



2016 North Carolina Energy Efficient, Green and High Performance Home and Building Inventory Report

Prepared for:
**NCBPA Members, Partners and Industry
Stakeholders**

Report Date:
December 4, 2016

TABLE OF CONTENTS

Executive Summary	4
Background	7
2016 Study Results.....	8
Study Data	8
Key Performance Indicators.....	8
NC's Energy Efficient, Green and High Performance Construction Market	8
Certification, Verification and Rating System Growth	9
Residential and Commercial Market Figures	9
NC Metro Area Analysis	9
Leading NC Cities in Non-Metro Areas	11
Certification, Verification and Rating System Results.....	12
Manufactured Home Data	12
NC as a National Leader.....	12
Data Analysis Assumptions	13
Market Drivers.....	14
D1. Builder and Developer Benefits	14
D2. Sales Price and Appraised Value in the Real Estate Market.....	14
D3. Green and Environmentally-Friendly Features.....	15
D4. Comfort and Other Non-Energy Benefits.....	15
D5. Energy Reduction.....	16
D6. Changing Home Buyer Demographics	16
D7. Rebate and Incentive Programs.....	17
Utilities	17
Product & Service Providers	17
Federal, State and Local Governments	17
D8. Value of Third Party Certification and Verification.....	17
D9. North Carolina's Continued Strong Construction Market	19
D10. Market Differentiation	19
D11. Advances to Building and Energy Code.....	19
Market Barriers.....	21
B1. Lack of Consumer Education and Resources	21
B2. Lack of Comparable Home and Building Data	22
B3. Perceived Added Cost.....	22

B4. High Quantity of Certification and Verification Programs	23
B5. Lack of Recognition for Trade Professional Certifications	23
B6. Uncertainty in Building and Energy Codes.....	24
B7. Uncertainty in Available Rebates and Incentives	24
B8. Value Added Propositions.....	24
B9. Low Cost of Energy in NC	26
Market Solutions.....	27
S1. Improve Consumer Education Resources	27
S2. Build Support Amongst Key Stakeholders	28
S3. Workforce Development.....	29
S4. Recognition of Total Cost of Ownership.....	29
S5. Improve Availability of Home and Building Certification Data.....	30
S6. Local Rebate and Incentive Programs.....	30
S7. Invest in New Technologies.....	31
S8. Increase Consumer and Vendor Access to Utility Usage Data.....	31
S9. Improve Building and Energy Code Requirements and Options.....	31
S10. Create Innovative Financing Programs	32
Improving Market Valuation.....	32
S11. Document and Communicate Features Using Consistent, Data-Driven and Standardized Methods ...	32
S12: Provide Visibility and Tracking of Inventories.....	33
S13: Offer Focused Continuing Education Opportunities	33
S14: Green North Carolina's MLS Directories	34
S15: Incorporate Data Into Sales and Appraisal Process.....	34
S16: Develop Automated Systems Integrations	34
S17. Ensure Selection of Qualified Appraisers	35
S18: Engage Lending Community.....	35
S19. Pilot Improvement Projects with Local Stakeholders	36
Actionable Steps to Increase Consumer Demand	37
Summary of Consumer Demand Drivers, Barriers and Solutions	37
Stakeholder Support Needed for Implementing Solutions.....	39
Data Tables	41
References.....	44
For More Information.....	47

EXECUTIVE SUMMARY

North Carolina Building Performance Association's (NCBPA) 2016 study identified 180,640 energy efficient, green and high performance homes and buildings as being built or retrofitted in the state from 2007 to 2015. In the second year of this first-of-a-kind study, the association believes that this volume places North Carolina in the top five states nationally for energy efficient, green and high performance construction volume and saturation.

To perform the study, NCBPA collected and analyzed data from third party certification and verification program providers, contractors, builders and others:

- 94,609 individual data points were collected and analyzed over a five-month period in 2016.
- Address-level data was requested from 36 different energy efficient, green and high performance home and building certification, verification and rating programs active in North Carolina.

The study's 2015 results demonstrate that North Carolina remains a national leader in the construction of energy efficient, green and high performance homes and buildings:

- The study identified 39,110 units as being built or retrofitted in 2015, which equates to nearly 63% of the roughly 62,000 new and existing units built or retrofitted in the state during the year.
- Beginning in 2007, North Carolina has experienced an annual increase in the number of units reported. However, 2015 was the first year of lower total units reported, down 1,354 (~3%) from the 2014 peak of 40,464 units.

Certification, verification and rating programs focusing on energy efficient homes and buildings make up the vast majority of overall program participation:

- In 2015, nearly 25 percent of all new residential homes received a Home Energy Rater System (HERS) Score.
- Also in 2015, the metro areas of Asheville, Greensboro and Raleigh each increased their number of units from the previous year, while Charlotte, Wilmington, Fayetteville and Jacksonville each decreased.

The residential single family market remained strong in 2015, while the commercial market continued a downward trend:

- 38,067 total residential units were reported in 2015, which amounts to roughly 61% of total units built or retrofitted in the market
- 2,450 multifamily units were reported in 2015, accounting for 6.9% of the total residential units.
- 105 commercial buildings were reported as being built or retrofitted to energy efficient, green or high performance standards in 2015.
 - This decrease continues a downward trend from a peak of 279 reported buildings in 2012.
 - Of the buildings reported since 2007, LEED accounts for 723 or 44% and ENERGY STAR accounts for 903 or 55%.
 - No ENERGY STAR commercial buildings data was collected in 2015 (which may indicate a reporting error), whereas 70 were reported in 2014 and 95 in 2013.

The study defined seven distinct metro areas across the state to analyze these markets more closely:

- The Raleigh market (including Durham, Chapel Hill and surrounding areas) leads the way in total units built or retrofitted since 2007 with 56,078 or 39% of the total units reported in the overall metro areas.
- The metro Charlotte market places second with 43,997 or 31% and has a higher concentration of commercial and multifamily buildings than the Raleigh market, which is most strong in residential single family.
- Greensboro and Wilmington placed third and fourth with 9,250 and 9,169 respectively. Asheville, Fayetteville and Jacksonville each follow.

In addition to these seven metro areas, the top ten cities by number of total units that were not included by NCBPA in the study's defined metro areas were reviewed more closely:

- Concord, a suburb of Charlotte, is the non-metro area city with the most total units at 5,744 since 2007.
- Waxhaw and Mooresville, also suburbs of Charlotte, placed second and third with 3,737 and 2,856 units respectively.
- Raleigh suburbs Holly Springs, Mebane and Pittsboro followed with 2,400, 1,546 and 1,112 units respectively.
- Sanford, Davidson, Hampstead and White Oak make up the remaining top ten cities for reported data.

Of the program data reported, ENERGY STAR certifications for new and existing homes and buildings continue to lead the way in North Carolina:

- Of all units reported since 2007, ENERGY STAR certifications account for 77,800 or 43% of the total.
- HERS Ratings place second overall at 67,204 or 37%.
 - However, this data is known to be roughly 25% overstated due to a lack of address-level data provided by the primary data source (RESNET) that results in duplicate units reported.
 - RESNET reports 12,757 HERS Ratings for North Carolina in 2015 (third most in the country) while the study's data shows a total of 17,765.
- The National Green Building Standard's (NGBS) single and multifamily residential green building certification places third overall. North Carolina was the third highest certifier in the country in 2015.
- Southern Energy Management's ecoSelect residential green building program was included this year for the first time and places fourth overall.

Similar to the 2015 study, NCBPA collected partial data for manufactured homes and segmented this category from residential single and multifamily data due to the unreliability of the total units reported.

- Manufactured homes account for 3,778 of total units reported since 2007.

Results of the study will be used by NCBPA, its members and partners to push for continued growth and development in North Carolina's energy efficiency, green and high performance construction market for new and existing residential and commercial buildings. Specifically, aggregate and address-level (if authorized by the providers) will be used on a variety of key market development initiatives that include:

1. Developing a prototype cloud-based database that stores valuable data on North Carolina's energy efficient, green and high performance homes and buildings that can automatically populate Multiple Listing Service (MLS) databases, providing better data for the real estate buying and selling, appraisal and lending processes that is also more accurate and timely than manual entry from real estate agents, appraisers and others.

2. Working with communities, utilities, consumer groups and other industry stakeholders across the state to develop resources, programs and educational campaigns to increase the awareness, support and participation in North Carolina's energy efficient, green and high performance construction market.
3. Promoting the strengths of North Carolina's energy efficient, green and high performance home and building markets to local, state and national policy makers, product and service providers, consumer and business groups, and others to bring more project investment, jobs and resources to the state.

Please continue reading this report for a detailed listing of market drivers, barriers and solutions that can be addressed by industry stakeholders using data collected in this study.

NCBPA would like to thank the nearly 40 organizations that provided data for this study.

NCBPA would also like to thank Peter Magner for collecting, analyzing and reporting on the data during a summer 2016 internship with NCBPA.

Please contact NCBPA's Executive Director Ryan Miller at 919-841-6207 or Ryan@BuildingNC.org for questions, comments or more information on the study.

BACKGROUND

In 2015, NCBPA completed a first-of-its-kind market study to inventory as many of a state's energy efficient, green and high performance homes and buildings as possible for the purposes of better understanding the quantity of units in North Carolina, defining areas of strong and weak saturation, and increasing engagement from industry stakeholders seeking to increase the number of units being built and retrofitted in the state.

Results from the 2015 study, performed with UNC Charlotte's [Energy Production and Infrastructure Center \(EPIC\)](#) resulted in the identification of more than 122,000 North Carolina homes and buildings built or retrofitted since 2007 as being energy efficient, green or high performance through primarily third party energy efficiency and green building certification programs and rating systems.

NCBPA presented this information to the national construction industry to bring recognition to North Carolina's strong industry while also promoting the significant opportunities available to the market in "greening" the MLS directories to create a comparables market for these homes and buildings. In doing so, consumers (homeowners and building owners) would have more visible and accurate data on the availability and value of these homes and buildings, resulting in increased interest, increased sales prices and increased appraised values.

Over the summer of 2016, NCBPA completed a second annual industry survey using the same data collection methodology that incorporates raw data collected from local, state and national energy efficiency, green and high performance certification and verification programs, builders and developers, home energy raters and many others to compile an updated database of units built or retrofitted in North Carolina since approximately 2007. New data from more sources identified more than 55,000 more energy efficient, green and high performance residential and commercial units built or retrofitted between 2007 to 2014 and now including 2015.

Because the study is in just its second year some of the data is not reliable, some duplicates exist and address-level detail is needed to verify the data provided. As such, this study should be considered an estimate of the actual unit inventory in North Carolina, and provide reason for increased availability and transparency of data to support industry growth and development. NCBPA estimates that up to 15% of the total number of units believed to be energy efficient, green or high performance may be duplicates. However, with only a portion of programs and data owners reporting data, the 15% could easily be made up for with valid data not yet provided for the study.

NCBPA is working to obtain more accurate address-level data from the many sources involved to improve accuracy in next year's study.

2016 STUDY RESULTS

The 2016 study demonstrates continued strength for North Carolina's energy efficient, green and high performance home and building industry. Certification and verification programs, energy ratings and other measures of these types of homes and buildings continue to increase in size and popularity, despite a slightly lower number of total units in 2015 compared to 2014.

STUDY DATA

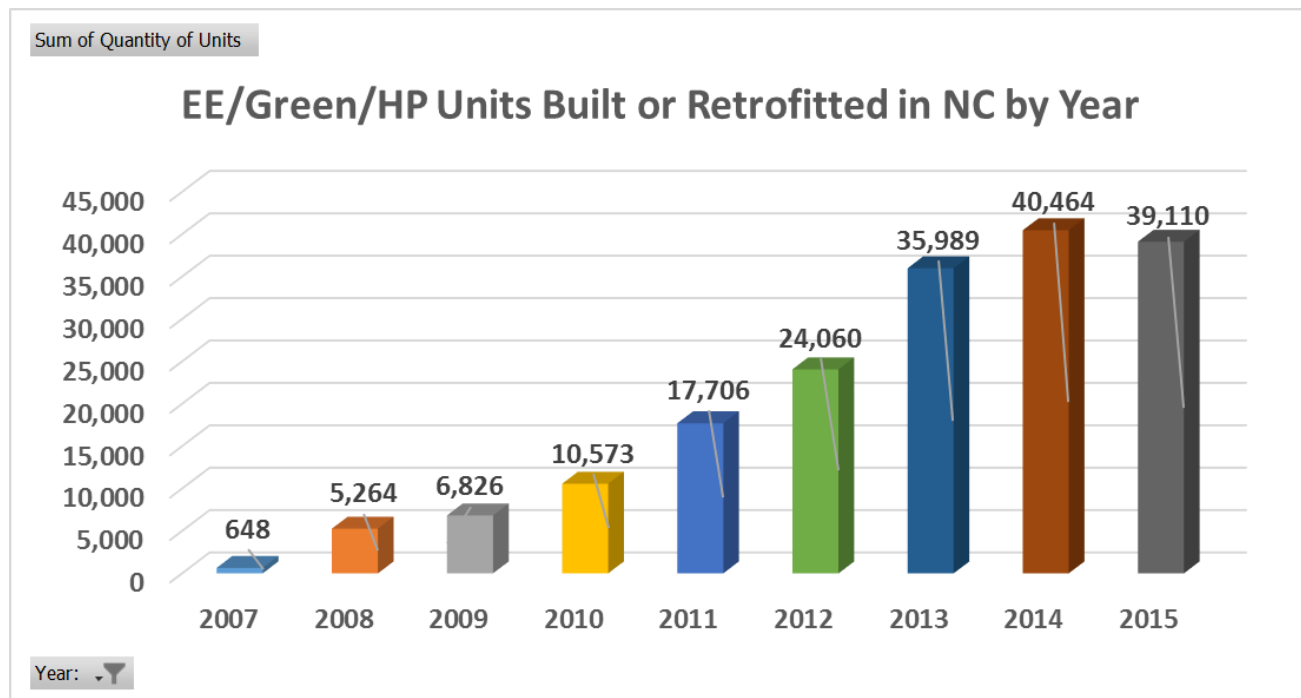
- The 2016 study identified 180,640 energy efficient, green and high performance homes and buildings built or retrofitted in the state from 2007 to 2015.
- 94,609 individual data points were collected and analyzed over a five-month period in 2016.
- 36 different energy efficient, green and high performance home and building certification, verification and rating programs active in North Carolina were contacted for data.

