

## SUMMARY

The overall objective of the studies covered in this report is to provide a residential new construction market assessment to help identify trends and opportunities for energy efficiency in Vermont as well as to establish baselines and equipment saturation levels to inform energy efficiency potential.

This report summarizes the combined findings of a telephone survey of 163 homeowners; on-site audits at 70 homes constructed in 2012 to 2016 across Vermont, of which 47 homes did not participate in Efficiency Vermont or Vermont Gas new construction programs (non-program homes) and 23 homes that did (program homes); in-depth interviews conducted with five retail store managers that sell Heat Pump Water Heaters (HPWH) or Home Energy Management systems (HEMS) in Vermont, four distributors of heating, ventilation and air conditioning (HVAC) equipment providing sales and support throughout Vermont and ten HVAC contractors; and an assessment of code compliance with Vermont's 2011 *Residential Building Energy Standards* (RBES), which went into effect on effective October 1, 2011 for all non-program homes.

The results presented in this report reflect statewide data encompassing all three Vermont Energy Efficiency Utilities (EEUs), which include Efficiency Vermont, Burlington Electric Department, and Vermont Gas Systems. Because sample sizes were much larger for Efficiency Vermont than for either Burlington Electric Department or Vermont Gas Systems, EEU-specific results often emphasize Efficiency Vermont Efficiency Vermont and Vermont Gas Systems cooperate on RNC projects when service territories overlap as do Burlington Electric Department and Vermont Gas Systems.

## HIGHLIGHTS

- For the first time in conducting these periodic market assessment studies, some inspected homes had heat pump water heaters (6 of the 70 homes).
- For the first time, no homes had a tankless coil water heating system.
- For the first time, some inspected homes used either central air source heat pumps (ASHP) or ductless mini-split heat pumps for heating. Auditors found three ASHPs and nine ductless mini-split heat pumps in 12 of the 70 homes. All these heat pumps were ENERGY STAR qualified.
- Use of LED lighting has soared in both program and non-program homes. Overall, the percentage of homes with LEDs rose from 10% in the 2011 study to 87% in the 2015 study.
- For the first time, over one-third (34%) of homes had central air conditioning. This is almost four times the percentages in the 2008 (10%) and 2011 (9%) studies. Also, in the 2015 study almost half (46%) of the homes with central air conditioning had ductless mini-split heat pumps, 3% had air source heat pumps, and 20% had ground source heat pumps, which can provide both heating and cooling. However, in half of these homes the heat pumps were the primary heating system.
- The shift away from using oil for heating continued, dropping to only four percent of homes. This is a dramatic drop from oil being the primary heating fuel in 65% of homes in the 1995 study.
- Heating system efficiencies across the board were high suggesting this market is transformed. Most boilers (68%) had AFUEs greater than 92 and most (90%) were ENERGY STAR qualified, most (93%) natural gas and propane furnaces had AFUEs over

95 and all but one were ENERGY STAR-qualified, and all heat pumps in inspected homes were ENERGY STAR qualified.