

Benchmarking Standards, Model Codes, Codes and Voluntary Guidelines on the HERS Index



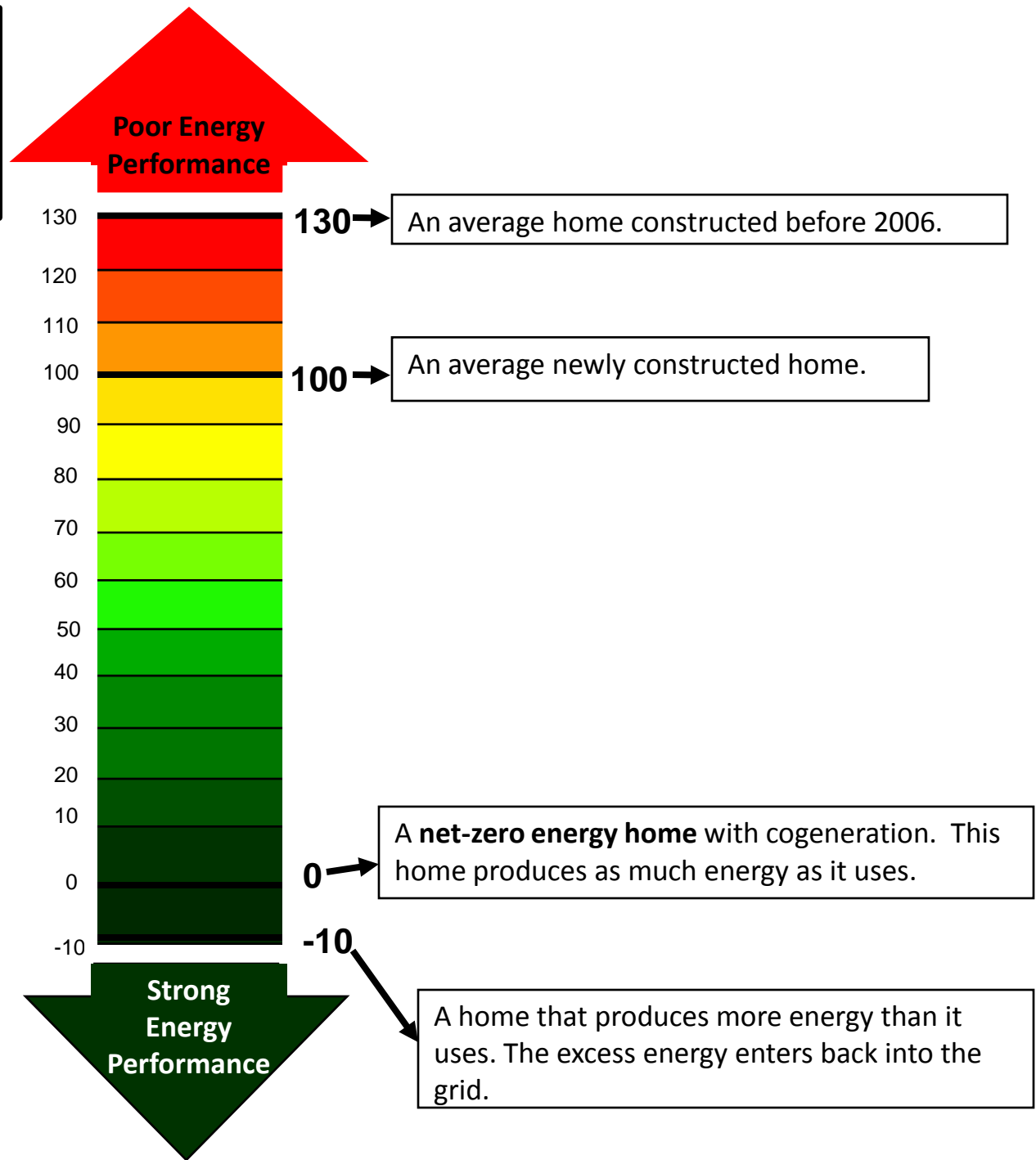
Importance of Benchmarking

Quantifying energy efficiency programs and codes helps:

- **Consumers** understand the performance of their own residence and compare it with comparable homes. This information can result in homeowner investments in energy efficiency improvements.
- **Contactors and developers** advise and construct the construction of higher performing buildings.
- **State and federal governments** ensure that the US Codes reflect the best technological advancements and practices.
- **Non-governmental organizations** compete with other non-governmental organizations to create the most advanced program regulations.