KEY PERFORMANCE INDICATORS

Provided below are key performance indicators, charts and tables that detail the quantities, metro locations, building types, verification types and other measurements of North Carolina's energy efficient, green and high performance homes and buildings built or retrofitted in the state between 2007 to 2015 that were collected through this study.

NC'S ENERGY EFFICIENT, GREEN AND HIGH PERFORMANCE CONSTRUCTION MARKET

- The study identified 39,110 units as being built or retrofitted in 2015, which equates to nearly 63% of the roughly 62,000 new and existing units built or retrofitted in the state during the year.
- Beginning in 2007, North Carolina has experienced an annual increase in the number of units reported. However, 2015 was the first year of lower total units reported, down 1,354 (~3%) from the 2014 peak of 40,464 units.

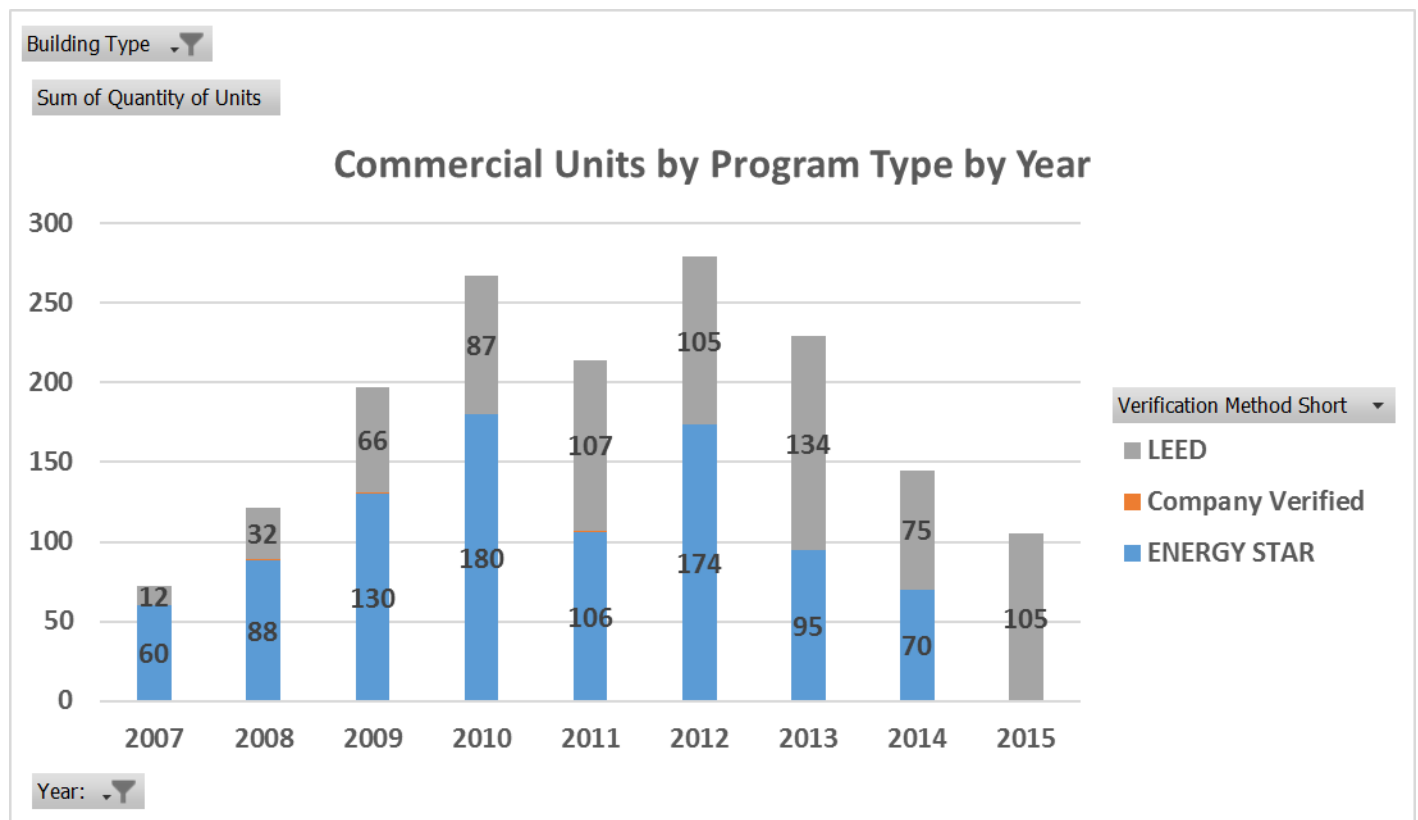


CERTIFICATION, VERIFICATION AND RATING SYSTEM GROWTH

- In 2015, nearly 25 percent of all new residential homes received a Home Energy Rater System (HERS) Score.
- Also in 2015, the metro areas of Asheville, Greensboro and Raleigh each increased their number of units from the previous year, while Charlotte, Wilmington, Fayetteville and Jacksonville each decreased.

RESIDENTIAL AND COMMERCIAL MARKET FIGURES

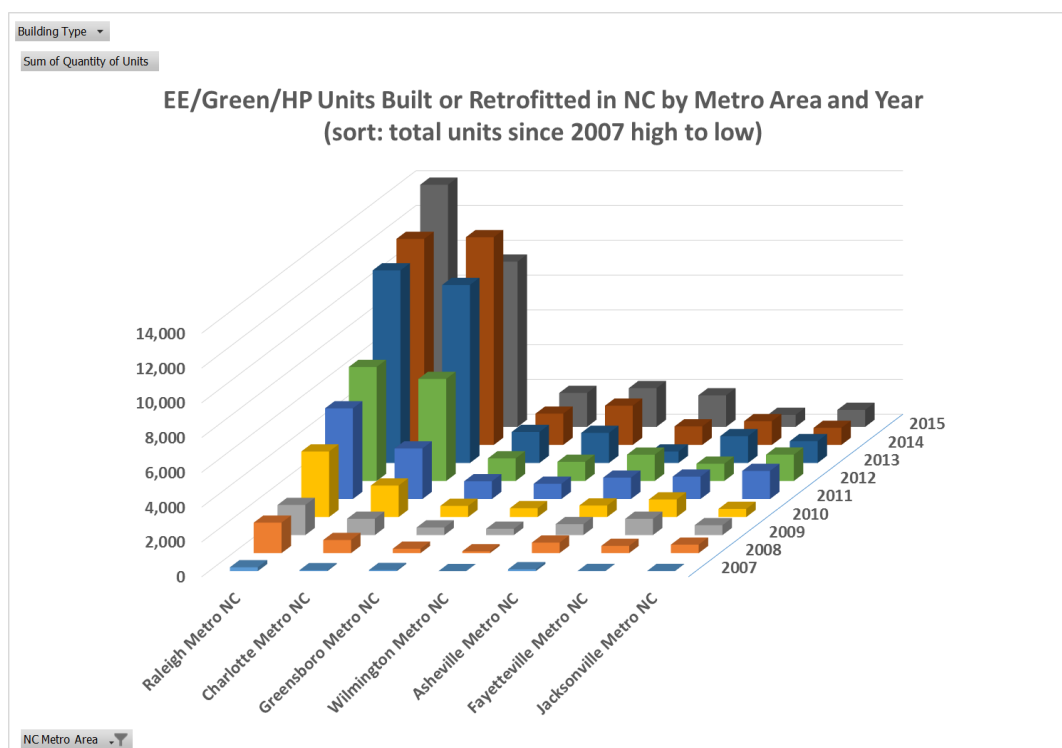
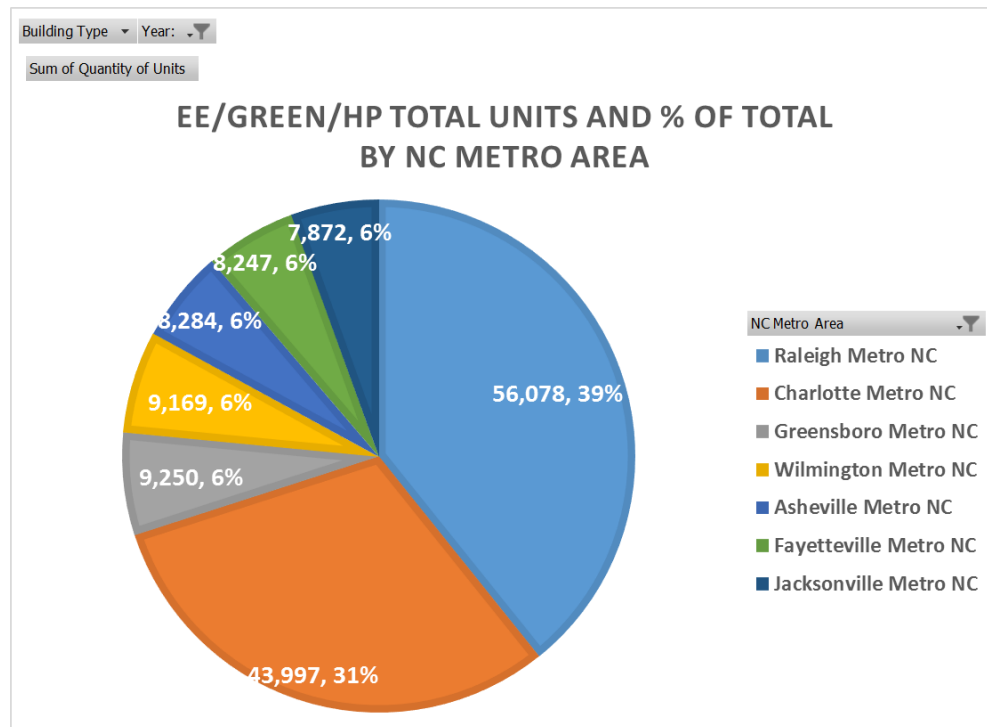
- 38,067 total residential units were reported in 2015, which amounts to roughly 61% of total units built or retrofitted in the market
- 2,450 multifamily units were reported in 2015, accounting for 6.9% of the total residential units.
- 105 commercial buildings were reported as being built or retrofitted to energy efficient, green or high performance standards in 2015.
 - This decrease continues a downward trend from a peak of 279 reported buildings in 2012.
 - Of the buildings reported since 2007, LEED accounts for 723 or 44% and ENERGY STAR accounts for 903 or 55%.
 - No ENERGY STAR commercial buildings data was collected in 2015 (which may indicate a reporting error), whereas 70 were reported in 2014 and 95 in 2013.

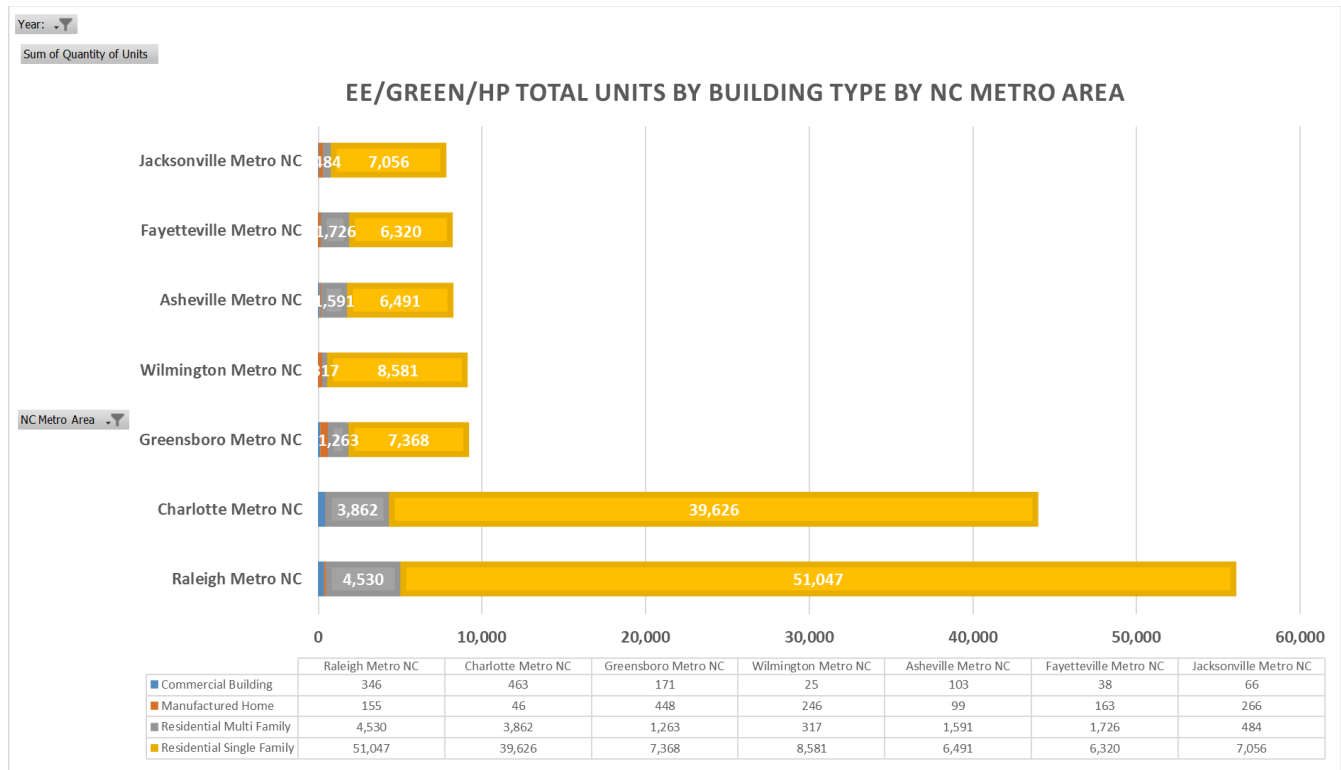


NC METRO AREA ANALYSIS

- The Raleigh market (including Durham, Chapel Hill and surrounding areas) leads the way in total units built or retrofitted since 2007 with 56,078 or 39% of the total units reported in the overall metro areas.

