



# Case Study

**Project Name:** Nobis Engineering, Concord, NH

**Building Type:** Offices, built in 2000, 12,700 SF; 50 +/- occupants

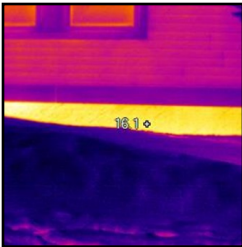
**Overview:** Nobis Engineering contacted RBG in 2014 to solve significant comfort issues in their office building. This employee-owned company has a dedicated team but many complained about temperature and air quality issues. Although they acknowledged that comfort was the driver for investing in their building and the suggested measures reduced unintended air infiltration by 50%, they will also save approximately 20% on their energy bills.

### Problems identified:

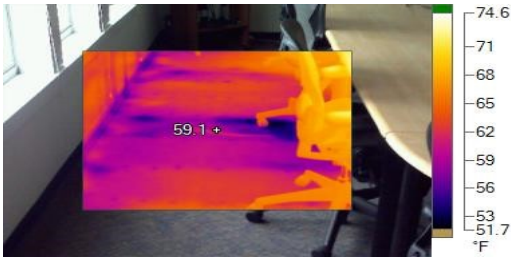
- ✓ Numerous gaps, cracks, openings, and holes in the foundation, sills, walls, doors, and around windows; Stack effect: cold air enters office spaces through gaps and cracks, warm air escapes through the attic;
- ✓ No air barrier in the attic;
- ✓ No air sealing = drafts;
- ✓ Missing insulation in key locations; uninsulated conditioned space
- ✓ Ice damming and icicle buildup, subsequent roof damage;
- ✓ HVAC systems not integrated and controls improperly programmed;
- ✓ Thermostats wired improperly, creating other cascading comfort issues;
- ✓ Structural damage to framing/trusses during original construction;
- ✓ Ventilation system and louvers not operational in some offices.

**Next steps:** RBG oversaw the construction management of the project to address these issues, commissioned the new systems to ensure that they operate as designed, and tracked energy use, temperature, and CO2 levels. Feedback through occupancy surveys and conversations convey a successful project. We will return to Nobis next winter (2016) to verify comfort improvements and energy use reductions.

V3-3/15



Heat (orange) transfers through uninsulated foundation walls and roof soffits. A “stack effect” of warm air moves up and out of the building like a chimney stack. Cold (purple) transfers through uninsulated spaces in the office causing uncomfortable work areas.



# Energy Audit

Assess your building’s potential: save energy and improve comfort

- ✓ Investigate ways to save energy and energy dollars
- ✓ Understand comfort issues that come from energy system related problems = better morale, attendance, productivity
- ✓ Troubleshoot indoor air quality problems, often related to poorly performing energy systems - once solved can reduce drowsiness, smells, VOCs, drafts
- ✓ Determine if systems work as designed and work together
- ✓ Address deferred maintenance and end-of-life equipment
- ✓ Prioritize health and safety issues
- ✓ Investigate renewable energy systems such as solar, wood pellets or wood chips heating systems, or other efficient technologies such as heat pumps, controls, or lighting
- ✓ Create an Energy Audit Report consisting of appropriate energy projects, comprehensive energy and financial models, and guidance for next steps.

**Fixing buildings requires trained professionals, thorough analysis, and a comprehensive approach.**

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Resilient Buildings Group, Inc.  
6 Dixon Avenue, Suite 200  
Concord, NH 03301  
603-226-1009

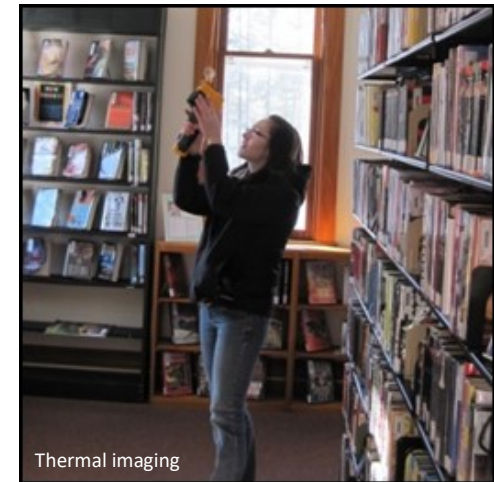
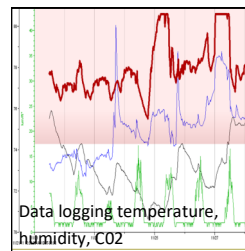
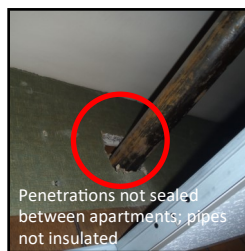
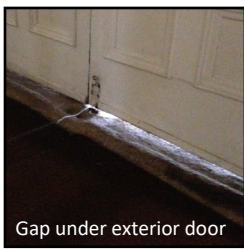


