

# Green Building Solutions



Aligning Regulations with Value to Owner in order to Promote Energy Efficient Building and Help Answer a Key Question before this Committee:  
Post-NEM 1, What is the Path Forward for reducing carbon emissions by reducing fossil fuel-based energy consumption?

# Challenges with Prescriptive Green Building Programs

1. Not stable enough to cause major shifts in building practices
2. Often looking to incentivize a particular technology or list of products
3. Because they do little to address the underlying problem (they are not market-aligned) distortion causes inefficiencies and do not usually become adopted as the industry standard once incentives are removed.
4. In some cases, like Southern Nevada's very successful turf buyback program, there is subsidization from non-participants to participants

# Goals:

1. Promote energy efficient building practices in residential construction
2. Increase access to energy efficient homes that provide a lower cost of living.
3. Increase access for homeowners to add cost-saving “green” features to their existing home to save electricity, gas or water by properly valuing these products through the IECC.

# Guiding Principles for Developing a Solution

- 1) Little/No impact to General Fund
- 2) Require few/no new employees to be hired to administer
- 3) Create a structure that is sustainable
  - Flexible to become more efficient over time
  - Not dependent on state subsidies for builders/customers to participate
- 4) Low administrative overhead and emphasis on ROI - Put the money in the home, for the benefit of consumers, not into new bureaucratic processes.

# International Energy Conservation Code (IECC)

Four things to keep in mind for today's discussion. Codes are:

1. **Boring** – Highly technical in nature, we will not be getting into the details of how compliance tools work, but giving overviews of policy approaches we know will work.
2. **Critically Important** - Buildings consume approximately 40 percent of all the energy used in the United States. Improving energy efficiency of our buildings, and of the appliances and equipment inside them, is one of the best and most efficient ways to improve the environment, save money, combat global climate change, and strengthen our economy.
3. **One of the key drivers of the price gap between old and new buildings as builders and regulators struggle to balance efficiency with affordability** – For every \$1,000 in price increase, 1,806 buyers are priced out of the market in Clark County.
4. **A product of national, state and local amendment, adoption and interpretation** – Any solution must be mindful of this unique regulatory environment and work for everyone.

# The IECC

The International Energy Conservation Code (IECC) is a building code created by the International Code Council in 2000. It is a model code adopted by many states and local governments for the establishment of minimum design and construction requirements for energy efficiency. It was desperately needed in 2000 to force industry to adopt best practices.

However, over the past 15 years, the code has become more and more prescriptive. Some of the core financial and resource supporters of recent energy codes are, not surprisingly, manufacturers of certain kinds of insulation and other energy-efficient equipment. Energy savings returns on each dollar spent on code compliance is rapidly diminishing each code cycle over the last decade.

# Cooling vs. Heating as Driver of Energy Use

**Challenge:** Southern Nevada is unique in that cooling is the driver of energy use, not heating and heat loss. This makes one-size-fits all prescriptive codes a poor fit for our climate.

According to the US Energy Information Administration's *Residential Energy Consumption Survey*, around 15% of residential energy consumption is used to heat homes in Nevada, versus 59% used in heating water and air in residential buildings in Massachusetts. This demonstrates why a standard built for the Northeast and Northwest may not be the best fit for Southern Nevada.

The net result of the IECCs increasingly prescriptive requirements, not aligned with building performance in our climate is that homes are more expensive than they need to be to reach comparable efficiency as builders are forced to spend tens of thousands of dollars building to national standards.

# Nevada Law Mandates Adoption of the IECC

**Challenge:** NRS 701.220 requires the Governor's Office of Energy to adopt the most recent version of the International Energy Conservation Code, making Nevada a national leader in residential energy efficiency requirements.

**Problem:** Cost of IECC compliance and administrative costs/prescriptive approach of Above Code programs like EnergyStar 3.1, LEED, etc.

**Impact:** Some of the most efficient new homes in the United States are being built in Southern Nevada, but the price does not allow for most Nevadans to buy them



# Solution – Align Regulations with Performance, not Special Interests

**Recommendation 1:** Allow the Governor’s Office of Energy to set three alternate paths to meeting IECC requirements and require local Building Officials to adopt three paths to compliance

- Instead of the state mandating use of “insulation rated at x value” and other prescriptive Code measures, the state would mandate that, as an alternate to the code, the home be “x efficient on the performance index”, as documented by a third party professional, by whatever means are most cost effective.
- This index should provide for a net score for solar homes to align efficiency and benefit for homeowner without new incentives.

**Note:** Such an efficiency regime would only exempt a home from the International Energy Conservation Code. All homes would still be required to meet all life-safety codes, such as the International Residential and International Fire Codes.

# Solution – Align Regulations with Performance, not Special Interests

This policy would allow Nevada to lead the nation in energy savings, while making “Green” more accessible and affordable than ever with ZERO impact to the State General Fund

Such a policy may also encourage major retrofits as well, as certain upgrades can make a remodel cost prohibitive. Remember, existing homes and commercial buildings use half of all energy consumed in the United States. Solutions should address both new and existing buildings.

