



# Case Study

**Project Name:** NH Housing Finance Authority - Transitional Housing

**Building Type:** Multifamily apartments, 10 units, 12,250 Square Footage

**Overview story:** We knew there was a problem—at first, the solar hot water panels were covered in snow, even though there had been three days of crystal clear sunshine after the storm. The system had been shut off by the building manager because he had sensed something to not be quite right. When the installation company arrived and “turned it on,” the snow melted right away. However, something still didn’t sit right with us. Upon inspecting the system and piping, we realized that it was plumbed incorrectly. In fact, the boiler was transferring hot water up to the rooftop panels and releasing that heat to the outdoors. With this information conveyed to all parties, the installer re-plumbed the system, and we set up energy monitoring equipment to ensure that water flows in the correct direction, that heat is provided to hot showers and laundry, not the roof, and that grant money is effectively used.

## Problems identified:

- ✓ Plumbing design was not followed;
- ✓ Plumber and building manager were unaware of how system should work;
- ✓ The system should have been commissioned to verify that it was installed properly and that it performs as designed;
- ✓ A disconnect of communications between building owner, occupants, building manager, and the organization paying the heating bills— no one realized that costs should have gone down, not up!

## Results:

- ✓ The Solar Hot Water System is now operational;
- ✓ Reduced fossil fuel use, energy costs, greenhouse gas emissions, all as designed;
- ✓ Educational opportunity for plumbing company and installer;
- ✓ Grant moneys now made effective;
- ✓ On-going M&V Plan to track energy savings through the solar hot water system

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# Monitoring & Verification

A crucial component of energy audits, commissioning, LEED certification, and documenting successful projects

**Monitor energy-related data to diagnose symptoms of comfort and energy-use anomalies:**

- ✓ Energy Use
- ✓ Temperature
- ✓ Carbon Dioxide
- ✓ Drafts
- ✓ Humidity
- ✓ Lighting use and intensity
- ✓ Verify that the energy project has been installed and performs as designed and expected
- ✓ Plug loads
- ✓ Air velocity
- ✓ Equipment run times
- ✓ Building occupancy
- ✓ Electric current use
- ✓ Occupancy surveys

**“You cannot manage what you do not measure”**

**Jack Welch, former CEO of General Electric**



*Resilient Buildings Group is a majority-owned, for-profit subsidiary of The Jordan Institute, a non-profit energy-use reduction think tank.*

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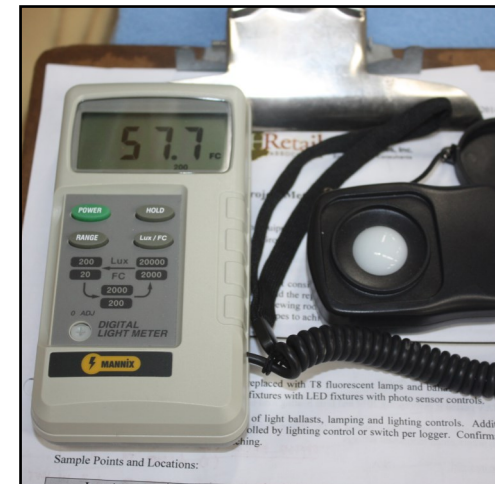
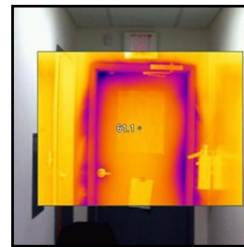
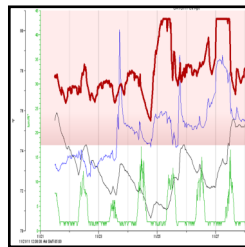
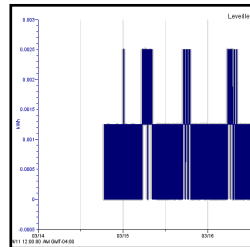
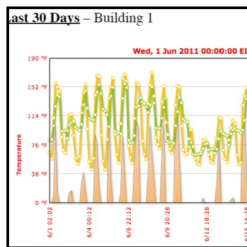


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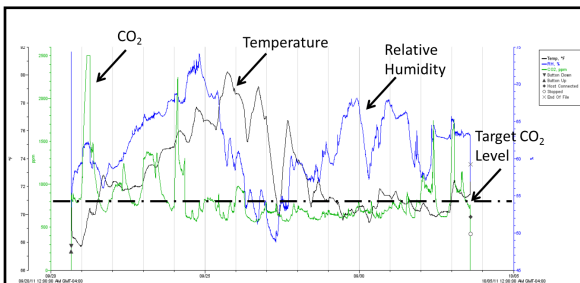
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**Why should I invest in M&V?** Ever felt drowsy in a meeting and couldn't blame the subject matter? It is possible that too much carbon dioxide had built up in the room because the ventilation system wasn't properly performing. Systems and their settings often get misadjusted, leading to cascading comfort, safety, and costly problems. Before making assumptions and



investing in the wrong fixes, we recommend a deeper analysis of the implicated energy systems with sub-metering monitoring equipment. Our M+V Reports put energy data analysis into context which adds depth and documentation to Energy Audits, Commissioning Reports, LEED Certifications, and problem-solving expeditions. M+V is a helpful step to better understand distinct challenges, anomalies, or complaints about how a building operates and how to optimize it.

**M&V is the only way to know with confidence that your project performs as designed.** Many financial rebates and lenders require projects prove that their dollars made the impact expected. Moreover, LEED Certification requires M+V for compliance and because they know that measuring and documenting energy use M & V is an excellent proving step.

**Before your project starts:** RBG suggests to monitor equipment and systems prior to replacement and building renovations. Results from data logging can assist a building owner in identifying energy waste (such as equipment run times, lighting use and quality, actual occupancy use, temperature settings and temperature swings, unnecessary plug loads), comfort and indoor air quality problems (such as unexpected or undesired temperature variation, noise, humidity, CO2 levels), and other ways that energy may be used and/or wasted. It is always helpful to establish baseline energy use data prior to implementing an energy project so that monitoring and verification proves that the project works as designed and expected.

**During your project:** Fine-tune systems during the implementation stage to avoid call-backs.

**After your project is complete:** Ensure that the project works as designed. Often times, comprehensive energy projects take time to optimally integrate with existing and new systems. Monitoring those systems during that sync-up period helps assure project works as a system. Comparing energy use data from before and after the project is a great way to assure yourself, lenders, grantors, and the public that your project works as designed and expected. The best way to accomplish this is through a targeted M & V process.

**We strongly recommend at least one year of monitoring use on all energy projects.**

### Recent M & V Projects in NH

- ✓ Grappone Toyota, Concord
- ✓ AutoFair Ford, Manchester
- ✓ Betty Dee Fashion, Berlin
- ✓ HCH Foundation/ Manchester Music School, Manchester
- ✓ Laperle's IGA, Colebrook
- ✓ Middle Earth, Berlin
- ✓ Morin Shoe Store, Berlin
- ✓ Pemi Laundry, Plymouth
- ✓ Ragged Mountain Equipment, Intervale
- ✓ St. Kieran's Art Center, Berlin
- ✓ NH Housing Finance Authority site, Concord
- ✓ Abingdon Square, Goffstown
- ✓ Bicentennial Square, Concord
- ✓ Brook Village North, Nashua
- ✓ Friedman Court, Nashua
- ✓ Lochmere Estates, Tilton
- ✓ Parmenter Place, Concord
- ✓ Pinecrest, Meredith
- ✓ Romano Place, Lebanon
- ✓ Town & Country, Littleton
- ✓ Union Block, Claremont