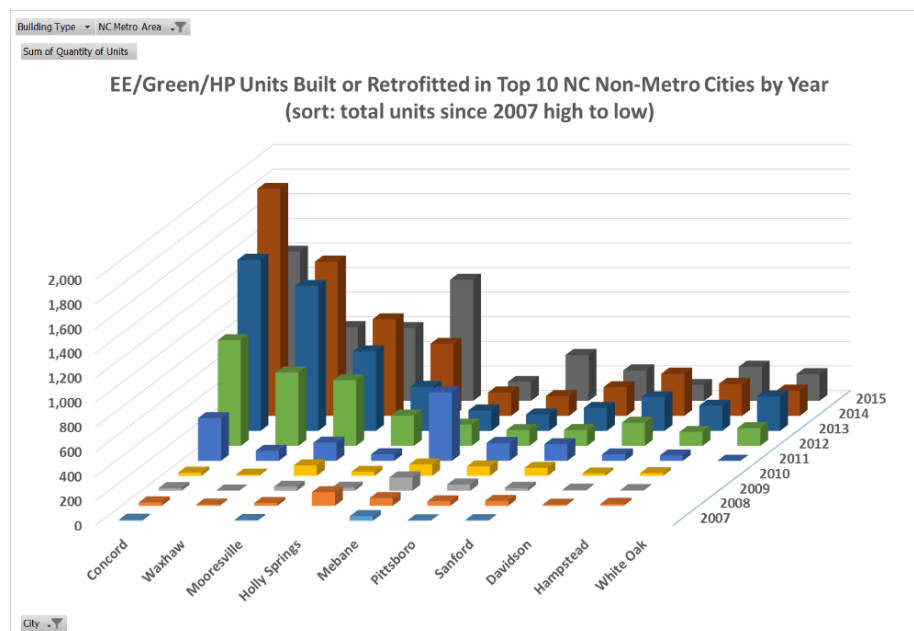
- The metro Charlotte market places second with 43,997 or 31% and has a higher concentration of commercial and multifamily buildings than the Raleigh market, which is most strong in residential single family.
- Greensboro and Wilmington placed third and fourth with 9,250 and 9,169 respectively. Asheville, Fayetteville and Jacksonville each follow.

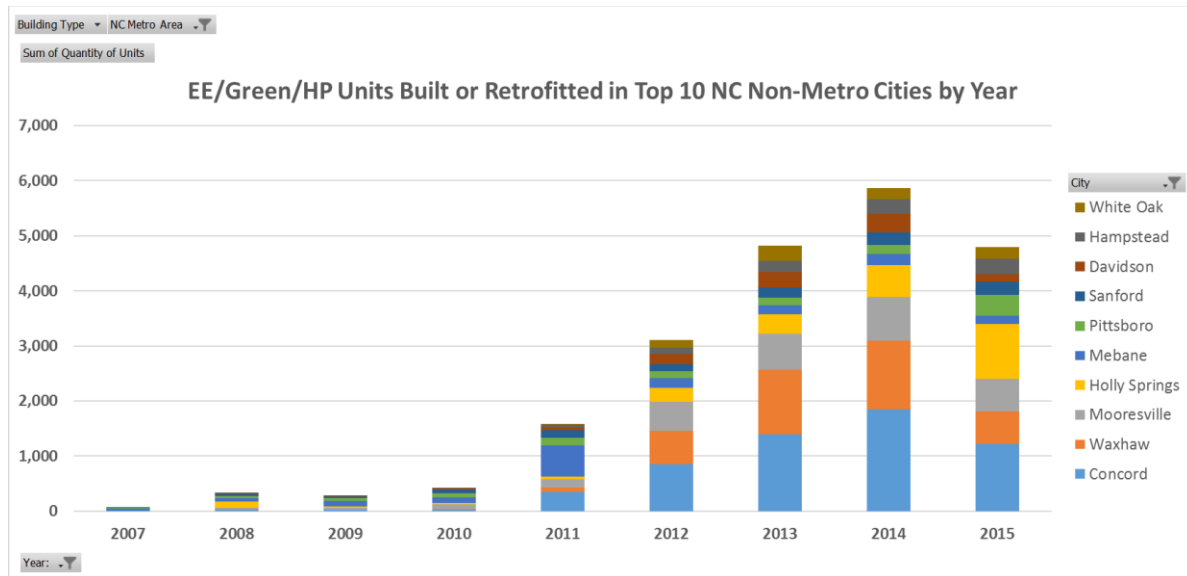




LEADING NC CITIES IN NON-METRO AREAS

- Concord, a suburb of Charlotte, is the non-metro area city with the most total units at 5,744 since 2007.
- Waxhaw and Mooresville, also suburbs of Charlotte, placed second and third with 3,737 and 2,856 units respectively.
- Raleigh suburbs Holly Springs, Mebane and Pittsboro followed with 2,400, 1,546 and 1,112 units respectively.
- Sanford, Davidson, Hampstead and White Oak make up the remaining top ten cities for reported data.





CERTIFICATION, VERIFICATION AND RATING SYSTEM RESULTS

- Of all units reported since 2007, ENERGY STAR certifications account for 77,800 or 43% of the total.
- HERS Ratings place second overall at 67,204 or 37%.
 - However, this data is known to be roughly 25% overstated due to a lack of address-level data provided by the primary data source (RESNET) that results in duplicate units reported.
 - RESNET reports 12,757 HERS Ratings for North Carolina in 2015 (third most in the country) while the study's data shows a total of 17,765.
- The National Green Building Standard's (NGBS) single and multifamily residential green building certification places third overall. North Carolina was the third highest certifier in the country in 2015.
- Southern Energy Management's ecoSelect residential green building program was included this year for the first time and places fourth overall.

MANUFACTURED HOME DATA

- Manufactured homes account for 3,778 of total units reported since 2007.

NC AS A NATIONAL LEADER

- Compared to all other states in 2015, North Carolina ranked:
 - Third in the number of [ENERGY STAR new home certifications completed](#).
 - Third in the number of [residential HERS Ratings](#).
 - Third in the number of residential [NGBS certifications](#).
- Within ENERGY STAR's ranking of states by market penetration, North Carolina ranked seventh with 15.35 percent market penetration as compared with the overall ENERGY STAR national market penetration of 9.74 percent (EPA, 2016).
- In 2013, USGBC recognized North Carolina as a national leader with its 133 completed commercial projects representing 17 million square feet of real estate making it seventh highest in the nation for LEED building (USGBC, 2013).
 - In 2015, North Carolina fell to 11th place nationally in LEED-certified buildings.

DATA ANALYSIS ASSUMPTIONS

As this study is in just its second year with limited data and known duplicates, a variety of assumptions were made in identifying energy efficient, green and high performance homes and buildings. Provided below are key assumptions used in the study:

- 38,067 residential energy efficient units built or retrofitted in 2015 would equate to roughly 69 percent of all new units built in the state. NCBPA believes this number is overestimated due to assumed duplicates in the data set, but chose not to modify the data as there is no clear way to choose which units to remove improve accuracy.
- There is no single number that denotes an energy efficient home based purely on a HERS Score. Code minimums, model homes and other factors are debatable. As such, all homes with a HERS Rating were included. NCBPA identified just 30 homes with a HERS rating over 85 and chose to include them in the data set.
- NCBPA considers manufactured housing units as its own category, not residential, as NCBPA has not sufficiently collected and analyzed available manufactured housing data to compare with the energy efficient units reported.
- All homes and buildings collected from energy efficient, green or high performance home and building certifications, verifications and rating systems submitted were included and accounted for as “units”.

MARKET DRIVERS

NCBPA regularly polls its member companies and partner organizations across the state and country to gain insight into the market drivers for home and building owners, builders and developers, and others for building or retrofitting homes and buildings to energy efficient, green or high performance standards.

Provided below are a selection of common market drivers reported to NCBPA in 2016.

D1. BUILDER AND DEVELOPER BENEFITS

North Carolina builders and developers have many reasons to build energy efficient, green and high performance homes and buildings, but it is challenging to narrowly define one, two or even three primary reasons for doing so. Some builders and developers do so to gain a marketing edge, while others seek third party verification that their project meets stringent criteria that should result in higher sales prices and appraised values upon completion.

In early November of 2016, NCBPA informally surveyed a group of residential green builders in the Raleigh, NC market and received wide-ranging responses to the question of why they build these types of homes. Responses included:

- “Because the consumer asked for it.”
- “Because it’s the only kind of home I build.”
- “Because of marketing purposes.”
- “Because I want to build environmentally-friendly homes.”
- “Because I was already building a good home so I might as well get a certification.”
- “Because I receive utility and product rebates if I do it.”

The vast differences in these responses amongst a small, close-knit group of residential green builders demonstrate that the motivations for building energy efficient, green and high performance homes vary tremendously. Efforts to motivate and influence builders and developers to continue to, or begin to, build better homes and buildings must start with a wide offering of the many varieties of tangible benefits to doing so. For commercial buildings, [efforts have been made in distinct markets including Charlotte](#) to require green building certifications for various building and site types: institutional, governmental, etc.

As it is difficult to narrow the reasons of why *most* builders and developers build to these higher standards, NCBPA’s study focuses on reporting the *actual* qualifications for energy efficient, green and high performance homes and buildings while providing recommendations for improving many of the more common reasons – increased sales price, higher appraised value, improved customer satisfaction, etc. – that builders and developers, homeowners and building owners, and many others choose to build to these standards.

D2. SALES PRICE AND APPRAISED VALUE IN THE REAL ESTATE MARKET

As an existing national leader in the energy efficient, green and high performance home and building construction market, North Carolina industry stakeholders continue to make strides in transforming the state’s real estate market into one that readily and accurately recognizes and promotes the value of energy efficient homes and buildings that incorporate green and high performance features, occupant comfort and safety, and monetary savings. Thousands of realtors, appraisers and lenders across the state have been trained on the value of energy efficient homes and buildings over the past several years. Efforts are currently underway in several

cities, including Asheville, to provide more continuing education opportunities to these stakeholders to support their role in properly valuing these types of homes and buildings.

No matter what the motivation is for a realtor, appraiser or lender to learn more, two factors play significant roles in adding credibility and market-based value to building to these standards: increased sales prices for home and building owners and developers, and increased appraisal values as a result of better construction techniques, design features and total cost of ownership of these energy efficient, green and high performance homes and buildings.

Improving the transparency, accuracy and usefulness of needed (readily available) data on these homes and buildings remains an essential step in clearly communicating, measuring and increasing the market value and benefits to companies and organizations that play a role in this process (real estate agents, appraisers, lenders, builders and developers, buyers and sellers, and others). Doing so leads to increased sales prices and appraised values for the home and building owners and improved profits for the others involved.

D3. GREEN AND ENVIRONMENTALLY-FRIENDLY FEATURES

The top reasons for increased *green building* activity nationally include consumer demand, energy cost increases, green product availability and affordability, recognition by appraisers of greater value in green homes and code requirements, ordinance and regulation changes (Dodge Data & Analytics, 2016). Other factors include a desire for higher quality homes and buildings, meeting changing codes and local building ordinances, improved occupancy rates and incentives from utilities and government entities.

Green-built spaces are environmentally responsible — they use less energy and water resources, save money for families, businesses and taxpayers, reduce carbon emissions and promote a cleaner environment. Certified new green homes generally include features that allow them to be 20 to 30 percent more energy efficient than standard homes resulting in savings of \$300 to \$500 or more per year on heating, cooling and water bills. They increasingly feature characteristics focusing on performance such as effective insulation, efficient windows, tight building envelopes and duct systems, and efficient equipment and appliances.

According to the World Green Building Trends 2016 SmartMarket Report, the global green building sector continues to double every three years (Dodge Data & Analytics, 2016). U.S. contractors lead, exceeding contractors outside the country in green building (Jones & Laquidara, 2016). For example, 21 percent of contractors in the U.S. report that more than 60 percent of their projects are green, compared to just 10 percent outside the country.

In North Carolina, there is strong consumer understanding for the benefits of green building, particularly in metro markets like Asheville with a very high saturation of green homes and buildings. But, there is a significant gap in statewide efforts to educate and connect home owners, building owners and related trades to opportunities to participate in energy efficient, green and high performance home and building construction. By in large part, the majority of green building activity, past and present, in North Carolina is the result of countless hours of community-based green building advocacy, local incentives and educational programs.

D4. COMFORT AND OTHER NON-ENERGY BENEFITS

Along with cutting down on utility costs, energy efficient, green and high performance homes and buildings come with other benefits including a quieter, more comfortable, more safe and healthier living or working space. Such homes and buildings tend to experience less dust, drafts and issues with pest infiltration. Improved air quality

allows for healthier occupants and less maintenance costs. Other features often include water conservation products and practices, recycling, materials conservation, sustainable landscaping and environmentally-mindful low impact development.

