
FirstView Case Study: PIER

NBI used FirstView™ to analyze 22 buildings involved in the State of California's Public Interest Energy Research (PIER) program. The participating projects were a broad distribution of type and California climate zones, with concentrations in the central and south coastal regions.

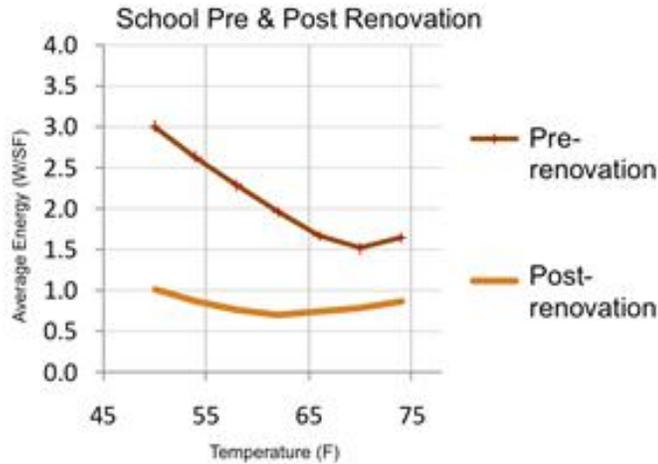
Investigators found that analyzing the FirstView Energy Signature prior to each site visit helped to effectively guide the more detailed site investigation. Furthermore, individual design feature findings were generally found to be consistent with the initial Energy Signature observations. For example, one FirstView Energy Signature had a steep heating slope and excessive simultaneous heating and cooling. These initial predictions were validated during the site visit, as the heating system was found to run excessively due to a combination of controls and design issues, such as a high boiler lockout temperature of 97 °F, three-way hot water valves throughout the VAV system reheat coils, and higher than normal ventilation loads associated with science lab equipment.

Here are a few specific examples of how FirstView facilitated the analysis.

School Before and After Renovation

The comparison of pre- and post-renovation signatures for an elementary school demonstrates improvement in three separate areas:

1. The steep pre-renovation heating slope suggests inefficient heating equipment and/or excessive ventilation rates or leakage.
2. Post-renovation reduction in base load (lowest point on the line) suggests improved lighting efficiency and/or reduced use of excessive reheat
3. Post-renovation balance point (temperature at which the lowest point occurs) suggests improvement in HVAC controls and/or economizer operation, reducing the need for mild temperature conditioning.



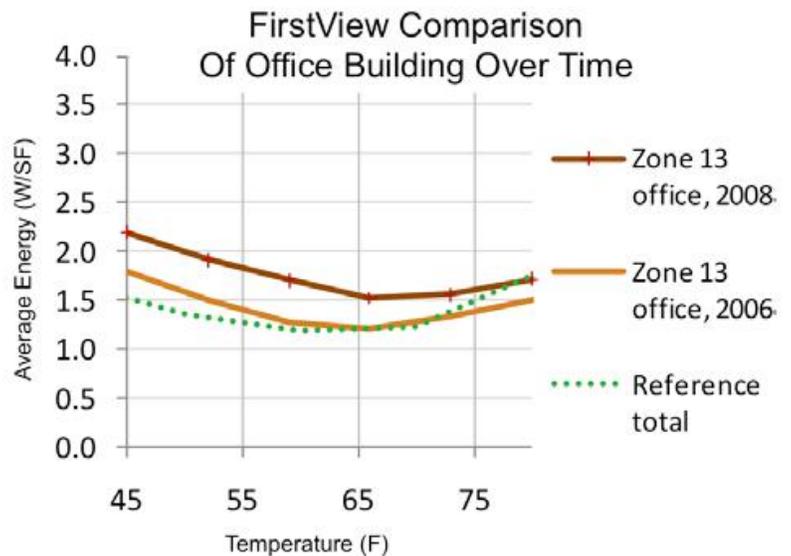
Different Performance in Two Library Buildings

The same three types of differences – heating slope, base load, and balance point – are seen in this comparison of current performance for two different libraries. In this case, the owner of the zone 4 library was aware of some comfort complaints and of their difficulty in using the complex HVAC control system. On the basis of their PIER Owners Report from FirstView, they advanced their priority for completing a full audit of the building to investigate these issues.



Office Building Change over Time

This two-year comparison for the same office building shows 2006 performance and a higher signature at all temperatures two years later. Review of the signature model detail and discussion with owners both suggest that changes in



occupancy level may account for the difference. If no changes were identified, then the signature, since it is already weather normalized, might prompt the owner/operator to check control settings or other sources of increased energy use.

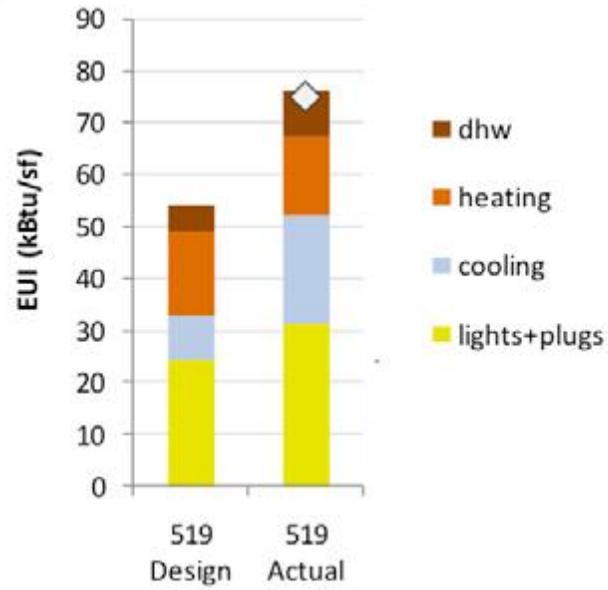
The above examples illustrate primary themes for further investigation that came out of the energy signature reviews:

- Possible excessive reheat and/or poor economizer operation.
- Possible excessive air change rates, resulting in increased heat requirements at cooler temperatures.
- Unusually high loads appearing to come from lights and plug loads. Basic information on weekly operating hours and the presence of any high process load equipment can help determine whether this reflects a need driven by the activities of the occupants.

Design Model Comparison

Of the nine buildings providing design models, two had actual measured EUIs very close to the design EUI . The rest of the cases all had measured usage in excess of the initial model, as seen in Figure 4. The comparison of modeled to measured EUI is subject to the previously discussed limitations of design model use.

Monthly detail from the design projections makes it possible to compare design and actual energy usage, using an energy signature view of each to better understand the source of material differences. However, even without the monthly model detail, and even without any system submetering in the actual building, the FirstView energy signature of measured results allows estimating the actual end use splits. Thus the modeled data does enhance the use of FirstView to provide more informative feedback to designers and owners on areas where performance is inconsistent with initial assumptions.



FirstView, which uses only monthly whole building billing data, can only create hypotheses of areas to investigate further, such as the cooling system in this example. But having this type of compass available can be a real help in identifying where further probing could be most productive.