Energy Code Compliance Attribution

National Grid

Quick Facts

Utility: National Grid

States Covered: Massachusetts & Rhode Island

Scope: Residential New Construction, Commercial & Industrial New Construction

Purpose: Increase energy code compliance rates while claiming the resulting energy and cost savings

Code Compliance Support Programs

Building energy codes have received considerable attention because of the highly cost-effective energy saving opportunities they present for utilities and other program administrators (PAs). Planning, implementing, and evaluating code compliance support programs, however, calls for a different framework than traditional widget-based energy efficiency programs. By incentivizing PAs to support energy code compliance and collaborating with them to develop this framework, states can unlock these energy savings.

National Grid's Code Compliance Support Programs

Why was the program introduced? Rising baselines (in the form of advancing codes, standards, and industry practices) that reduce the savings potential and cost-effectiveness of National Grid's traditional efficiency programs drove investigation of new strategies to capture energy savings.

How was the program designed? National Grid modeled its broader codes & standards strategy and compliance methodology on California's principles and launched programs in Rhode Island and Massachusetts This framework is described in NEEP/IMT/EEI's *Attributing Building Energy Code Savings to Energy Efficiency Programs report.*

How do energy savings from this program contribute to National Grid's wider energy efficiency portfolio? As an electric and gas utility, National Grid has portfolio savings goals for both electricity and natural gas. These goals are further divided between the residential and commercial/industrial (C&I) sectors. Savings from code compliance efforts contribute to each of the company's four primary savings categories: residential electric, residential gas, C&I electric, and C&I gas.

How do savings relate to utility energy efficiency plans? Massachusetts and Rhode Island both use three-year periods to plan their energy efficiency efforts. In both states, code compliance savings are projected in advance of each of these three-year periods based on forecasted compliance rates and construction volume. Savings are then claimed annually as forecasted unless the nature of the company's activities or measured outcomes diverge significantly from what was anticipated; in this case, National Grid would need to work with relevant stakeholders to reach an agreement on any adjustments to the planned savings values.

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National Grid's Code Compliance Program: Activites & Initiatives

1. **Training:** Classroom, in-field, webinar
2. **Circuit Rider:** Phone and email support
3. **Stakeholder Engagement:** Building department visits, participation in industry groups
4. **Resource Development and Delivery:** Checklists, field guides, FAQs, bulletins, pocket guides
5. **Third-party compliance support:** Supporting use of third-party specialists in code compliance

Outcome: An increase in Energy Code Compliance Rate

Studies Demonstrating National Grid's Achievements in Increasing Energy Code Compliance Rates:

Massachusetts

- Residential: The code compliance component of this study documents compliance with the energy code for single-family homes built at the end of the 2009 International Energy Conservation Code (IECC) cycle, homes built at the beginning of the 2012 IECC cycle, and homes built under the stretch energy code.
- Commercial: The primary objectives of this study were to assess compliance with the 2012 IECC for new commercial construction in Massachusetts as well as to leverage data collected during the compliance assessment to inform baseline market practices for National Grid's C&I New Construction program. The 2017 Study focused on the review of construction documents from a sample of 39 buildings.

Rhode Island

- Residential: This study included 2017 site visits to 40 new, non-program homes (19 spec- and 21 custom-built) across 27 Rhode Island cities and towns.
- Commercial: The principal research objectives of the 2016 study were to update the overall state-wide compliance rate for Rhode Island commercial buildings provided in the Rhode Island Energy Code Compliance Baseline Study (2012 study)[1], provide feedback on patterns of compliance and non-compliance, and to qualitatively assess the effectiveness of Code Compliance Enhancement Initiative (CCEI)[2] and its influence on changes in compliance.

[1]http://rieermc.ri.gov/wp-content/uploads/2018/03/final-ri-rnc-2011-baseline-report-sent-10-8-12.pdf [2]http://rieermc.ri.gov/wp-content/uploads/2018/03/ri-ccei-attribution-and-savings-final-report-12-12-17-clean.pdf

Evaluation Methodology

First, residential and commercial baseline studies determine the state's code compliance rate while also clarifying the Industry Standard Practice (ISP). This information helps create energy models for a set of prototypes designed to standardize construction across the state. These models compute the average gross technical potential savings from full compliance with the energy code for each prototype.