Referring again to the multiple different reasons that builders and developers, homeowners and building owners, and others participate in energy efficient, green and high performance construction, the prevailing recommendation of marketing and selling the benefits of these types of homes and buildings is to start wide – communicate the many different benefits available – and then narrow the conversation to the areas most important to the target consumer. Some consumers will respond more favorably to environmental benefits, while others are interested in lower utility bill expenditures.

D5. ENERGY REDUCTION

Residential and commercial buildings represent approximately 41 percent of total U.S. energy consumption with U.S. households spending \$230 billion each year on energy (IMT, 2015). Implementation of energy saving improvements in these units of 20 percent would result in potential annual energy savings worth \$46 billion (EIA, 2014). Improvements that offer these savings include highly efficient and properly-sized heating and air equipment, efficient water heating equipment, energy efficient appliances and lighting, and exceeding code minimums for insulation, windows and other building envelope requirements.

Lowering the monthly energy bills of North Carolina homes and buildings are not just advantageous for consumers, but also for the state's utilities. Duke Energy, for example, has long offered energy efficiency programs, rebates and incentives for homes and buildings that help reduce the utility's electricity generation needs during peak seasons. In reducing these peak loads, the utility lessens the need for further investment in new generation sources such as coal and natural gas power plants and higher operating expenses for current generation sources. Duke Energy, a regulated investor-owned utility, is also required to invest in energy efficiency and renewable energy capacity through the state legislated [Renewable Energy and Energy Efficiency Portfolio Standard](#) (REPS), which requires the utility to meet up to 12.5% of their energy needs through renewable energy resources or energy efficiency measures.

While Duke Energy as an investor-owned utility is incentivized through various means to invest in energy efficiency programs, rebates and incentives, other utilities in the state including electric cooperatives and municipal utilities lack incentives (rural electric cooperatives and municipal electric suppliers are subject to a 10% REPS requirement). Utility and market-based programs in non-Duke Energy territories must have clear benefits to their own business models in order to support energy efficiency programs and incentives.

D6. CHANGING HOME BUYER DEMOGRAPHICS

While the benefits of construction practices for energy efficient, green and high performance homes and buildings have been known for decades and change relatively slowly in the marketplace, the demographics of individuals and companies buying or renting these homes and buildings are changing quickly in today's market. As more millennials enter the home buying market and seek out workspaces offering modern design, improved air quality and green features, the housing and building markets are responding.

Dodge Data & Analytics found that homebuyers older than 55 years of age are the demographic most influences by homes that are energy efficient, offer a healthier indoor living environment or that are durable/resilient (Dodge, 2015). A recent study by the National Association of Home Builders found that on average consumers would pay an additional \$10,732 in energy efficiency improvements to save \$1,000 per year on utilities (Smith,

2016). With a strong business economy and diverse metro areas (mountains to sea), North Carolina's energy efficient, green and high performance construction industry must direct marketing efforts to these demographics and others.

D7. REBATE AND INCENTIVE PROGRAMS

Rebate and incentive programs are used by utilities, local, state and federal government entities, nonprofit advocacy groups and others to push financial and other benefits to homeowners, renters and building owners to participate in energy efficient, green and high performance home and building construction. Additionally, product manufacturers and suppliers, service providers, builders and developers, and others offer or receive rebates and incentives to further encourage widespread acceptance and participation of constructing homes and buildings with these features.

UTILITIES

North Carolina's largest investor-owned utility Duke Energy is the largest provider of rebates and incentives for energy efficient homes and buildings in the state. The utility offers a variety of new and existing home and building rebate and incentive programs that provide financial benefits to builders and developers, contractors, home and building owners to make their homes and buildings energy efficient. Through these programs, Duke Energy has invested hundreds of millions of dollars into energy saving initiatives that incent these and other stakeholders to lower the energy usage of the homes and buildings they live or work in.

Of particular note, Duke Energy's [Residential New Construction Program](#) available in the legacy Progress Energy territory (and in the legacy Carolinas territory in the near future) provides up to \$9,000 in rebates to builders of above energy code homes. The utility, and some others including electric cooperatives and municipal utilities, offer free energy audits and energy saving upgrades in existing homes and buildings. Financial incentives like these can be drivers for builders and developers to build and retrofit energy efficient homes.

PRODUCT & SERVICE PROVIDERS

Product manufacturers, suppliers and service providers continue to offer builders and developers, contractors, home and building owners financial and other incentives to purchase and install energy efficient, green and high performance products and services in homes and buildings across the state. In doing so, they are providing an upfront financial benefit to these stakeholders with the hopes of earning repeat business from the consumer and their future projects. Search for product and service provider energy efficiency rebates on [the ENERGY STAR program's website](#).

FEDERAL, STATE AND LOCAL GOVERNMENTS

With the 2015 loss of North Carolina's [Renewable Energy Investment Tax Credit](#) that offered a 30 percent tax credit on renewable energy projects (note: a safe harbor provision is in effect through 12/31/16), our state has seen a dramatic drop in the installation of renewable energy and clean energy technologies at the non-utility scale. Additionally, the forecasted loss of [the federal 30 percent geothermal tax credit](#) at the end of 2016 will further deter builders and home owners from installing energy saving technologies like geothermal heating and cooling systems beginning in 2017. The [NC Clean Energy Technology Center](#) administers the [Database of State Incentives for Renewable Energy \(DSIRE\)](#) that lists available incentives for energy saving technologies across the country that continues to be a valued resource for finding rebate and incentive programs. Additionally, [the Department of Energy](#) lists a variety of tax credit, rebate and financing options available at the federal level.

D8. VALUE OF THIRD PARTY CERTIFICATION AND VERIFICATION

North Carolina is home to 36 different active third party certification and verification programs for energy efficient, green and high performance homes and buildings. These programs accelerate market adoption of energy efficiency, green and high performance measures by providing a yardstick for comparing better homes and buildings to those without the upgraded features and benefits. The large quantity of available programs in North Carolina provides consumers, builders, utilities and others with many options for building better homes and buildings, but also creates confusion in the market by the many varying choices.

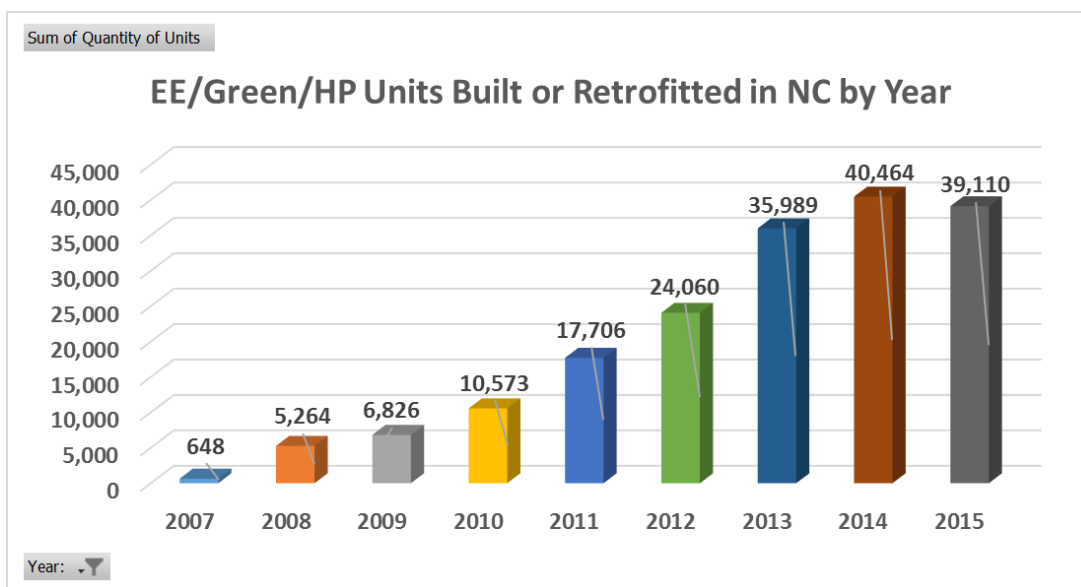
Notwithstanding, the value of these programs is rooted in third party certified and verified construction specifications, code requirements and more that offer a variety of benefits to various stakeholder groups.

- Home and building owners value a label on the home detailing its above-code features (even if they don't necessarily recognize the brand) that offer a variety of environmental, comfort, monetary and other savings.
- Builders and developers value the third party assistance required by many programs that helps ensure that the builder or developer's investment in energy efficient, green or high performance design, products and features result in tangible benefits, financial and otherwise, at the completion of their projects.
- Realtors, appraisers and lenders value industry-approved and recognized labels that denote higher market values and lower mortgage default risks than code-built homes and buildings.

In 2015, North Carolina ranked third among U.S. states in the number of [ENERGY STAR new home certifications completed](#), [third in residential HERS Ratings](#) and [third in NGBS certifications](#). Within ENERGY STAR's ranking of states by market penetration, North Carolina ranked seventh with 15.35 percent market penetration as compared with the overall ENERGY STAR national market penetration of 9.74 percent (EPA, 2016).

In 2013, USGBC recognized North Carolina as a national leader with its 133 completed commercial projects representing 17 million square feet of real estate making it seventh highest in the nation for LEED building (USGBC, 2013). In 2015, North Carolina fell from the top 10 list with a continued decline in LEED-certified buildings.

As shown below, North Carolina's construction industry has progressively increased the quantity of energy efficient, green and high performance homes and buildings from 2007 to 2014, with a slight decrease in 2015.



D9. NORTH CAROLINA'S CONTINUED STRONG CONSTRUCTION MARKET

North Carolina's growing reputation as a leader in energy efficient, green and high performance homes and buildings is due in large part to strong uptake of these types of units in a continually strong construction market.

- 53,212 new residential construction permits were filed in 2015, of which 37,465 were single-family and 16,047 were multi-family.
- The city of Charlotte, the state's leader in commercial construction activity, recorded 4,216 commercial building permits in the first three quarters of 2016, representing a 65% jump from the same time period last year.
- North Carolina is home to nearly 60 HERS Rating companies covering approximately 90 percent of municipalities across the state and employ around 200 field raters and inspectors.

D10. MARKET DIFFERENTIATION

The national real estate market crash in 2008 impacted the energy efficiency, green and high performance construction market by creating more value for these homes and buildings when compared to others of distressed or code-built qualities. Builders, developers and owners of better homes and buildings weathered the downturn better than others by keeping more market value in these homes and buildings.

When the recession deepened, green building became a way for builders to stand apart and attract buyers in a slow, cautious market. Although the inventory surplus gave them the advantage, buyers demonstrated a willingness to pay more for better homes and buildings. This bolstered the energy efficient, green and high performance building industry as the overall market for energy efficiency products became increasingly available and affordable.

In turn, the additional cost of constructing these homes and buildings decreased. By the time the market emerged from its slump, the industry had gained a growing share of the overall construction market, especially for new single family homes. Consequently, such growth resulted in a range of new opportunities for builders, building product manufacturers, distributors and suppliers.

According to USGBC, the proportion of new energy efficient single-family home sales rose dramatically from 2 percent in 2005 to 23 percent in 2013. USGBC estimates that such homes will represent up to a third of the real estate market by the end of this year (USGBC, 2016).

D11. ADVANCES TO BUILDING AND ENERGY CODE

North Carolina residents and businesses will [save an estimated \\$490 million in energy costs by 2030](#) through energy efficiency measures currently mandated in the state's residential and commercial building energy conservation codes. [North Carolina's current energy code](#) includes a "HERO" option for homes that are 15 percent more energy efficient than standard code. Builders that meet these requirements currently receive rebates from Duke Energy Progress as part of its Residential New Construction Program. A HERO code option for the state's next version of code is expected to be available in 2019.

North Carolina currently works from the 2009 IECC version of energy code with amendments that form the 2012 version of the North Carolina energy conservation code. In discussion now and being implemented in 2019, the state can adopt as a baseline the 2012, 2015 or 2018 versions of the IECC, which will be in place for the next 6-year code cycle. Adopting a more stringent code for energy efficient, green and high performance requirements

and options will continue to grow the market for these types of homes and buildings, the products and services they use, and the companies and workers that construct them.

NCBPA has been working with builders, home energy raters, product manufacturers, utilities and others to implement improved energy efficient, green and high performance minimum requirements and options in the state's next building and energy code. The association will continue this work through legislative approval in March of 2017 (expected) and afterward for needed code change amendments.