HERS (Home Energy Rating System) Scale:

The lower the scale value the better the energy performance.



- **Standard:**

- Developed by non-profit technical societies.
- Specifies how a building *should* be constructed.

- **Model Code:**

- Compilation of standards by a technical society.
- Designed to be adopted by governments.

- **Code:**

- Adopted by individual states, counties, and cities.
- Specifies how a building *must* be constructed.

- **Guideline:**

- A voluntary program followed, in addition to a code, meant to promote the construction of energy efficient buildings.

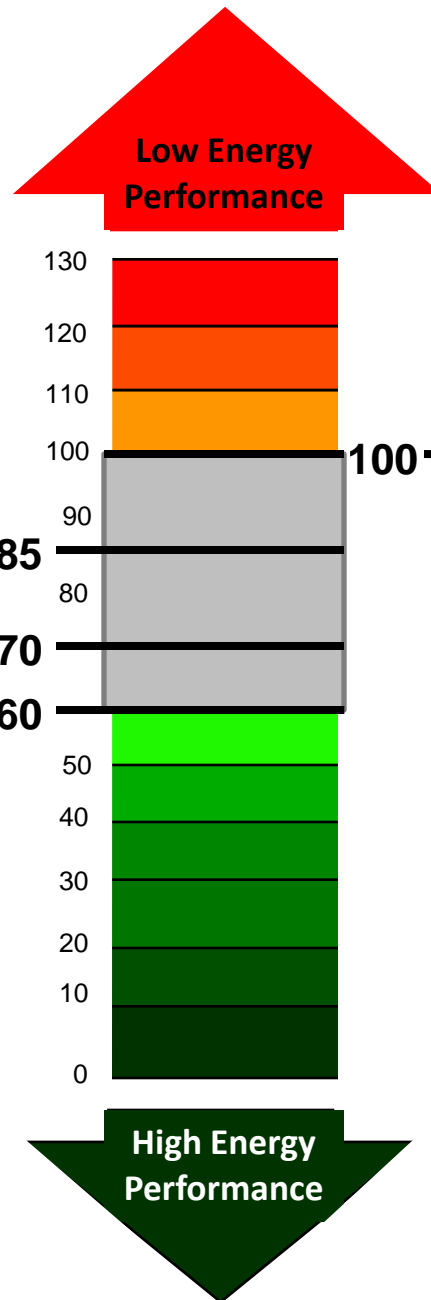
STANDARDS

Standards set by **National Association of Home Builders (NAHB)**

NAHB Green standard **Bronze Rating.**

NAHB Green standard **Silver Rating.**

NAHB Green standard **Gold Rating.**



NAHB

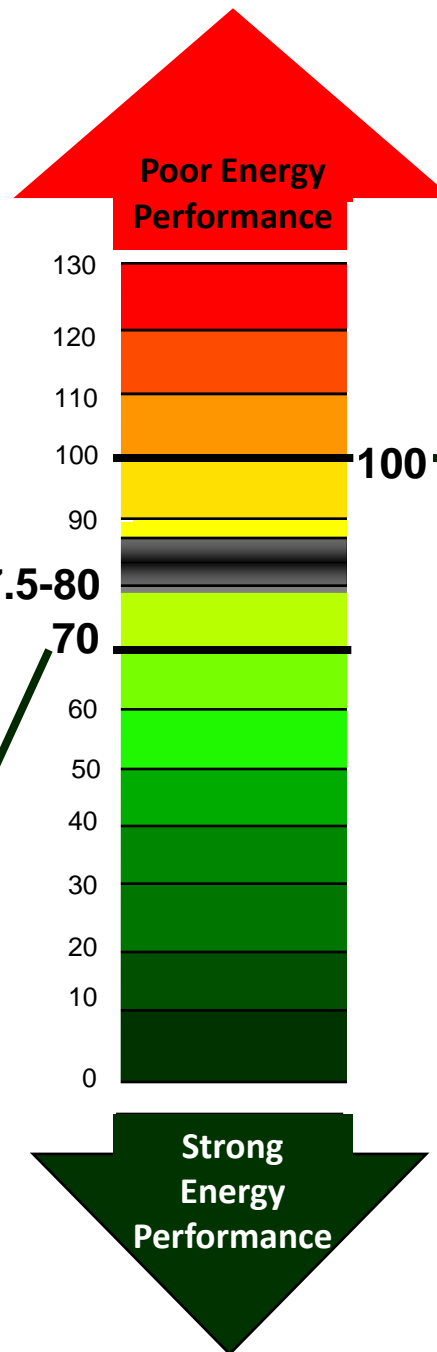
