

Introduction

A few years ago, NYSERDA ran the Comprehensive Energy Management (CEM) program to assist multifamily buildings in installing submeters to measure each apartment's electricity consumption. For this Tech Tip, we analyzed data from 29 of those projects, encompassing 68 separate buildings. We compared the whole-building electricity consumption from a 12-month period before the buildings were submetered (the baseline period) to annual whole-building electricity consumption for one or more years after the submeters were installed.

Results

Our analyzed dataset included 1-5 years of data for each building after the buildings switched to submetering. The number of years analyzed depended on availability of electricity data for each building. The following chart shows the average percent electricity savings across time and the number of buildings included in each data point. This chart only includes the 55 buildings that had non-negative savings in the first year after submetering. See the Estimating First-Year Savings section for more information on why some buildings were excluded.

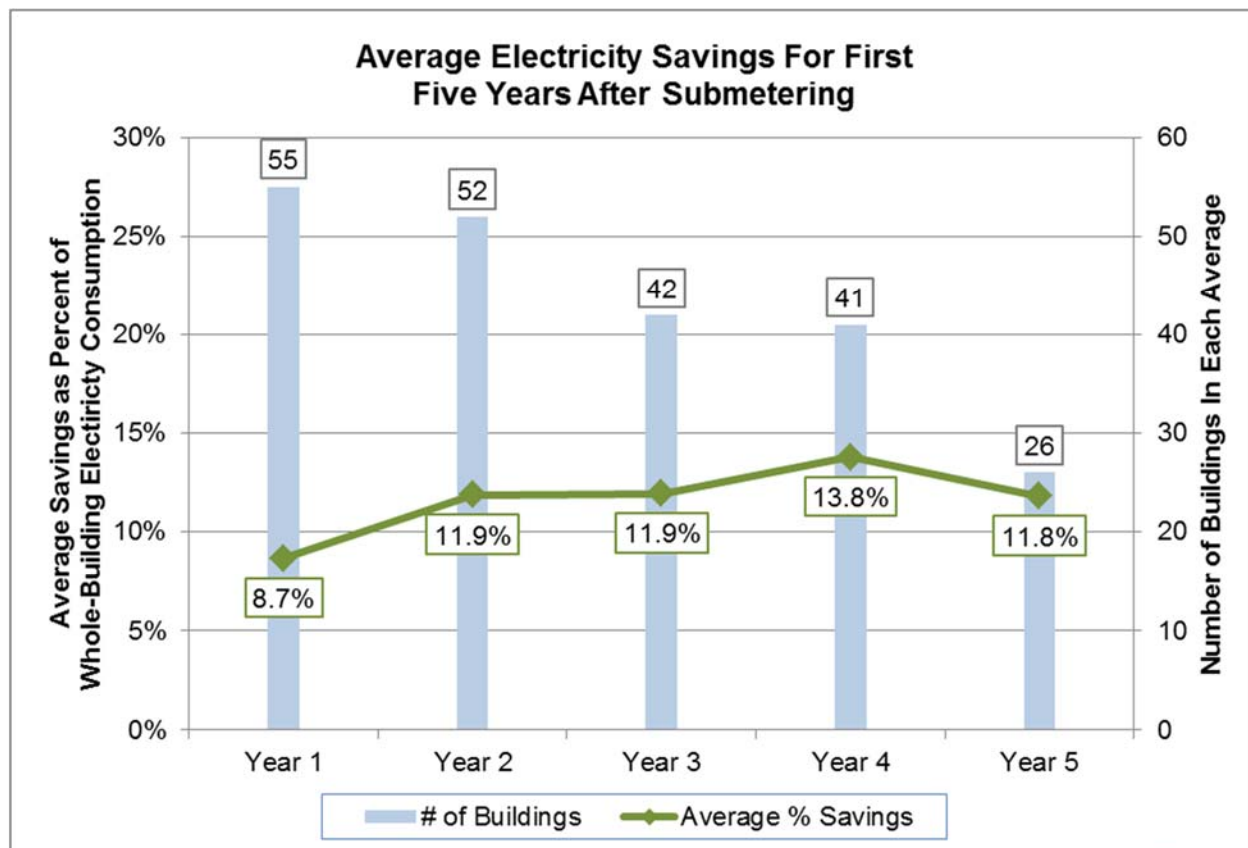
There is an increase in savings between year one and year two post-construction, and then savings holds fairly constant at an average of 12% in years two through five.