MARKET BARRIERS

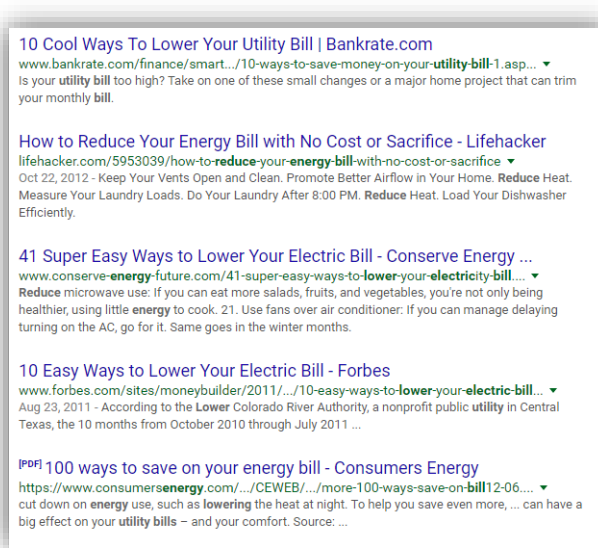
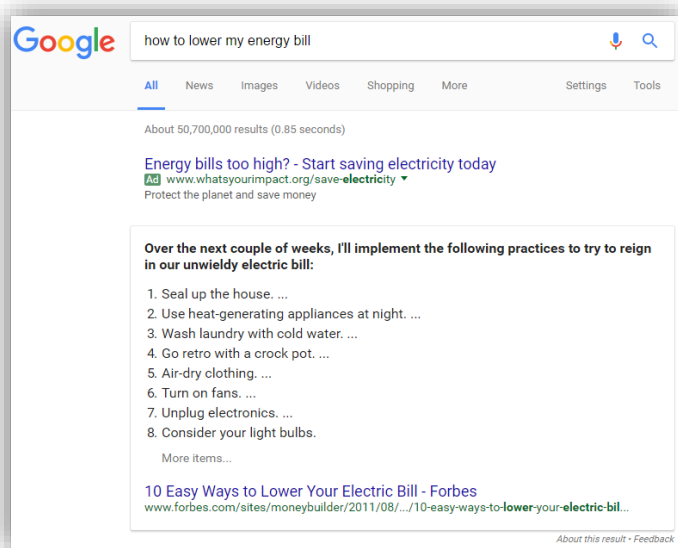
While North Carolina has shown continued growth in new and existing energy efficient, green and high performance homes and buildings entering the market, there are many market barriers that continue to, and will soon prevent, further progress from being made. Provided below are a selection of those barriers.

B1. LACK OF CONSUMER EDUCATION AND RESOURCES

Home and building owners are the primary stakeholders targeted by builders and developers, contractors, product and service providers, and others as the key driver of increasing the demand for energy efficient, green and high performance homes and buildings in North Carolina. As such, an educated consumer group of home and building owners with access to accurate, readily available and easy-to-understand resources would offer significant support and opportunity for the market.

However, North Carolina consumers (home and building owners alike) are very poorly educated about the options they have to live and work in energy efficient, green or high performance homes and buildings. They also lack the needed resources to take action on industry-recommended steps for do-it-yourself improvements, hiring contractors and prioritizing needed projects. In many cases, a consumer's online search for topics involving participating in this part of the state's construction market will yield partial narrowly product-focused solutions for doing so.

In the example below of a homeowner seeking support on "how to lower my energy bills", progress has been made by search engine providers (namely Google) to list specific, industry-vetted steps to making improvements. The actual search results below that, however, frequently lead to articles from national sources with varying credibility that do not refer homeowners to actionable steps they can take with support from local and state programs, utilities, retailers and contractors.



Source: Google search in November of 2016 from Raleigh, NC

In the example of a building owner seeking support on "how to lower my energy bills", while their best option would be to hire a professionally-trained and certified energy auditor or building performance consultant to

complete an assessment, most never learn of the “building performance” industry, the work that it performs and the benefits that it can offer a building owner. Performance contracting is a model supported by North Carolina’s state government that would offer significant growth if implemented in the private sector.

B2. LACK OF COMPARABLE HOME AND BUILDING DATA

The second greatest barrier to increasing consumer demand of energy efficient, green and high performance homes and buildings in North Carolina (and the rest of the country) is the lack of accessible data on how these types of homes compare to standard or code-built homes in the real estate and appraisal markets.

Training real estate agents and appraisers on energy efficient features, advertising the “greenness” of a new building with certificates or labels in the building lobby and other steps that have been undertaken for years in North Carolina have amounted to very little meaningful improvement in the market due to a lack of comparable data in the real estate and appraisal process for these homes and buildings. Without the ability to compare the sales prices and appraised values of these better homes and buildings to others, the best-case-scenario for ensuring that a better home or building receives the higher sales price and appraised value it deserves cannot happen.

Roughly 46 MLS directories exist in North Carolina that list homes and buildings for sale across the state. To create an effective comparables market in the state, each one (a few use the same core software/service) would need to include “green” fields that list information on why the home or building is energy efficient/green/high performance and would have to effectively offer a comparison to appraisers that clearly demonstrates an increased market value (based on actual consumer purchases) for them. Data listed in the MLS directories must also be reliable – e.g. not a realtor listing a home as “ENERGY STAR Certified” due to a single appliance with the ENERGY STAR label – and can be populated from databases that track the many third party certification and verification programs available in North Carolina that contain this information.

NCBPA and others have researched what it would take to “green” the many MLS directories available in North Carolina. The largest roadblock is a lack of interest by the MLS provider in adding more “green” fields to their system. Other trade groups – landscapers, plumbers, etc. - are also vying for more information on the home and building features their industry is responsible for. Another roadblock is the high cost of making the needed changes of adding new fields and potentially integrating these systems with databases that contain the home and building data our industry needs to make available in the systems in order to create the metadata needed to provide a comparables market.

B3. PERCEIVED ADDED COST

Perhaps the third greatest barrier to consumer uptake in energy efficient, green and high performance construction in North Carolina (and again, nationally) is a perception that these types of homes and buildings, and the products and services that they involve, carry a higher/added cost. While there is a greater up-front cost for some homes, buildings and specific products and services (though not always), they nearly always make up for it with long-term financial and other benefits that provide an equitable or positive return over time. The “Total Cost of Ownership” is a phrase used to compare code-built homes and buildings versus those with energy efficient, green and high performance features that may cost more up-front but cost less over the span of the financing for the product, home or building involved.

Recent building and energy code discussions in North Carolina have also put an emphasis on the cost of energy efficient, green and high performance measures as minimum code requirements. In the code development

process, [code change proposals](#) that result in more than \$80 of added cost to a home or \$1,000,000 to a building must include an economic analysis, two alternatives and both a time-value of money analysis and risk analysis before being submitted for review as a code change. Common misperceptions about energy efficient, green and high performance features *always* being more expensive than code-built features, whether up-front or over the life of the features of a home or building, persist and sway the opinion of Building Code Council members and other policy makers.

B4. HIGH QUANTITY OF CERTIFICATION AND VERIFICATION PROGRAMS

While offering a variety of ways for builders and developers, home and building owners, and others to build or retrofit homes and buildings to be energy efficient, green or high performers provides flexible options, too many choices can water-down the overall market value of the certification and verification programs being offered.

NCBPA's 2016 study identified 36 different third party certification and verification programs available in North Carolina related to the energy efficiency, green building and high performance construction characteristics of homes and buildings. Each program offers a variety of measures focusing on these categories with legitimate benefits to end users including home and building owners.

In the case of a homeowner, the limited resources offering easily-accessible and legitimate comparisons of the variety of programs available to them are not well-known and supported (note: NCBPA's consumer website www.HomeEnergyNC.org offers a simple resource addressing this problem). How can an average homeowner distinguish the differing benefits, costs and participation process for an ENERGY STAR home versus one certified through National Green Building Standard?

In many cases, these decisions are left up to the builder that knows which programs work best for a variety of reasons, but in North Carolina's current market homeowners have difficult choices and a significant lack of comparative resources to make the decision to build energy efficient, green or high performance in the first place.

The green building program with the most brand recognition in North Carolina is likely the LEED certification offered by USGBC. In discussions with policy makers, code council members and legislators throughout 2016, NCBPA found strong brand recognition for the LEED certification but a consistent misunderstanding in energy efficient, green and high performance home and building certifications overall. In nearly all interactions with these stakeholders, the "expensive LEED certification" was the only known certification program, resulting in misperceptions including that the LEED certification is the only one available in North Carolina. Legislators also expressed strong disinterest for requirements of green building certifications for public buildings, again focusing on the LEED certification.

B5. LACK OF RECOGNITION FOR TRADE PROFESSIONAL CERTIFICATIONS

Another obstacle to increasing the demand of energy efficient, green and high performance homes and buildings is the lack of consumer and regulatory recognition for professional certifications of the companies and individuals performing our industry's work. Most home or building owners choose a licensed contractor for their electrical, plumbing or heating and cooling needs at their property. But, for the trades our industry represents, a lack of consumer education, resources and awareness of the few available certifications and credentials available presents distrust of the work we perform. Most homeowners will not seek out a certified Building Performance Institute (BPI) Building Analyst or HERS Rater for an energy or performance assessment needed of their home. Likewise, most building owners will consult maintenance staff or heating and air contractors to

inspect and perhaps perform key building diagnostics testing and repairs that require specialized training and tools to perform – both of which workers in our industry have.

B6. UNCERTAINTY IN BUILDING AND ENERGY CODES

Another challenge to our industry is the unknown future of our building and energy codes. Within the past two years North Carolina passed legislation changing its code cycle from three to six years, with the next set of codes going into effect on January 1, 2019. The code development process began in the spring of 2016 to determine which requirements and options should be incorporated. Energy efficiency, green and high performance features, products and services being discussed include heating and air equipment efficiency, insulation levels, building envelope requirements, third party performance testing and more.

The six year code cycle offers a longer term for builders, their subs and product manufacturers to learn the best ways to meet code and keep construction costs down by not having to change too often. But, the longer cycle does create a longer gap between advances in energy efficiency, green and high performance requirements and options.

B7. UNCERTAINTY IN AVAILABLE REBATES AND INCENTIVES

The now expired REITC offered in North Carolina from 2006 to 2015 (again, with a safe harbor policy in place through 2016) provided a wealth of tax credit support to the state's burgeoning renewable energy industry. With this tax credit in place, North Carolina's solar industry grew to become the state with the third most installed solar capacity in the country, mostly due to utility-scale solar but with strong popularity in the residential sector as well. While geothermal heating and air installations can be considered a hybrid renewable energy and energy efficiency technology, the REITC provided no financial support for energy efficiency, green or high performance home and building construction practices.

Because most financial incentives involving our industry are provided by utilities and product suppliers, uncertainty in the utility business model that creates these programs, and both the state and national political and business environments, create uncertainty with the future availability of rebates and incentives that support our industry, its businesses and its workers. Most energy efficiency, green and high performance home and building rebates and incentives are derived from programs receiving funding from local, state or national sources. While the focus on programs provides infrastructure, advertising and marketing, and other activities that support growth in the marketplace, the underlying current of real industry growth and opportunity is in the private, free and open market where consumers participate in energy efficiency, green and high performance home and building construction without local, state or national programs, rebates and incentives.

B8. VALUE ADDED PROPOSITIONS

Increasing consumer demand for energy efficient, green and high performance homes and buildings requires a clear and present transformation in the real estate, appraisal and lending markets. Historically, certification, verification and rating systems and programs that verify the added benefits of these homes and buildings have not focused on transactional steps that offer automated, accurate and reliable transmission of consistent and standardized data about the features our industry seeks to promote to lenders, appraisers, buyers, and sellers.

For example, appraisers rely on comparable data to help justify their home and building valuations. Of the nearly 850 multiple listing services (MLS) nationwide providing comparable data for real estate appraisers, only 185 offer fields permitting information about green features (McGraw Hill, 2014). Even then, these fields are often

sparsely populated. Builders and developers, homeowners and building owners all need an effective platform to list the upgraded features in the MLS directories.

Provided here are a select few of the value-added propositions offered to market stakeholders by energy efficient, green and high performance homes and buildings:

- **Homeowners and Building Owners:** Utility savings provide greater funds available for mortgage payments, while better construction techniques and products reduce maintenance costs and increase durability. Increased comfort, indoor air quality, health and safety add additional value when listed for sale.
- **Lenders:** Greater funds available to pay mortgages lessens default risks and allows for earlier payoff. Energy efficient, green and high performance homes also carry higher appraised values and spend less time listed for sale, again reducing default risks.
- **Real Estate Agents:** Upgraded features, higher sales prices and less time on the market result in higher commissions and less time spent selling the property. Third party certification and verification certificates, labels and supporting documentation help prove the greater value of the home or building.
- **Builders and Developers:** Increasing market demand matched with product differentiation offer builders and developers opportunities to sell their projects faster for increased profits, resulting in improved cost recovery of their investment. Increases in customer satisfaction resulting from a better product result in increased referrals and brand recognition.
- **Appraisers:** Industry recognized and approved third party certification and verification documentation, mostly including the [Green and Energy Efficiency Addendums](#), paired with accurate data readily available for c comparisons, yield more effective, efficient and accurate appraisals.

Third party certifications and verifications aid in accelerating market adoption by providing data-driven measurements for comparing energy efficiency, green and high performance features of homes and buildings across the state. A 2011 study by [North Carolina Energy Efficiency Alliance \(NCEEA\)](#) found that new ENERGY STAR homes in Raleigh-Durham-Chapel Hill spent 89 less days on the market and sold for a premium \$5,566 higher than similar code built homes without EE innovation ([NCEEA, 2011](#)). This corroborates similar findings shown in **Table 1** illustrating an increased premium of 4.2 to 13.9 percent and up to 42 fewer days on the market.

TABLE 1: COMPARISON OF MARKET RESPONSE TO EE/HP AND CODE BUILT HOMES

Premium Price Increase	Fewer Days on the Market	Location	Reference
\$5,566	89	Raleigh-Durham-Chapel Hill, NC	NCEEA, 2011
12.9 %	42	Raleigh-Durham-Chapel Hill, NC	Argeris, 2010
13.88 %	N/A	Asheville, NC	Mosrie, 2011
9.6 %	0	Seattle, WA	Griffin, 2009
4.4 %	31	Atlanta, GA	Carson, 2009
4.2 %	18	Portland, OR	Griffin, 2009

\$4,576	24	Chicago, IL	Elevate Energy, 2014
3.46 %	N/A	Washington, D.C.	Institute for Market Transformation, 2015.