Example - The opposition to the ERI approach in the 2018 IECC is being led almost exclusively by foam insulation manufacturer-aligned industry groups.

# Solution - Three Paths to IECC Compliance

1. Traditional/Prescriptive – Approach used today.
2. Beating Performance of Geometrically Identical “Reference Home” Model (ERI approach in 2015 and 2018 IECC)
  - Allows for tradeoffs after meeting basic building envelope and testing requirements
  - Building envelope must meet basic 2009 IECC requirements before tradeoffs can occur.
3. Energy Rating Index – Pure performance-based
  - Allows for maximum innovation
  - Measured against the Purchased Power needs of a references code-built home, meaning that the performance of installed energy producing and storing features would be accounted for in the rating of the home.

# Reference Home Approach and ERI Approach

## Allow for Tradeoffs

**Scenario 1 – Ceiling Insulation and Furnace swapped for savings on AC and duct insulation** - Investing \$5,000 in conditioned attic and higher efficiency furnace, but using the increased performance of the envelope to use less expensive duct insulation, and a single air conditioning unit instead of two.

**Scenario 2 – Window Glazing swapped for insulation R value – R5** continuous insulation that costs an additional \$3,000 over R4, saves the same amount of energy as a \$200 investment in slightly more glazed windows.

# Difference between Reference Home Approach and Performance Approach

- Reference home approach allows for tradeoffs after meeting 2009 IECC envelope requirements
- ERI pure performance path, as proposed today, would measure the purchased power needs of the home, allowing for a pure performance-based approach that would have no prescriptive measures and account for the net benefit of energy producing features in addition to scoring the energy saving features as in the reference home approach.
- Because energy storage capability enhances the net impact of solar panels and other generating technologies on the purchased power needs of a home, this category of technology would also be integrated in to the ERI approach

# How will a performance paths be regulated?

- Index method, all ERI scores must be verified by a third-party.
- The third-party serves as an energy consultant to the builder and can reassure the code official that an energy efficient, code complicate home is built.
- Third party raters are certified after they have taken training courses and have passed field and online tests and are required to have continual professional education and periodic recertification
- A percentage of every rater's output each year must be rechecked by an independent rater, and the two ratings must agree within 3 ERI points.

# Will the performance paths weaken the requirements of the IECC?

No. Although the performance paths introduce many new variables into code compliance, such as heating, cooling and water heating trade-offs, and other assumptions not currently in the IECC, the required ERI scores were determined using a modeling method in each of the climate zones based on values represented in the IECC.

These paths are designed to result in homes that are proven to exceed the efficiency of code, although they may use alternate means and methods to reach that performance goal. The performance of the features in the software are a product of independent testing and observed correct installation of those products in the home.

# Other States

- As Energy Codes become more and more challenging, a vast majority of states and local Building Officials have simply not adopted newer versions. Almost all homes across the country are built to the 2006 or 2009 IECC, or a newer version with building envelope and equipment efficiency standards removed.
- Many other states are recognizing the need to be able to adopt updated requirements, but reduce the cost impact by adopting performance-based alternatives. Illinois, Arizona, Florida, California, and several other states have moved in this direction.



# Other States: What we Can Learn

## Good

- In the states with alternate compliance paths, it has allowed the state and local jurisdictions to move forward with adoption of new codes and in most cases lowered compliance costs.

## Bad

- Some states have put in place a static index score in statute, this score will not float with the efficiency of new codes, but will require legislative action to change. In some cases, these measures also mandate a single ERI that is owned by a private company.
- Some states have turned to recreating entire code-making and code-enforcing bodies at the state level, increasing control and implementation of new standards, but also creating added costs, delays and conflicts with national efficiency programs
- Some of the states have adopted ERI scores that require homes to meet standards of efficiency comparable to codes that are a decade old.

# IECC Performance-Based Code as Economic Development Tool

- Energy efficiency can help drive innovation and encourage investment in non-fossil fuel onsite generation and storage, combined heat and power technologies, waste heat recovery systems, water reuse and recycling and demand response--they help commercialize these innovations, which makes it easier for others to follow.
- In a small state like Nevada, the barriers to entry would be among the lowest in the United States. Because energy efficiency standards are high, but also because the ERI options incentivize innovation, Nevada could see building technology companies move to Nevada to enter the market before a nationwide launch of their product.
- Instead of spending over \$1 million lobbying the IECC Committees to allow for a product to be included in future versions of the code, new products (after meeting all Building/Fire Code requirements) and testing to prove energy efficiency performance, could be immediately allowed to be used for IECC compliance.
- By unleashing market forces within the structure of a building, Nevada would benefit from technologies that we cannot imagine today. Technologies we hope are designed, manufactured and installed by Nevadans.