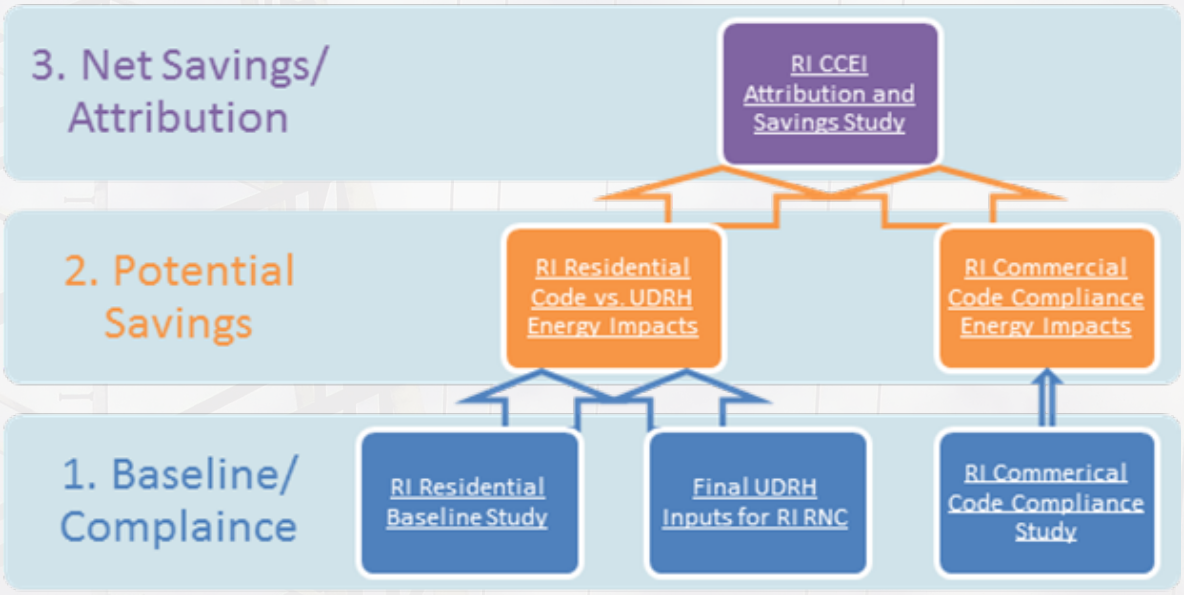
Construction volume projections over the study horizon (2018 – 2020) are used to determine the total gross technical savings potential; i.e. the total energy savings that could be realized by achieving full compliance with the energy code in all new construction projects over this timeframe. In order to convert this figure to net savings, it is reduced to account for factors such as the estimated effectiveness of National Grid's program, the efforts of other entities in improving compliance, naturally occurring market adoption (NOMAD), estimated time lag between the start and end of a construction project, and the realistic improbability of achieving 100 percent compliance.

Attribution is a mechanism for converting gross savings to net savings. Net savings (electric and gas) is one of the most important components of the state energy efficiency plans to which National Grid is legally bound. Regarding energy code support, attribution is the portion of a state's improvement in compliance rate that is due directly to National Grid's efforts. Since compliance changes as a function of time, National Grid's attribution is a different rate every year.

Here is where the approaches taken by the Massachusetts and Rhode Island programs differ. The Rhode Island attribution methodology is a purely analytical approach, while the Massachusetts attribution methodology is a Delphi panel approach. More details are available in the Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study and summarized in this ACEEE Summer Study paper: *Polishing a Hidden Gem: A Novel Evaluation Method for Energy Codes & Standards Programs.*

The output is annual electric & gas net savings data for the residential and commercial sectors for each year of the study horizon. This entire cycle is repeated every 3-5 years in alignment with utility planning and state code adoption cycles.

RI 2018-2020 Savings Quantification Process:



Barriers to Implementation

Quantifying the value of this initiative: Preliminary baseline studies are expensive but necessary to justify these programs.

Evaluating challenges for this long-term initiative: Utility energy efficiency systems and plans are largely built around delivering on annual goals with simple savings calculations (number of units installed times deemed amount of savings per unit). Energy code compliance, on the other hand, is a long-term approach with an indirect and more complex savings calculation.

Utility/Program Administrator staffing: Utility staff are often strictly divided between residential and commercial lines, while larger utilities typically have separate structures for new construction versus existing building initiatives. Utilities that have both electric and gas distribution can divide staffing even further. Energy code compliance cuts across all of these lines, so it can be difficult to identify and allocate resources at a utility/PA. Upon launching its Rhode Island and Massachusetts initiatives, National Grid created a new position whose role includes oversight of all codes & standards programs.

Lessons Learned: Existing Buildings

While National Grid was allowed to claim savings for improving code compliance in existing buildings (i.e. through renovations and retrofits) in the first cycle of programs, it now only claims energy code savings for new construction. This is largely because its baseline, modeling, and attribution studies are focused wholly on the new construction market and analogous data is unavailable or much more difficult to acquire for existing buildings.

This is significant because the estimated code compliance savings potential for existing buildings is much larger than that of new construction. The impact on savings can be seen on the next page.

How Much Savings?

Fuel	Initiative	2014	2015	2016	2017	2018*	2019
Electric (kWH)	R.I. CCEI program	3,048	11,277	19,947	28,442	407	479
	Portfolio	255,319	193,602	199,760	201,347	186,855	194,677
	% of Total	**1.2%**	**5.8%**	**10.0%**	**14.1%**	**0.2%**	**0.2%**
Gas (MMBtu)	CCEI	9,157	36,025	66,810	92,617	1,207	1,519
	Portfolio	329,963	376,963	395,760	414,606	414,795	432,708
	% of Total	**2.8%**	**9.6%**	**16.9%**	**22.3%**	**0.3%**	**0.4%**

**The drop-off from 2018 onwards is due to losing savings from the existing buildings stock.*

This case study was prepared by NEEP with input from National Grid. For more information about energy code compliance savings attribution for utilities, please contact Moses Riley at mriley@neep.org or Kevin Rose at Kevin.Rose@nationalgrid.com.