B9. LOW COST OF ENERGY IN NC

While any amount of energy saved in a home or building is a net benefit to the owner, North Carolina has a unique obstacle for increasing the consumer demand for energy efficiency, green and high performance homes and buildings due to [the state's comparatively low electricity and gas rates](#). Simply put, the relatively low cost of energy in North Carolina yields less cost effectiveness, return on investment and value in energy saving projects and improvements.

- “... A typical residential bill for Duke Energy Carolinas, which provides service to the western Triangle, will be \$103.44 effective January, down 3.4 percent from \$107.11 a month last winter. Similar story for Duke Energy Progress households, where the typical monthly bill will fall to \$99.04 in January, a 5.4 percent drop from \$104.73 over 12 months. ([News and Observer, November 2016](#)).

Duke Energy, which is mandated by the State Utilities Commission to offer only cost-effective programs, faces difficulty in offering programs, rebates and incentives for some energy efficiency measures that are not cost-effective for them to offer. Despite the public benefit of such programs from home and building owners, builders and developers, and others that may participate in such programs if available, if Duke Energy were to forecast a financial loss on offering the program, it could not be offered.

In the private and free market, the low cost of energy in North Carolina yields a lack of concern for some consumers – mainly middle and upper income groups – that do not struggle to afford their monthly utility bills. In these cases where a direct return on investment from energy savings is not desired, wanted or needed by the consumer, industry stakeholders are best positioned to sell these consumers on the many other benefits that energy efficient, green and high performance homes and buildings offer.

MARKET SOLUTIONS

NCBPA has reconciled market solutions offered or implemented in other parts of the country with local and state requirements, market conditions and more to provide the following market-based solutions for increasing consumer demand of energy efficient, green and high performance homes and buildings in North Carolina.

S1. IMPROVE CONSUMER EDUCATION RESOURCES

Develop new and consolidate existing resources into industry-supported resources that, over time, will develop brand recognition and increased usage by consumers.

Homeowners:

Challenges:

1. Lack of centralized resources that address most homeowner education needs.
2. Difficulty communicating the upfront cost vs. upfront and long-term value and benefits of energy efficient/green/high performance home features.
3. Lack of consumer awareness of trade contractors offering services that address these features.
4. Homeowners more often guided towards kitchen, bath, location and other preferences vs. energy saving features.

Solutions:

1. Push industry support towards a consolidated, centralized, free and nonbiased website offering helpful information and resources on energy efficient, green and high performance home features.
 - a. Note: NCBPA is currently working on major improvements to www.HomeEnergyNC.org to address these needs. The association is also working on rebranding efforts to incorporate green building into this site and is looking to create a second site for commercial buildings.
2. Consistently direct homeowners to the multiple different benefits of energy efficient, green and high performance homes at the initial ask/sell and follow their interest/engagement point from there.
3. Offer more visibility, transparency and energy saving suggestions on utility bills.
4. Promote the adoption and usage of smart homes with integrated energy efficiency, green and high performance information on appliances, monitors, etc.
5. Create advertising and marketing campaigns at the state and local levels that “rise the tide” across the state for improved consumer education and awareness of resources.

Building Owners

Challenges:

1. Lack of centralized resources that address most building owner education needs.
2. Difficulty communicating the upfront cost vs. upfront and long-term value and benefits of energy efficient/green/high performance building features.
3. Lack of consumer awareness of trade contractors offering services that address these features.
4. Building owners are often incentivized to make only easy and low-cost energy saving improvements (LED lighting) as opposed to taking on more costly but rewarding improvements (HVAC and boiler systems, building envelope improvements, etc.).

Solutions:

1. Push industry support towards a consolidated, centralized, free and nonbiased website offering helpful information and resources on energy efficient, green and high performance building features.
 - a. Note: NCBPA is looking to create a building owner education and resource site in 2017.
2. Create educational materials and programs that allow industry experts to support building owners of many types in understanding their options and benefits for improving their buildings.
3. Create advertising and marketing campaigns at the state and local levels that “rise the tide” across the state for improved building owner education and awareness of resources.

S2. BUILD SUPPORT AMONGST KEY STAKEHOLDERS

Work with key stakeholder organizations and individuals to better understand the needs and opportunities in North Carolina’s energy efficient, green and high performance construction industry.

Policy Makers

Challenges:

1. Most are only familiar with the industry’s LEED certification and believe it to be a costly program that should not be required (of government, institutional or other buildings).
2. NC’s legislature has been deeply involved in clean energy legislation for several years over the Renewable Energy Investment Tax Credit, Renewable Energy and Energy Efficiency Portfolio Standard, and more.

Solutions:

1. Develop and attempt to pass a statewide resolution whereby North Carolina adopt a strategy of “Energy Efficiency First” for addressing the state’s energy needs.
2. Offer brief, effective, accurate and impactful education on our industry to target legislators and groups.
3. Offer consistent, trustworthy and involved industry advocacy and lobbying campaigns and efforts.

Local and State Governmental Entities

Challenges:

1. NC’s State Energy Office is not involved in most energy efficiency, green and high performance home and building industry activities.
2. NC’s various metro areas have vastly different experience, desires and benefits to supporting industry growth opportunities.
3. NC’s state legislature controls key legislative activities that could be taken at the local level otherwise.

Solutions:

1. Develop strong relationships with local government staff in workforce development, economic development, sustainability, housing and chambers of commerce roles to identify opportunities to promote and grow our industry in local economies.
2. Offer effective resources that local and state governmental entities can use and benefit from.

Construction Allies

Challenges:

1. Home Builders Associations are highly-focused on keeping housing affordable and do not offer many programs or options for energy efficient, green and high performance home construction.
2. Various commercial building entities operating in the state (ASHRAE, BOMA, USGBC, CAGC, ESCNC) work in silos from one another.
3. USGBC North Carolina is focused primarily on education and advocacy related to LEED commercial buildings, which has driven attention away from less costly and more market impactful programs and initiatives.

Solutions:

1. Develop strong industry relationships with key construction ally organizations to offer shared benefits and clear communications on industry needs and partnership opportunities.
2. Offer construction allies opportunities to get involved in improved market valuation efforts that benefit all construction trades.
3. Garner support from construction allies to refer their energy efficiency, green and high performance construction education and resources to centralized and consolidated resources made available by our industry.

S3. WORKFORCE DEVELOPMENT

Challenges:

1. There are two primary competing certifications for residential energy efficiency professionals (BPI and RESNET) that increase the cost of being a certified/credentialed trade professional in our industry.
2. NC's nearly 40 home and building energy efficiency, green and high performance certification programs all come with costs related to training and education, marketing and more that limit the resources made available to general and diverse education by industry employers.
3. There is very little oversight of residential industry certifications, credentials and regulations that keep our trades from receiving consumer and key stakeholder recognition in the marketplace.
4. Industry professionals lack effective resources for career development.

Solutions:

1. Leverage NC's strong community college and university system to create job opportunities for educated workers.
2. Research opportunities to implement industry company and professional oversight and regulation (e.g. licensure) that would provide more market credibility to our industry workers.
3. Invest in new career development tools including a job board, apprentice programs and more.

S4. RECOGNITION OF TOTAL COST OF OWNERSHIP

Challenges:

1. Most consumers, builders and developers, lenders and others involved in the buying and selling of energy efficient, green and high performance homes and buildings (and their features) perceive only a higher upfront cost to acquire these units, products and services.

2. Misinformation is widely present across the state in construction trades that do not know the true cost or value (whether upfront or lifetime) of energy efficient, green and high performance home and building features.

Solutions:

1. Develop educational campaigns, resources and tools that clearly explain and demonstrate the upfront cost vs. long-term costs and benefits of these features.
2. Offer innovative financing programs (e.g. PACE Financing) that offer low or no upfront cost for financing of these features that have a longer return on investment than more well-known home and building improvements/upgrades.

S5. IMPROVE AVAILABILITY OF HOME AND BUILDING CERTIFICATION DATA

Challenges:

1. NCBPA's annual market inventory project is time consuming due to nearly 40 program information sources and many additional sources of energy efficient homes and buildings built or retrofitted in the state.
2. Local, state and national energy efficient, green and high performance home and building programs do not aggregate their data into usable formats that can be easily and accurately searched by consumers or mined for value by industry stakeholders.
 - a. Examples:
 - i. RESNET and NGBS allow consumers to enter an address on their websites (each) to find a HERS Rating or NGBS certification for the specific address, as opposed to searching an area and seeing all homes that have a HERS Rating or NGBS certification.
 - ii. RESNET has only provided NCBPA with the number of HERS Ratings by zip code by year for use in its market study, which creates duplicates with data obtained by actual HERS Rating companies.
 - b. USGBC promotes only the LEED certification in its green building reporting, ignoring larger market segments for ENERGY STAR homes and buildings, NGBS homes and more.
3. Many third party energy efficiency, green and high performance home and building certification programs require software-supported models for energy and other savings that offer valuable data for use in the real estate, appraisal and lending processes but that aren't made available through the software providers directly.

Solutions:

1. Work with local, state and national program partners to create a national database/clearinghouse of energy efficient, green and high performance home and building data that can be leveraged in the real estate, appraisal and lending markets, and with consumer education initiatives.
2. Create standards for home and building data transferability and communications in database systems used by program administrators, utilities and others.

S6. LOCAL REBATE AND INCENTIVE PROGRAMS

Challenges:

1. Local and regional electric cooperatives and municipal utility companies have little incentive to offer rebate and incentive programs for energy efficient, green and high performance homes.
2. Local municipalities generally lack funds to incent these types of homes and buildings.

Solutions:

1. Create national and state-sponsored rebate and incentive programs that can be funded and offered by national and state entities with support and participation by local governments.
2. Work with local construction allies and community workforce and economic development authorities to offer some level of support for energy efficient, green and high performance products, services, industry professional career support, continuing education and more.

S7. INVEST IN NEW TECHNOLOGIES

Challenges:

1. Few energy efficiency, green and high performance products and services involve readily available and exciting forms of consumer technology that would motivate uptake for homeowners and building owners.
 - a. Example:
 - i. Some homeowners are turned off by receiving recommendations for needed attic insulation that they will essentially never see, when they can purchase solar panels that they can see and monitor through apps and mobile connectivity.
2. The market for home automation products (nationally) is still very immature. Additionally, laws and policies that restrict technology companies from having access to consumer and building energy usage data prevent new technologies that require that data from launching in North Carolina.

Solutions:

1. Work with local partners to research and invest in new home and building technologies that are viable for North Carolina consumers.
2. Leverage North Carolina's Research Triangle Park and University system resources to identify new areas of technology opportunity for job creation, consumer engagement and more.

S8. INCREASE CONSUMER AND VENDOR ACCESS TO UTILITY USAGE DATA

Challenges:

1. Technology companies and suppliers of energy saving devices, appliances and more are not able to access energy usage information from consumer bills with Duke Energy.

Solutions:

1. Work with partner organizations and Duke Energy to develop access to needed data that would support improved energy saving products, services and consumer behavior.
2. Work with all NC utilities to document and track energy savings on utility bills.

S9. IMPROVE BUILDING AND ENERGY CODE REQUIREMENTS AND OPTIONS

Challenges:

1. North Carolina recently adopted a six year code cycle that prevents major changes from being implemented between long stretches of code cycles.

Solutions:

1. Identify mid-cycle code change amendments that can be implemented to offer gradual, cost-effective improvement leading up to larger changes to start the next cycle.

S10. CREATE INNOVATIVE FINANCING PROGRAMS

Challenges:

1. Many home and building owners have fairly easy access to needed capital to perform energy efficiency, green or high performance upgrades on their homes and buildings.
 - a. Note: This is a good aspect to North Carolina's current market, but does reduce innovation efforts to offer more and better financing.

Solutions:

1. Create innovative financing programs such as On-Bill Financing, Property Assessed Clean Energy (PACE) Financing and others that are competitive financing programs to residential and commercial building owners.
 - a. Note: NCBPA is currently drafting legislation to enable PACE Financing in North Carolina. The association is also involved in efforts to encourage more On-Bill Financing programs in the state.

IMPROVING MARKET VALUATION

Lack of standardization and automated communication of available data on the features, benefits and values of energy efficient, green and high performance homes and buildings presents a major dysfunctionality of supporting growth in consumer demand for these homes and buildings. Data is essential to clearly communicate and measure the value and benefits and build the validation of these homes and buildings through the market sectors of real estate agents, appraisers, lenders, builders and developers, and buyers and sellers.

Implementing behavior change for the appraiser will create value the lender can then use to enable more mortgage capabilities in providing more buying capital to the home or building owner to purchase a greater volume of units which will incentivize the builders and developers to create more energy efficient, green and high performance homes and buildings. Then, the builders and developers can seek to produce additional homes and buildings in meeting the increased market demand of future buyers. Each part of the value chain plays a role both in helping the market realize the true value of these homes and buildings, but also in reaping the financial and other benefits.

S11. DOCUMENT AND COMMUNICATE FEATURES USING CONSISTENT, DATA-DRIVEN AND STANDARDIZED METHODS

Challenges:

1. North Carolina needs an accurate value of energy efficient, green and high performance home and building features that is recognized by the market (in the end, consumers) to yield payback of investment. With features not being valued or ignored, the builder, developer, home or building owner who paid for

the upgrades/improvements fails to regain their investment and loses interest in pursuing future developments of these types.

