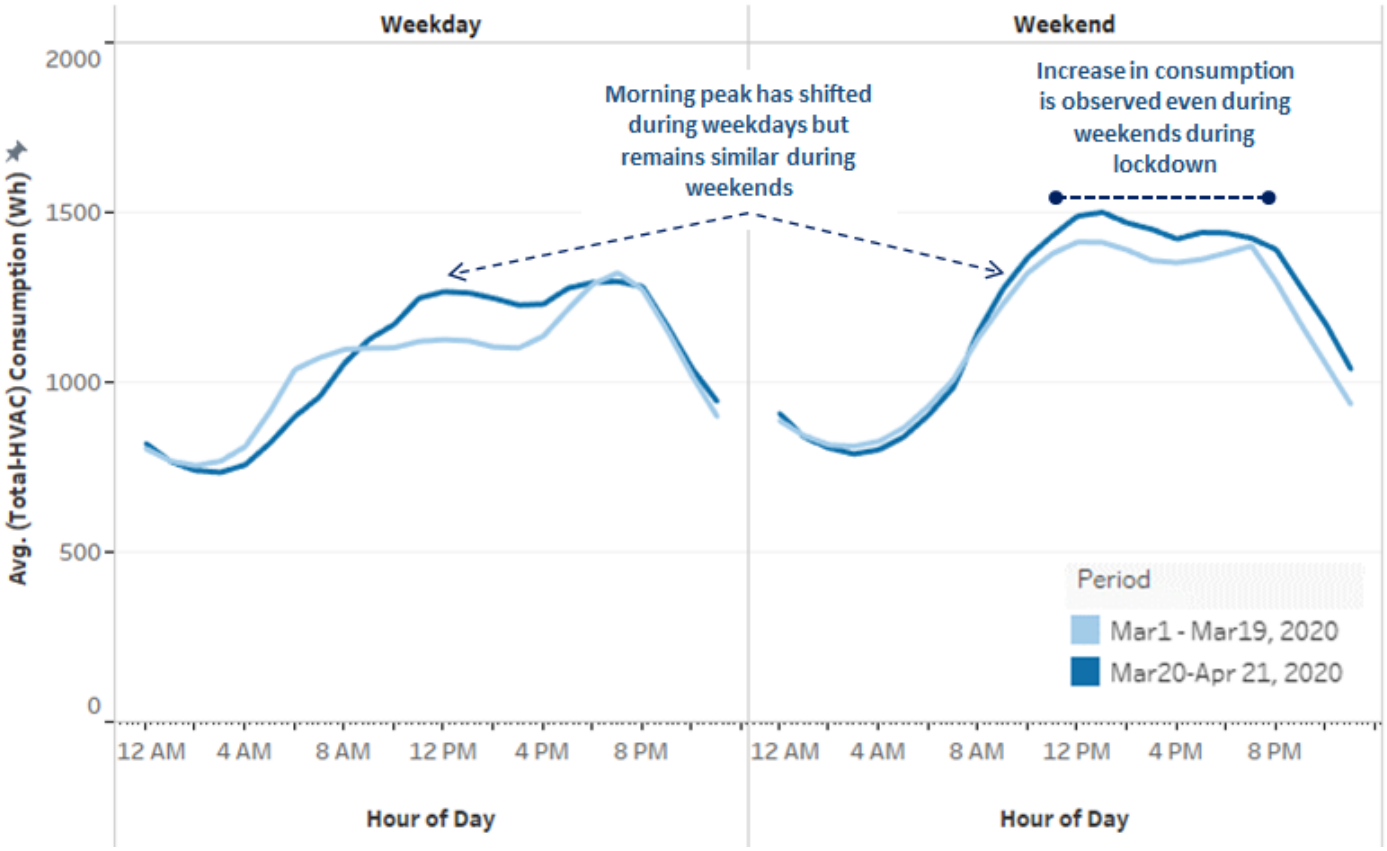
Use data from AMI

Utilities that use advanced metering infrastructure (AMI) or smart grids are well positioned to continue collecting data during the protracted COVID-19 crisis. These tools also allow evaluators to establish a more accurate energy baseline according to appliance or end use.

Figure 1 shows data collected by energy-monitoring software company Bidgely during the early days of the pandemic. Appearing in the POWERGRID International article How utilities are using AI to predict energy consumption during grid uncertainty, the graph illustrates how HVAC energy-consumption peaks shifted during the spring lockdown.

Figure 1: Average HVAC peak consumption during COVID-19 lockdown

During the March and April shelter-in-place mandate, residential customers turned on their HVAC equipment earlier in the day and ran it for longer periods. By April 21, these customers had shifted their peak usage from late afternoon to midday. The load profile for weekends was mostly unchanged, but usage was higher.



Adapt evaluation, measurement, and verification methodologies to the post-COVID-19 world

Evaluators will have to shift from in-person site visits and verification to virtual verifications, desk reviews of project files, and engineering analysis and simulations. One evaluator plans to take an approach similar to what they used after Hurricane Katrina in 2005:

- Conduct a cumulative review of previous program years
- Identify likely savings estimates and patterns
- Calibrate the estimates to reflect the downturn in operations during the COVID-19 shutdown

Although COVID-19 is a global crisis, it's not unlike the emergencies you handle all the time in your territory. During these situations, you suspend your energy-efficiency programs and switch your focus to service reliability. Evaluators can use data from standard emergency situations such as hurricanes

and floods to extrapolate the energy impacts of COVID-19.

BGE’s before and after

BGE told us that it has seen the same savings from its home energy report (HER) program as it saw before the pandemic. Across all residential customers, the utility has noted a 2% increase in electricity usage, according to data from March to May 2020. The HER program’s control and treatment groups showed this increase, so the difference in savings between the two comparison groups is the same as it was before the pandemic.

BGE has also seen a shift in when customers use energy, with usage occurring later in the morning, as the Bidgely chart shows. Other utilities’ data have shown a similar trend, as outlined in the New York Times article The City That Never Sleeps Is Waking Up Later.

Some utilities have capitalized on the stay-at-home orders and shutdowns to find alternative methods for delivering energy efficiency. They now offer direct-mail kits, install efficiency measures in empty buildings, or perform virtual audits. Evaluators can determine the energy savings from such activities through online surveys, program database reviews, and statistical analyses to assess overall program effectiveness and project energy savings.

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