NATIONAL ASSOCIATION
OF HOME BUILDERS

International Energy Conservation Code (IECC)

According to the DOE, a home built according to the **2009 IECC** is expected to use 15 to 20 percent less energy than a home following the 2006 IECC. Required duct sealing under the 2009 IECC alone is projected to reduce buildings' energy consumption between 8 to 10 percent.

Note: The IFC predicts that the 2009 IECC will only decrease energy use in homes by 12.2 percent compared to the 2006 IECC.

In the future, the **2012 IECC** is expected to decrease energy consumption in homes by 30 percent when compared to the 2006 IECC. Both the Alliance to Save Energy and the DOE are promoting this action through "**The 30% Solution**" and the "**Residential Codes Initiative**" respectively.



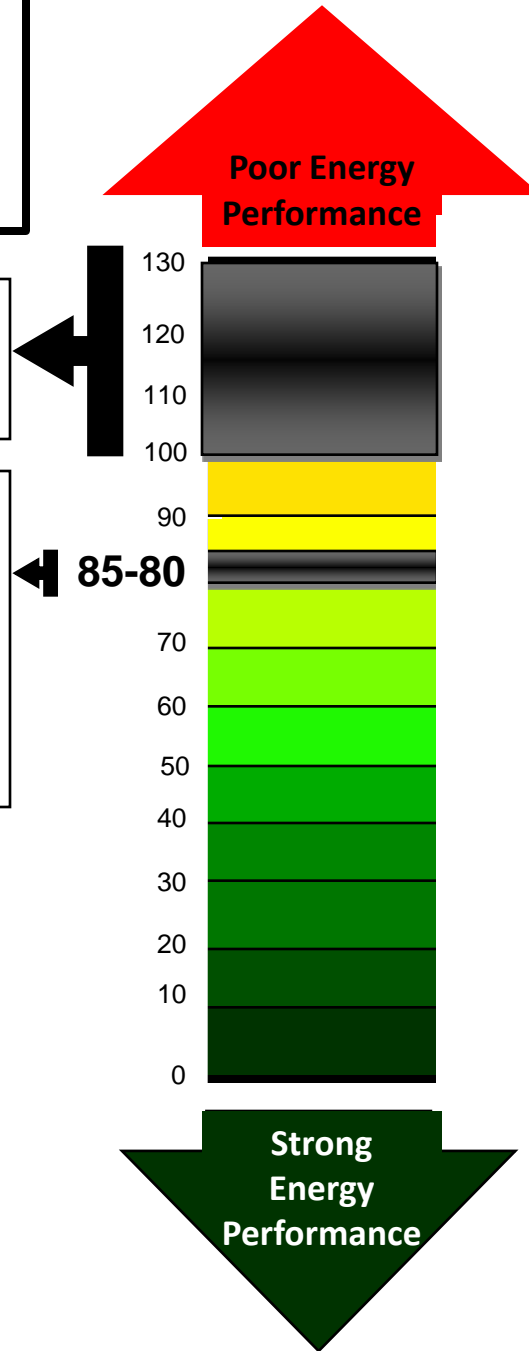
A home constructed according to the **2006 IECC**.