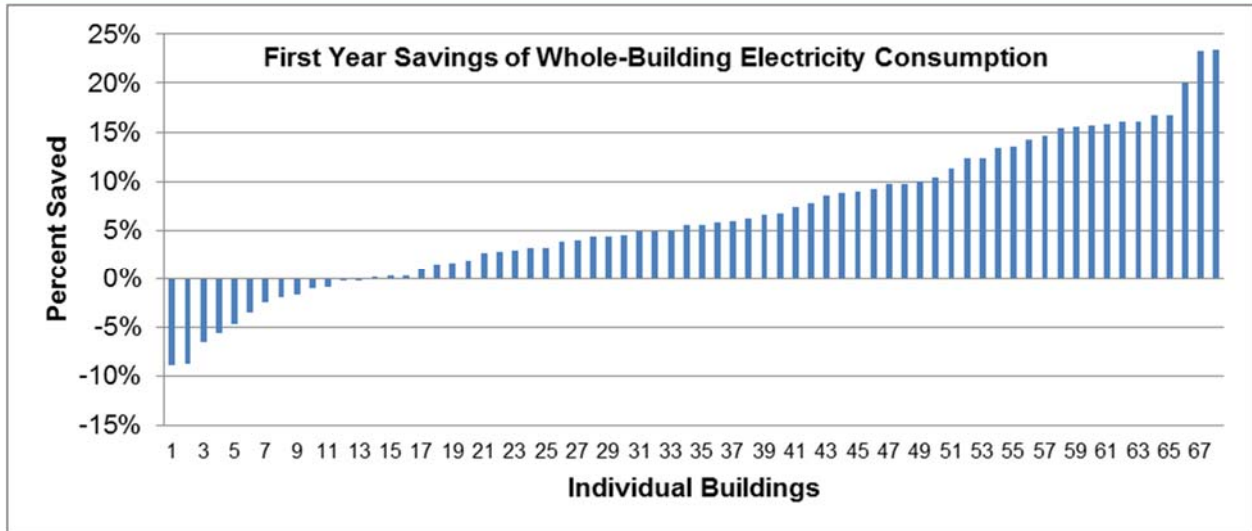
Estimating First-Year Savings for MPP

In the first year after switching to submetering, achieved savings varied from -9% to 23% of whole-building electricity consumption, as shown in the chart on page 2. Buildings with negative savings increased their electricity consumption.

There are several reasons why first year savings may be lower than savings in later years. One is that it may take time for tenants to be fully aware of their electricity consumption. For example, the first summer they are submetered, they may be surprised by how high their electricity bill is, but it's not until the second summer of submetering that they remember to turn off the AC when they leave the apartment for the day.

A second reason first year savings may be lower is that many buildings performed several months of shadow billing before actual billing was implemented in order to ease the transition from electricity being included in the rent to each tenant paying for their actual electricity consumption. In shadow billing, tenants received a statement that showed how much electricity they had used in the previous month and how much they would have been charged. Tenants did not pay for their consumption during the shadow billing period.





Approximately 10 of the 68 buildings in our dataset did shadow billing but reportedly never transitioned to billing their tenants for their electricity consumption. Since these buildings abandoned the submeters in place and effectively did not implement submetering, we should not see any savings that are attributable to submetering. Unfortunately, we do not know which buildings did not use their submeters.

To determine first-year savings, we excluded the 13 buildings that showed a negative savings in the first year. This approach is based on our arbitrary assumption that these 13 are the buildings that did not implement submetered billing during the entire five years analyzed. This approach causes the Tech Tip to display slightly larger average savings each year than might be warranted. It is possible that some of the 13 excluded buildings did implement billing despite the negative savings, and likewise possible that some of the remaining 55 buildings never implemented billing despite showing some savings. However, the impact of excluding these 13 buildings is moderate, as demonstrated in the table below.

First Year Savings		
	All 68 buildings	55 buildings with positive savings
Average Savings	6%	9%
% Savings— 66th Percentile	9%	10%
% Savings— 90th Percentile	16%	16%

The average first-year savings for all 68 buildings was 6%, whereas the average first-year savings was 9% among the 55 buildings with positive savings. However, the first-year savings at the 66th and 90th percentiles are nearly identical regardless of whether the 13 buildings are excluded.

Outside of this analysis, we have heard anecdotally of other submetering projects where the submeters were installed and then abandoned before billing was implemented. Therefore it is important to ensure that the property owner fully understands all financial and managerial ramifications related to initiating submetered billing before the agreeing to install submeters.

Long-Term Savings

In our dataset that excludes the 13 buildings with negative first-year savings, savings during years 2-5 post-construction averaged 12% of whole-building baseline electricity consumption. When those 13 buildings are included in the analysis, the overall average savings for years 2-5 decreases to 10%.

Conclusion

On average, submetering apartment electricity usage reduces the amount of electricity consumed in the apartments. By closing the feedback loop and charging tenants for how much electricity they actually consume, submeters encourage electricity conservation as a way for tenants to save money. Savings vary widely for reasons that cannot be determined from the data available in this analysis. First year predicted savings should be conservative because data show that savings are often not fully realized until the second year after submeters are installed. We recommend projecting no more than 9% savings for the first year after submeters are implemented. Long-term savings are somewhat higher than first-year savings as tenants acclimate to paying for their electricity consumption.