ADAPTING TO THE 2018 NORTH CAROLINA ENERGY CONSERVATION CODE:
LESSONS FROM THE HOME ENERGY RATING SYSTEM (HERS) INDEX

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Overview

The Home Energy Rating System (HERS), administered by the Residential Energy Services Network (RESNET), is one of the most popular methods for measuring the energy performance of new and existing homes. Overall, RESNET has audited more than two million houses in the United States, and the detailed data available from these audits provides a snapshot of home energy performance that can be used to better understand the status of energy efficiency and code compliance nationally.

HERS ratings are an especially valuable source of data on construction trends in North Carolina. In 2016 RESNET reported that the state was second only to Texas in the total number of homes rated, and that year the HERS Index was the most common energy performance certification in North Carolina.

As North Carolina adapts to a new residential energy code that went into effect on January 1, 2019, we expect that more homes will demonstrate code compliance by utilizing a new performance pathway, R406: Energy Rating Index (ERI), of which the HERS Index is currently the most established method. Because the HERS Index can now be used to determine code compliance, data from home assessments conducted between 2014 and 2016 is valuable to gauge how prepared the state is to meet this new standard moving forward, as well as what component-level steps builders are taking to meet more flexible ERI thresholds.

Findings

The data shows that homes with a HERS score below the ERI ceiling for their climate zone achieve significant efficiency gains by focusing on components like envelope tightness, high-quality insulation, efficient HVAC systems, and the installation of high-performing windows. The high rate of compliance on component-level code requirements among newly built HERS-rated homes – homes that were built before the 2018 NCECC went into effect – suggests that the state’s builders are well prepared to meet the updated code requirements. Many builders already are, and the 2019 changes will not require radical changes in existing building practices in the North Carolina market.

These is less consistency in homes with HERS scores at the low end of the spectrum, and the closer that homes get to zero energy ready the more varied the pathways that builders are using to get there – a topic that will be explored in a subsequent report.

These findings show that North Carolina has an opportunity to add more stringent energy requirements in future code adoptions without requiring builders to pay more or to radically change existing building practices. The state should particularly consider updating code requirements for the building envelope (ACH50), window standards, and insulation R-value requirements – all of which were being met by a significant proportion of builders even before the current code was in place.
These findings also show that there are still areas where efficiency gains can be made even within the state’s high-performance housing stock. The installation quality for insulation is an area that can be improved across the board through builder and contractor education and outreach. Advanced building technologies like heat pumps and heat pump water heaters are still rare. Yet these technologies offer significant cost and energy savings over standard heat pumps or HVAC equipment and should be incorporated into new homes moving forward. High-efficacy lighting also offers low-hanging fruit that builders can use to make new homes more efficient and appealing to potential homeowners and renters. Finally, builders should expand opportunities for renewable energy generation in new homes, which when combined with energy efficiency can significantly reduce the energy used in the state’s building stock and can equip homes to approach Zero Energy/Zero Energy Ready status.

It is important to note that these results are necessarily skewed toward urban and suburban markets, since HERS-rated homes are more prevalent in these parts of North Carolina. As the state adapts to the 2018 NCECC ERI path, it is likely that this pathway will be less frequently used in rural North Carolina, where the building expertise and HERS raters are not yet as prevalent. As a result, there will likely be a need for outreach to these areas to make sure that builders and others in the industry understand this new ERI pathway and that resources are available to support its use in this region.

Ultimately, the data shows that while the state’s builders are largely prepared to meet the 2018 NCECC, more education and discussion needs to be focused on component-level steps – aside from energy generation – that can be used to reduce the energy used by new homes.

**Recommendations**

Based on this analysis, we have several recommendations to help North Carolina’s builders, policymakers, homeowners, and renters realize the full value of energy efficiency available to them without requiring significant changes in construction practices or occupant behavior:

- Add more stringent efficiency requirements to the state’s energy code in future adoptions in areas with high rates of compliance and market adoption, especially building envelope standards, insulation heat resistance, and window requirements.

- Provide education opportunities for builders and contractors on aspects of the state’s energy code where compliance is low, like the installation of insulation.

- Expand opportunities for the generation of renewable energy in new homes, which when combined with energy efficiency can significantly reduce the energy footprint of the state’s building stock and move efficient homes closer to Zero Energy and/or Zero Energy Ready status.