87.5-80

Federal Building Codes With the exception of manufactured housing, federal building codes only apply to buildings used by the federal government that are not already following state or local codes.

Currently manufactured homes built according to the **HUD-code** are expected to earn a HERS Index number of 100 and above.

In compliance with the 2007 Energy and Security Act, the 1994 **HUD-code** must be updated by 2011. The new HUD-code will adopt standards set by the 2009 IECC and is expected to increase the energy efficiency of **manufactured housing** by about 15 to 20 percent ^{vii, xi}.



State Building Codes

CODES

Indiana, North Dakota, Mississippi, Missouri, and Wyoming follow model codes either equivalent to, or older than, MEC 92.

Delaware and Georgia follow codes equivalent to the 2000 IECC model code.

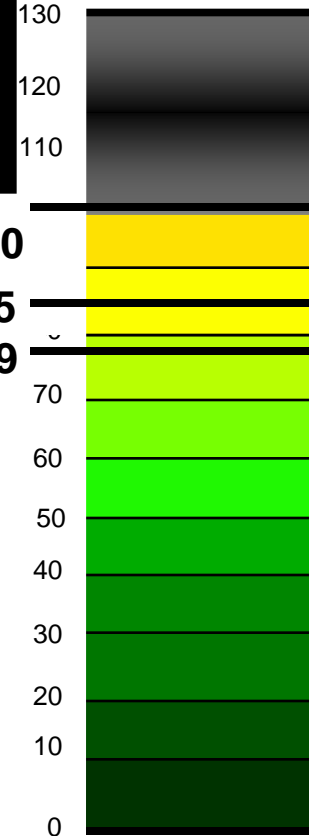
Alabama, Arizona, Arkansas, Connecticut, Florida, Hawaii, Louisiana, Maine, Maryland, Michigan, Montana, Nebraska, New York, North Carolina, Ohio, Oklahoma, South Carolina, Texas, Vermont and West Virginia follow a 2003 IECC model code equivalent.

Alaska, Colorado, Idaho, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, Pennsylvania, Rhode Island, Utah, Virginia, and Wisconsin a 2006 IECC model code equivalent.

Oregon's 2007 Structural Specialty Code, Chapter 13, is expected to decrease energy consumption by 15 percent compared to the 2006 IECC.

Title 24 is estimated to increase energy efficiency by about 21% compared to the ASHRAE 90.1-2004 standards^{iv}. **California** will start implementing these regulations in August 2009^{iv}.

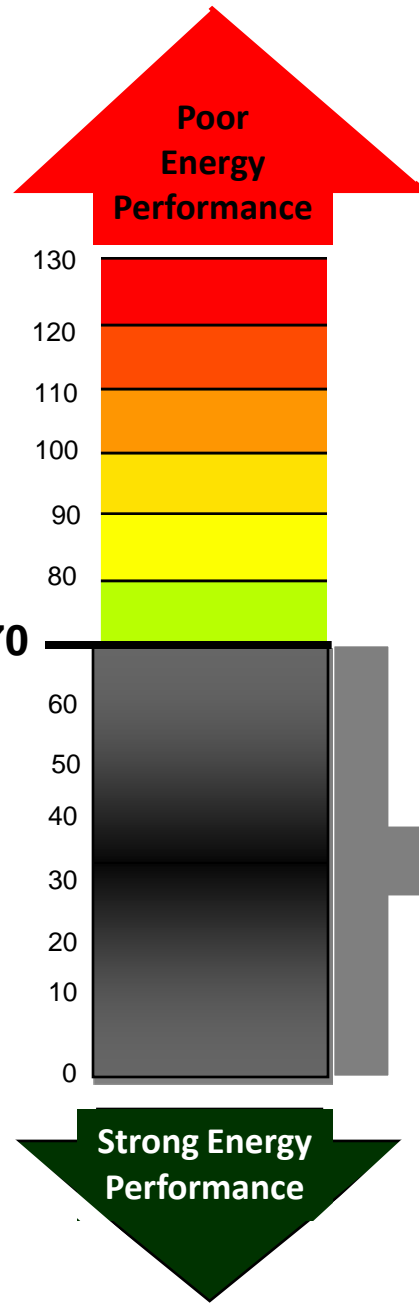
Low Energy Performance



Illinois, South Dakota, Tennessee, and Wyoming do not have state building codes. Local governments decide codes.