Solutions:

1. Create reliable methods and enforceable policies that offer data-driven communication between the parties with proven energy efficiency, green and high performance home and building data and the real estate agent, appraiser and lender involved in the transaction to ensure that the upgrades and improvements are visible and properly accounted for in the transaction process.
2. Relevant reports and forms should be transmitted through appropriate channels with oversight to ensure compliance with industry-accepted policies and procedures for setting sales prices, appraisal values and mortgage rates.
3. Create advertising and marketing campaigns highlighting the features and benefits of energy efficient, green and high performance homes and buildings so that more consumers ask for them.
4. Educate homeowner and building owner groups on proper methods for accounting for the added value of energy efficient, green and high performance homes and buildings that offer:
 - a. Lower utility costs.
 - b. Premium resale values.
 - c. Less time on the market.
 - d. Increased customer/buyer satisfaction.
 - e. Lower total cost of ownership.
 - f. Less maintenance and increased comfort.

S12: PROVIDE VISIBILITY AND TRACKING OF INVENTORIES

Challenges:

1. North Carolina (and the country) lack a centralized repository listing energy efficient, green and high performance home and building data that could be leveraged to create more value in the real estate, appraisal and lending markets at macro levels.

Solutions:

1. Collect and track the sales prices and appraisal values of energy efficient, green and high performance homes and buildings to study their true value in the market.
2. Push reliable and accurate data on these types of homes and buildings into the real estate and appraisal markets (namely MLS directories) in order to create comparables markets vs. code-built homes and buildings.

S13: OFFER FOCUSED CONTINUING EDUCATION OPPORTUNITIES

Challenges:

1. In North Carolina, thousands of realtors, appraisers and lenders have been trained on how to recognize and communicate energy efficient, green and high performance homes and buildings (and their features) with little overall improvement to the market.
2. Realtors, in particular, have many other home and building features to pay attention to – the ones our industry cares about the most are not near the tops of their lists, in most cases.
3. North Carolina appraisers are randomly chosen for appraisal services across the state, so realtors, lenders and buyers/sellers cannot rely on a single or small group of trained appraisers to properly value their

better homes and buildings unless they specifically request it. Builders are permitted to specify (similar to an agricultural appraisal) that the appraisal requires a professional experienced and trained in appraising energy efficient homes due to their unique characteristics. Unfortunately, there are only three known appraisers in the state that meet these qualifications.

Solutions:

1. Focus training needs on having realtors, appraisers and lenders understand how to use the newly available (reliable, certified, tangible) data vs. understanding how to find and list the data themselves.

S14: GREEN NORTH CAROLINA'S MLS DIRECTORIES

Challenges:

1. North Carolina does not currently have an effective MLS-based market for comparable data for code-built vs. energy efficient, green and high performance homes and buildings.

Solutions:

1. Circumvent the vast (costly and time consuming) need to train every single realtor, appraiser and lender on the added value and benefits of energy efficient, green and high performance homes by "greening" the MLS directories with automated data from proven sources that is supported by additional information accessible through the MLS directories to learn more about the features and v listed in the directory.

S15: INCORPORATE DATA INTO SALES AND APPRAISAL PROCESS

Challenges:

1. Currently, the only true ways to incorporate energy efficiency, green and high performance home and building data into the real estate, appraisal and lending processes is to manually, diligently and accurately source the data from multiple different sources, complete various forms and personally ensure that they get into the hands of the right persons who may or may not be trained to properly recognize the value of these homes and buildings.
2. The actual, market-driven tangible value of these features, homes and buildings is not readily available at this time in North Carolina (or the country).
3. Overstating the value of these features creates risks for all involved in the buying/selling process.

Solutions:

1. Create a comparables market that allows individual energy efficiency, green and high performance features to be properly assessed for added (or reduced) market value in a given city, county or region.
2. Work with MLS directories and data providers of appraisers and lenders to present proven, reliable and accurate data on the added value of these homes and buildings (and their features) timely.

S16: DEVELOP AUTOMATED SYSTEMS INTEGRATIONS

Challenges:

1. Currently, the best-case scenario for transferring the right energy efficient, green and high performance home and building data into the right locations (people, systems, etc.) is very time intensive, manual and prone to inaccuracy and miscommunications.

Solutions:

1. Circumvent human intervention by reducing the number of hands/eyes/systems that collect and transfer valuable data, focusing on third party certification and verification program data being provided to a third party cloud-based database(s) that sends the data directly into the relevant MLS directory as soon as a listing is created.
 - a. Note: NCBPA is currently developing a prototype of this system with its vendor Pivotal Energy Solutions.

S17. ENSURE SELECTION OF QUALIFIED APPRAISERS**Challenges:**

1. North Carolina appraisers are randomly chosen for appraisal services across the state, so realtors, lenders and buyers/sellers cannot rely on a single or small group of trained appraisers to properly value their better homes and buildings unless they specifically request it. Builders are permitted to specify (similar to an agricultural appraisal) that the appraisal requires a professional experienced and trained in appraising energy efficient homes due to their unique characteristics. Unfortunately, there are currently only 3 such appraisers in NC meeting these qualifications.
2. Failure to accurately assess the value of these features likely results in an appraisal report that underrepresents the home or building value. This in turn may prevent the loan amount from covering the full purchase price of the home or building, increasing risk of the transaction falling through.
3. The scope of work for appraisers is generally on a per job basis. With over thirty ways to certify an energy efficient, green or high performance home in North Carolina, understanding all of the features and their values can be challenging and not cost-effective for the appraiser.

Solutions:

1. Focus training needs on having appraisers understand how to use the newly available (reliable, certified, tangible) data vs. understanding how to find and list the data themselves.
2. Provide a hard copy of the Green Energy and Energy Efficiency Addendum to every appraiser used on jobs your company is involved in to begin the process of the appraisers seeing and using the forms, asking for them on future jobs, etc.
3. If an appraiser is not capable of properly assessing the energy efficient, green and high performance features of a home or building that your company is involved in, “fire” them from the job while they are still on it (not when complete) and request another appraiser. Over time, the “fired” appraiser will understand the need to properly value the home or building.

S18: ENGAGE LENDING COMMUNITY**Lenders****Challenges:**

1. Energy efficiency-focused loan products are not readily available in North Carolina.
2. Few North Carolina lenders are trained and/or interested in providing loans for highly energy efficient, green or high performance homes and buildings that take more work to properly appraise and value.
3. These features may not qualify for traditional mortgage financing and therefore may not be attractive to homeowners or building owners financing the purchase.

4. Lenders are disinterested in nontraditional loans that include energy efficient/green/high performance features.

Solutions:

1. Support the availability of a network of lenders that meet the needs of highly energy efficient, green and high performance homes and buildings in the state.
2. Research opportunities to create local, regional and state lending programs where financing for these improved features is included.
3. Support loan products that incorporate the lower monthly utility and maintenance cost of the energy efficient, green or high performance home or building into the calculations of the applicant's ability to pay (debt-to-income ratio), resulting in a lower interest rate and other benefits.
4. Support loan products that incorporate energy efficiency, green and high performance home and building renovations into loan amounts.
5. Assess the market opportunity to promote the current availability of Energy Efficient Mortgages (EEM) backed by Federal Housing Administration and Department of Veterans Affairs.

S19. PILOT IMPROVEMENT PROJECTS WITH LOCAL STAKEHOLDERS

Challenges:

1. North Carolina operates roughly 46 MLS directories, most of which are independently operated.
2. Most realtors and appraisers work in local markets, so educational workshops, marketing campaigns and pilot projects must be focused locally to gain their attention and acceptance.
3. The large number of lending institutions used by home and building owners for mortgages present problems in trying to educate and engage with a single mortgage provider or group of companies at the local level (their support at the national level would be more advantageous to push down locally).

Solutions:

1. Work with local builders, realtors, appraisers, lenders and supporting trades to pilot the usage of the Green Energy and Energy Efficiency Addendum on a portion or all of a market's home and building sales for a period of time. Doing so will uncover communication issues, identify needed resources and educate local stakeholders on the benefits of a good sales and appraisal process.
2. Offer local education and networking for realtors, appraisers, lenders and others to gain their support for properly valuing energy efficient, green and high performance homes and buildings.

ACTIONABLE STEPS TO INCREASE CONSUMER DEMAND

This study has resulted in a database with 94,609 data points representing 180,640 energy efficient, green and high performance homes and buildings in North Carolina that, with authorized access to data and partnerships with vested stakeholders in the real estate, appraisal and other markets, could significantly increase consumer demand over the next decade in our state.

The information highlighted in the reports encourage new and more outreach of information toward educating builders and developers, appraisers, realtors, lenders, home and building owners, and many others to play a more defined role in generating demand through better access to available information.

NCBPA recommends that industry stakeholders strengthen their support and involvement in next year's study to further illustrate the current and possible benefits of leveraging this data in the market. The data remains a critical factor in providing the validity of the results.

It is important to note that the data evaluation is based on the data received and does not at this time truly represent a current evaluation of North Carolina's energy efficient, green and high performance home and building inventory. Additional work to provide a statistically valid data set including general construction, sales prices, sales days on market and energy savings is recommended to further understand and communicate the value of these homes and buildings.

SUMMARY OF CONSUMER DEMAND DRIVERS, BARRIERS AND SOLUTIONS

Drivers	Barriers	Solutions
D1. Builder and Developer Benefits	B1. Lack of Consumer Education and Resources	S1. Improve Consumer Education Resources
D2. Sales Price and Appraised Value in the Real Estate Market	B2. Lack of Comparable Home and Building Data	S2. Build Support Amongst Key Stakeholders
D3. Green and Environmentally-Friendly Features	B3. Perceived Added Cost	S3. Workforce Development
D4. Comfort and Other Non-Energy Benefits	B4. High Quantity of Certification and Verification Programs	S4. Recognition of Total Cost of Ownership
D5. Energy Benefits	B5. Lack of Recognition for Trade Professional Certifications	S5. Improve Availability of Home and Building Certification Data
D6. Changing Home Buyer Demographics	B6. Uncertainty in Building and Energy Codes	S6. Local Rebate and Incentive Programs
D7. Rebate and Incentive Programs	B7. Uncertainty in Available Rebates and Incentives	S7. Invest in New Technologies

D8. Value of Third Party Certification and Verification	B8. Valued Added Propositions	S8. Increase Consumer and Vendor Access to Utility Usage Data
D9. North Carolina’s Continued Strong Construction Market	B9. Low Cost of Energy in NC	S9. Improve Building and Energy Code Requirements and Options
D10. Market Differentiation		S10. Create Innovative Financing Programs
D11. Advances to Building and Energy Code		S11. Document and Communicate Features Using Consistent, Data-Drive and Standardized Methods
		S12. Provide Visibility and Tracking of Inventories
		S13. Offer Focused Continuing Education Opportunities
		S14: Green North Carolina’s MLS Directories
		S15: Incorporate Data into Sales and Appraisal Processes
		S16. Develop Automated Systems Integrations
		S17. Ensure Selection of Qualified Appraisers
		S18: Engage Lending Community
	S19. Pilot Improvement Projects with Local Stakeholders	

STAKEHOLDER SUPPORT NEEDED FOR IMPLEMENTING SOLUTIONS

The support of many stakeholder groups is needed to push forward North Carolina's market for energy efficient, green and high performance homes and buildings. With successful projects proven, North Carolina stakeholders can work with organizations in other states on opportunities in their markets.

Solution Area	Builders, Developers and Contractors	Home and Building Owners	Realtors, Appraisers and Lenders	Govt. Entities and Policy Advocates	EE Program Developers and Operators	NCBPA Action
S1. Improve Consumer Education Resources	Recipient	Recipient	Recipient	Supporter	Implementer	Underway
S2. Build Support Amongst Key Stakeholders	Target	Target	Target	Target	Target	Underway
S3. Workforce Development	Target		Target	Supporter	Implementer	Underway
S4. Recognition of Total Cost of Ownership	Target	Target	Recipient	Supporter	Implementer	Underway
S5. Improve Availability of Home and Building Certification Data	Target	Target	Recipient	Supporter	Implementer	Underway
S6. Local Rebate and Incentive Programs	Target	Target	Target	Supporter	Implementer	Underway
S7. Invest in New Technologies	Recipient	Target		Supporter	Implementer	
S8. Increase Consumer and Vendor Access to Utility Usage Data	Recipient	Target	Recipient	Supporter	Implementer	
S9. Improve Building and Energy Code Requirements and Options	Target	Recipient		Supporter	Implementer	Underway
S10. Create Innovative Financing Programs	Recipient	Target	Recipient	Supporter	Implementer	Underway
S11. Document and Communicate Features Using Consistent, Data-Drive and Standardized Methods	Recipient	Recipient	Target	Supporter	Implementer	Underway
S12. Provide Visibility and Tracking of Inventories	Recipient	Recipient	Target	Supporter	Implementer	Underway
S13. Offer Focused Continuing Education Opportunities	Target	Recipient	Target	Supporter	Implementer	Underway
S14: Green North Carolina's MLS Directories	Recipient	Recipient	Target	Supporter	Implementer	Underway
S15: Incorporate Data into Sales and Appraisal Processes	Recipient	Recipient	Target	Supporter	Implementer	Underway
S16. Develop Automated Systems Integrations	Recipient	Recipient	Target	Supporter	Implementer	Underway
S17. Ensure Selection of Qualified Appraisers	Recipient	Recipient	Target	Supporter	Implementer	Underway

S18: Engage Lending Community	Recipient	Recipient	Target	Supporter	Implementer	Underway
S19. Pilot Improvement Projects with Local Stakeholders	Target	Recipient	Target	Supporter	Implementer	Underway

DATA TABLES

Provided below are select data tables used to complete the 2016 study. Contact NCBPA at Info@BuildingNC.org for more information. Note that most other data collected in the study is confidential and will not be provided for any reason.