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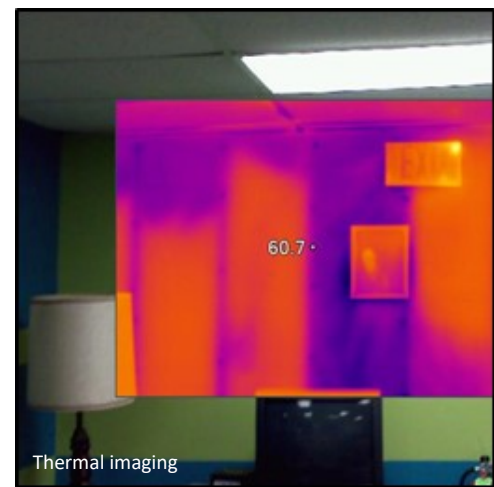
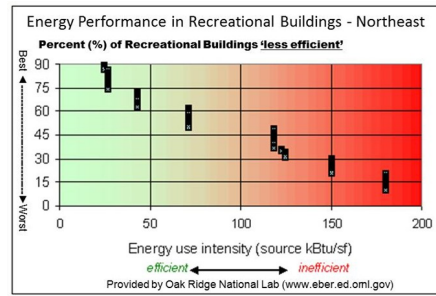
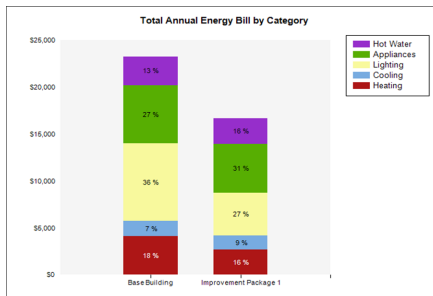
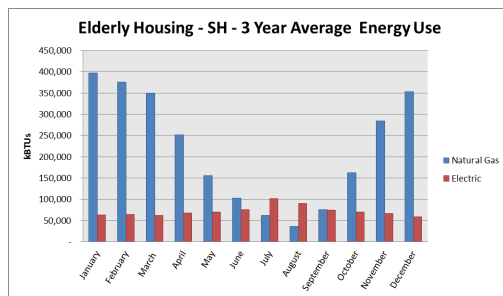
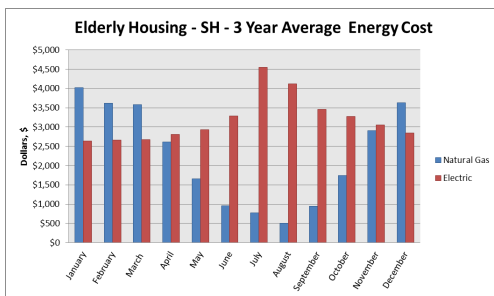
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**An Energy Audit** is a customized assessment, analysis, and action plan that describes current conditions in your building and guides you to make energy and comfort improvements as needed, cost-effective, and desired. We take into account your concerns and wishes for next steps, results from our analysis, energy use, building science, health and safety issues, and our expertise to make your building more cost-efficient, comfortable, safe, and resilient. We analyze your energy bills; use diagnostic tools such as blower door, thermal imaging, and data monitoring equipment; inventory where energy is used in the building; inspect construction, insulation levels and installation techniques; and determine if building management systems and/or controls operate as designed. Our recommendations range from low-cost/no-cost advice to sophisticated upgrades to the building envelope, energy and ventilation systems, and renewable energy systems. Many clients seek our ASHRAE Level 2 audits to qualify for rebates or energy efficiency programs. Our audits can be simple walk-through assessments and benchmarking, single-measure analysis or comprehensive feasibility studies.

**Benchmark:** We compare your energy bills to similar buildings as a first step in our analysis. Benchmarking also helps us understand where and when you use the most energy - electricity versus heating and their costs, and we can then further determine end uses of your energy. Some buildings in NH are so inefficient they are "off the chart".



**Reports:** Once we have a deep understanding of how your building uses energy and where it can be made more efficient, we model the energy and financial savings which helps inform our recommendations for your next steps.

**Financial Model**

**Energy Model**

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- Recent Energy Audits in NH**
- ✓ Nobis Engineering, Concord
  - ✓ Sunrise Towers, Laconia
  - ✓ South Congregational Church, Concord
  - ✓ Technology Education Concepts, Concord
  - ✓ Stafford House, Laconia
  - ✓ Riverbend Community Mental Health, 4 buildings in Concord
  - ✓ Derryfield School, Manchester
  - ✓ Families in Transition, Manchester and Concord
  - ✓ Kidsview Academy, Claremont