Voluntary programs from the
Department of Energy
(DOE)

GUIDELINES



A home that meets the goals set by the **Builders Challenge**.

Building America goals.

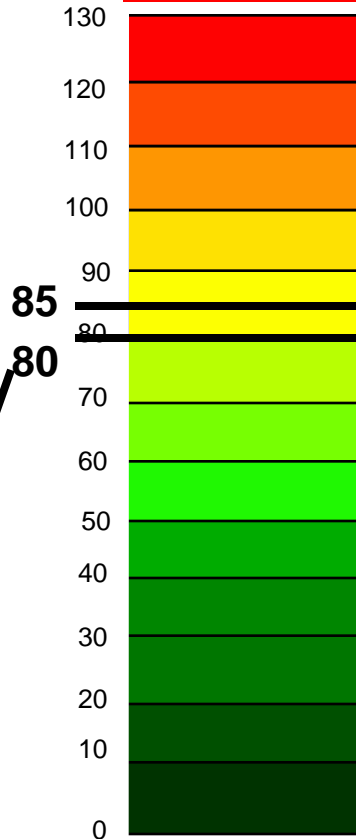
Voluntary programs from the **Environmental Protection Agency (EPA)**

GUIDELINES

The benchmark to qualify as an **Energy Star** building in IECC climate zones 1-5^v as shown in Figure 1.

The benchmark to qualify as an **Energy Star** building in IECC climate zones 6-8^v as shown in Figure 1. In both cases, higher energy performance is achieved by replacing old appliances, caulking and replacing insulation^{vi}.

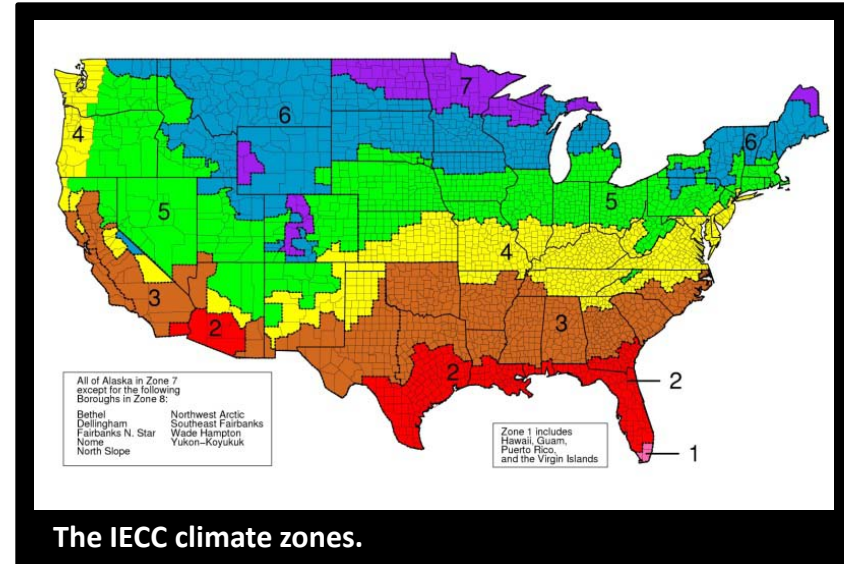
Poor Energy Performance



85

80

Strong Energy Performance



The IECC climate zones.