Total Units by Metro Area by Year

Metro Areas	2007	2008	2009	2010	2011	2012	2013	2014	2015	Grand Total
Raleigh Metro NC	222	1,750	1,733	3,767	5,212	6,555	11,071	11,846	13,921	56,078
Charlotte Metro NC	54	753	936	1,809	2,905	5,866	10,231	11,942	9,501	43,997
Greensboro Metro NC	64	253	437	641	1,022	1,301	1,783	1,798	1,951	9,250
Wilmington Metro NC	3	104	361	508	877	1,103	1,728	2,257	2,228	9,169
Asheville Metro NC	108	603	630	664	1,228	1,512	660	1,066	1,813	8,284
Fayetteville Metro NC	9	417	934	1,013	1,286	991	1,542	1,364	691	8,247
Jacksonville Metro NC	9	484	567	469	1,614	1,515	1,252	983	979	7,872
Grand Total	469	4,364	5,598	8,871	14,144	18,844	28,267	31,256	31,084	142,897

Total Units by Program Type by Year

Program Types	2007	2008	2009	2010	2011	2012	2013	2014	2015	Grand Total
ENERGY STAR	135	4,447	5,437	7,433	12,166	11,919	11,990	11,883	12,390	77,800
HERS Rating	1	138	449	1,144	2,292	7,711	16,282	21,422	17,765	67,204
National Green Building Standard			65	151	1,021	1,068	2,544	1,132	2,836	8,817
ecoSelect			26	835	677	1,108	1,926	1,778	1,635	7,985
Company Verified	50	112	172	244	645	1,358	2,058	1,941	79	6,659
Duke Energy Progress Residential New Construction Program							498	1,636	3,753	5,887
SystemVision	385	402	474	393	340	370	268	283	360	3,275
LEED	12	33	69	233	465	343	261	190	105	1,711
Green Built NC	65	132	133	128	99	132	162	198	187	1,236
Progress Energy Home Advantage Certification Program			1	11		50				62
Passive House Institute US				1	1	1		1		4
Grand Total	648	5,264	6,826	10,573	17,706	24,060	35,989	40,464	39,110	180,640

Total Units by Construction and Building Type by Year

Construction and Building Type	2007	2008	2009	2010	2011	2012	2013	2014	2015	Grand Total
Existing	9	21	19	53	116	229	855	302	79	1,683
Commercial Building	9	21	18	51	53	35	35	32		254
Residential Multi Family						1	2	1		4
Residential Single Family			1	2	63	193	818	269	79	1,425
New	639	5,243	6,807	10,520	17,590	23,831	35,134	40,162	39,031	178,957
Commercial Building	63	100	179	216	161	244	194	113	105	1,375
Manufactured Home				416	711	365	748	600	938	3,778
Residential Multi Family		1	270	1,162	4,566	3,081	2,878	1,186	2,450	15,594
Residential Single Family	576	5,142	6,358	8,726	12,152	20,141	31,314	38,263	35,538	158,210
Grand Total	648	5,264	6,826	10,573	17,706	24,060	35,989	40,464	39,110	180,640

Total Units by Metro Area and Building Type

Metro Area	Commercial Building	Manufactured Home	Residential Multi Family	Residential Single Family	Grand Total
Raleigh Metro NC	346	155	4,530	51,047	56,078
Charlotte Metro NC	463	46	3,862	39,626	43,997
Greensboro Metro NC	171	448	1,263	7,368	9,250
Wilmington Metro NC	25	246	317	8,581	9,169
Asheville Metro NC	103	99	1,591	6,491	8,284
Fayetteville Metro NC	38	163	1,726	6,320	8,247
Jacksonville Metro NC	66	266	484	7,056	7,872
Grand Total	1,212	1,423	13,773	126,489	142,897

Total Units by Top 10 Non-Metro Area Cities by Year

Non-Metro City	2007	2008	2009	2010	2011	2012	2013	2014	2015	Grand Total
Concord	9	28	22	26	348	860	1,391	1,846	1,214	5,744
Waxhaw		11	3	10	82	597	1,179	1,255	600	3,737
Mooresville	7	23	33	85	148	534	646	787	593	2,856
Holly Springs		111	25	33	54	246	359	586	986	2,400
Mebane	38	63	109	93	558	172	167	191	155	1,546
Pittsboro	4	37	51	77	145	128	134	162	374	1,112
SANFORD	6	40	24	65	136	130	187	234	248	1,070
Davidson		10	9	19	53	188	274	343	130	1,026
HAMPSTEAD		16	6	22	44	114	205	261	278	945
White Oak					1	144	280	206	218	850

Commercial Building Certification Types by Year

Year	ENERGY STAR	Company Verified	LEED	Grand Total
2007	60		12	72
2008	88	1	32	121
2009	130	1	66	197
2010	180		87	267
2011	106	1	107	214
2012	174		105	279
2013	95		134	229
2014	70		75	145
2015			105	105
Grand Total	903	3	723	1,629

Energy Efficiency, Green and High Performance Home and Building Certification Programs Active in North Carolina

1. ASHRAE Building and Energy Code Standards
2. ASHRAE Building Energy Quotient
3. Better Buildings Challenge
4. Better Buildings Neighborhood Program

5. Duke Energy Progress Residential New Construction Program
6. EarthCraft Building
7. EarthCraft House
8. ecoSelect
9. ENERGY STAR 2.0 for Multifamily Buildings
10. ENERGY STAR Buildings and Plants
11. ENERGY STAR Certified New Homes
12. Enterprise Green Communities
13. Environments for Living
14. FSL Home Energy Solutions
15. Green Gauge
16. Green Globes Certification
17. Green Plus Certification
18. GreenBuilt North Carolina
19. High Performance Home Program
20. Home Energy House Call
21. Home Energy Score (HES)
22. Home Performance with ENERGY STAR
23. LEED (various additional programs for green building)
24. LEED for Buildings
25. LEED for Homes
26. Living Building Certification
27. National Green Building Standard (existing)
28. National Green Building Standard (new)
29. Net Zero Energy Building Certification
30. North Carolina HERO/Stretch Energy Code
31. Passive House Institute US+ Certification
32. PEARL Certification
33. Petal Certification
34. Remodeling NGBS Certification
35. SystemVision (existing)
36. SystemVision (new)

REFERENCES

- Argeris, K. (2010). High Performance Homes Sell Better in the Triangle. Retrieved from <http://www.raleighquickappraisals.com/High+Performance+Homes+Sell+Better+in+the+Triangle>
- Carson, M. (2009). Certified green homes sales in Atlanta, GA 2009. Retrieved from <https://greentothescene.files.wordpress.com/2010/03/atlanta-2009-green-sales-nar.pdf>
- CNT Energy. (2013). Unlocking the Value of an Energy Efficient Home: A Blueprint to Make Energy Efficiency Improvements Visible in the Real Estate Market. August 2013. CNT Energy, National Home Performance Council. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/Unlocking_the_Value_of_an_Energy_Efficient_Home_FINAL.pdf
- Demand Institute. (2014). The Housing Satisfaction Gap; What People Want But Don't Have. Report. Demandinstitute.org/projects
- Dodge Data & Analytics. (2015). Green and Healthier Homes: Engaging Consumers of all Ages in Sustainable Living from <https://www.nahb.org/~media/Sites/NAHB/Research/Priorities/green-building-remodeling-development/Green-and-Healthier-Homes%202015.ashx>
- Dodge Data & Analytics. (2016). World Green Building Trends 2016: Developing Markets Accelerate Global Green Growth. Retrieved from <http://fidic.org/sites/default/files/World%20Green%20Building%20Trends%202016%20SmartMarket%20Report%20FINAL.pdf>
- EIA. (2015). United States Energy Information Agency. Newer U.S. homes are 30% larger but consume about as much energy as older homes. Retrieved from <http://www.eia.gov/consumption/residential/>
- Elevate Energy. (2014). Energy Cost Disclosure in Chicago Residential Listings: Eighteen Months Out", 8-21-15. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/ECD_Analysis_YEAR21.pdf
- EPA. (2016). United States Environmental Protection Agency. 2015 ENERGY STAR Certified New Homes Market Share. Retrieved from <https://www.energystar.gov/index.cfm?fuseaction=qhmi.showhomesmarketindex>
- Griffin, Ann, Kaufman, Ben, and Hamilton, Sterling. (2009). Certified Home Performance: Assessing the Market Impacts of Third Party Certification Residential Properties". Retrieved from <https://www.earthadvantage.org/assets/documents/AssessingMarketImpactsofThirdPartyCertification-090529.pdf>
- IBE. (2013). Setting the PACE: Financing Commercial Retrofits. Issue Brief, February 2013. Institute for Building Efficiency, Johnson Controls, PACENow, and the Urban Land Institute. Retrieved from: <http://www.buildingefficiencyinitiative.org/sites/default/files/legacy/InstituteBE/media/Library/Resources/Financing-Clean-Energy/Setting-the-PACE-Financing-Commercial-Retrofits.pdf>
- IMT. (2015). What is Green Worth: Unveiling High-Performance Home Premiums in Washington, D.C.; Institute for Market Transformation; Sandra Adomatis; September 2015. Retrieved from http://www.imt.org/uploads/resources/files/HighPerformance_Home_Valuation_Report_Sept2015.pdf

- Johnson Controls. (2010). Property Assessed Clean Energy Financing: Benefits and Barrier Busting. Institute for Building Efficiency. PowerPoint Presentation. Retrieved from <http://www.buildingefficiencyinitiative.org/sites/default/files/legacy/InstituteBE/media/Library/Resources/Financing-Clean-Energy/PACE-Benefits-and-Barrier-Busting.pdf>
- Jones, S., & Laquidara-Carr, D. (2016). Opportunities in Global Green Construction. ENR: Engineering News-Record, CBQ16-CBQ18.
- McGraw Hill Construction. (2015). Green Multifamily and Single Family Homes: Growth in a Recovering Market. Retrieved from http://www.nahb.org/~media/Sites/NAHB/SupportingFiles/4/Gre/GreenMultifamilyandSingleFamilyHomesSMR2014_20140806111210.ashx?la=en
- Mosrie, D. (2011). Just the facts Asheville's green housing market. Western North Carolina Green Building Directory, 2011, 82-83.
- NC Gen. Assembly. (2009). Senate Bill 97. Regular Session, 2009. Retrieved from <http://www.ncleg.net/Sessions/2009/Bills/Senate/PDF/S97v6.pdf>
- NCBPA. (2016). NCBPA's 2018 NC Residential Building and Energy Code Proposal. North Carolina Building Performance Association; August, 26, 2016. Retrieved from <http://www.buildingnc.org/#!2018-commercial-code-proposal/c1md9>
- North Carolina Energy Efficiency Alliance. (2011). Market Impacts of ENERGY STAR Qualifications for New Homes. William Pfleger, Chuck Perry, Nicholas Hurst, Jeff Tiller, August 2015. Retrieved from http://ncenergystar.org/sites/ncenergystar.org/files/NCEEA_ENERGY_STAR_Market_Impact_Study.pdf
- NREL. (2010). Property-Assessed Clean Energy (PACE) Financing of Renewables and Efficiency. National Renewable Energy Laboratory: Energy Analysis. Figure 1: Basic PACE Financing. Retrieved from: <http://www.nrel.gov/docs/fy10osti/47097.pdf>
- RESNET. (2016). Over 190,000 Homes in the U.S. were RESNET HERS Rated and Issued a HERS Index Score in 2015 (30% Increase Over 2014). Laurel Elam, January 21, 2016. Retrieved from: <http://www.resnet.us/blog/over-190000-homes-in-the-u-s-were-resnet-hers-rated-and-issued-a-hers-index-score-in-2015-30-increase-over-2014/>
- Rosenfeld, C. (2015). Property Assessed Clean Energy: North Carolina, PACE-ing Itself. UNC Environmental Finance Center: Environmental Finance Blog. October 16, 2015. Carol Rosenfeld. Retrieved from <http://efc.web.unc.edu/2015/10/16/pace-nc/>
- Scott, C., Oliveria, M., Freitag, A., Guyer, R., Boughton, M. (2012). Improving Grease Disposal in Multifamily Housing and Latino Populations, UNC Charlotte–EEAO report. Retrieved from <http://repository.lib.ncsu.edu/dr/bitstream/1840.4/8185/1/NC-WRRI-431.pdf>
- Smith, R. (2016). Homebuyers Willing to Pay More for Energy Efficiency—Survey. Mortgage Professional America. Ryan Smith; April 13, 2016. Retrieved from <http://www.mpamag.com/news/homebuyers-willing-to-pay-more-for-energy-efficiency--survey-30413.aspx>

U.S. Census Bureau. (2016). New Residential Construction. Retrieved from <https://www.census.gov/construction/nrc/index.html>

U.S. Census. (2015). 2014 Characteristics of New Housing. U.S. Census Bureau News Joint Release U.S. Department of Housing and Urban Development, August 18, 2015. Retrieved from <http://www.census.gov/construction/chars/pdf/c25ann2014.pdf>

U.S. Department of Energy. (2015). Local Option: Property Assessed Clean Energy. Retrieved from <http://energy.gov/savings/local-option-property-assessed-clean-energy-pace-financing>

USGBC. (2013). Infographic: Top 10 States for LEED in 2013. Retrieved from <http://www.usgbc.org/articles/infographic-top-10-states-leed-2013>

USGBC. (2014). LEED in Motion: Residential. Retrieved from <https://kapost-files-prod.s3.amazonaws.com/published/538f6e57b36e9d680a000033/leed-in-motion-residential.pdf>

USGBC. (2016). Benefits of Building Green. April 1, 2016. Retrieved from <http://www.usgbc.org/articles/green-building-facts>

FOR MORE INFORMATION

Please visit www.BuildingNC.org and click on the Resources – Market Study tab or contact NCBPA Executive Director Ryan Miller at 919-841-6207 or Ryan@BuildingNC.org.