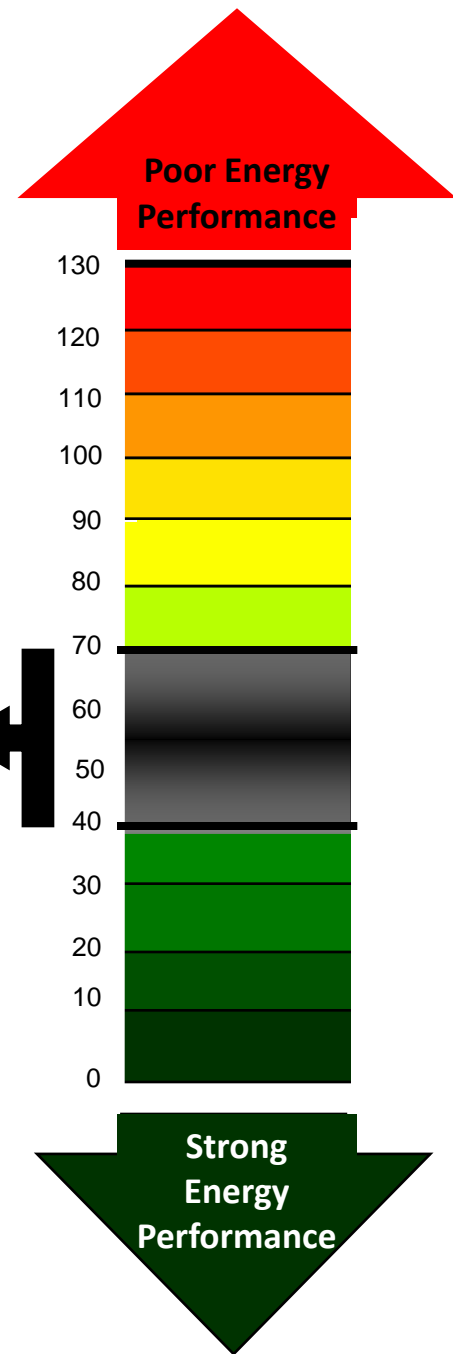


GUIDELINES

Voluntary programs from **US Green Building Council's** Leadership in Energy and Environmental Design (LEED) Program

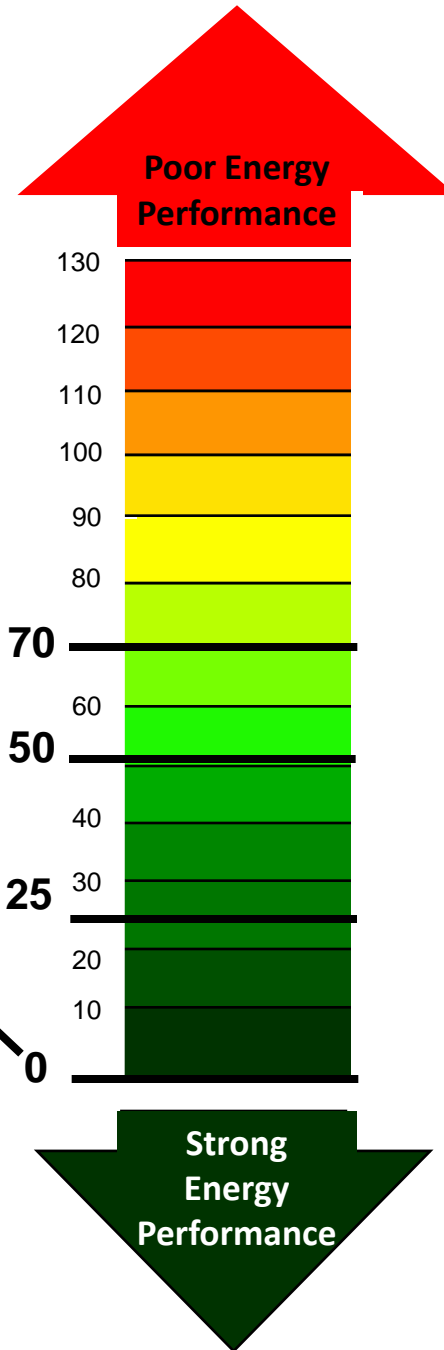
A 2008 study demonstrated that the average LEED certified home is 30 to 60 percent more energy efficient than an average home.

70-40



Voluntary programs from
Architecture 2030

GUIDELINES



- Goals of **Architecture 2030**:
- 30% below code by 2016
 - 50% below code by 2022
 - 75% below code by 2028
 - carbon neutral by 2028



SUMMARY

- = Standards
- = Model Codes
- = Codes
- = Guidelines

