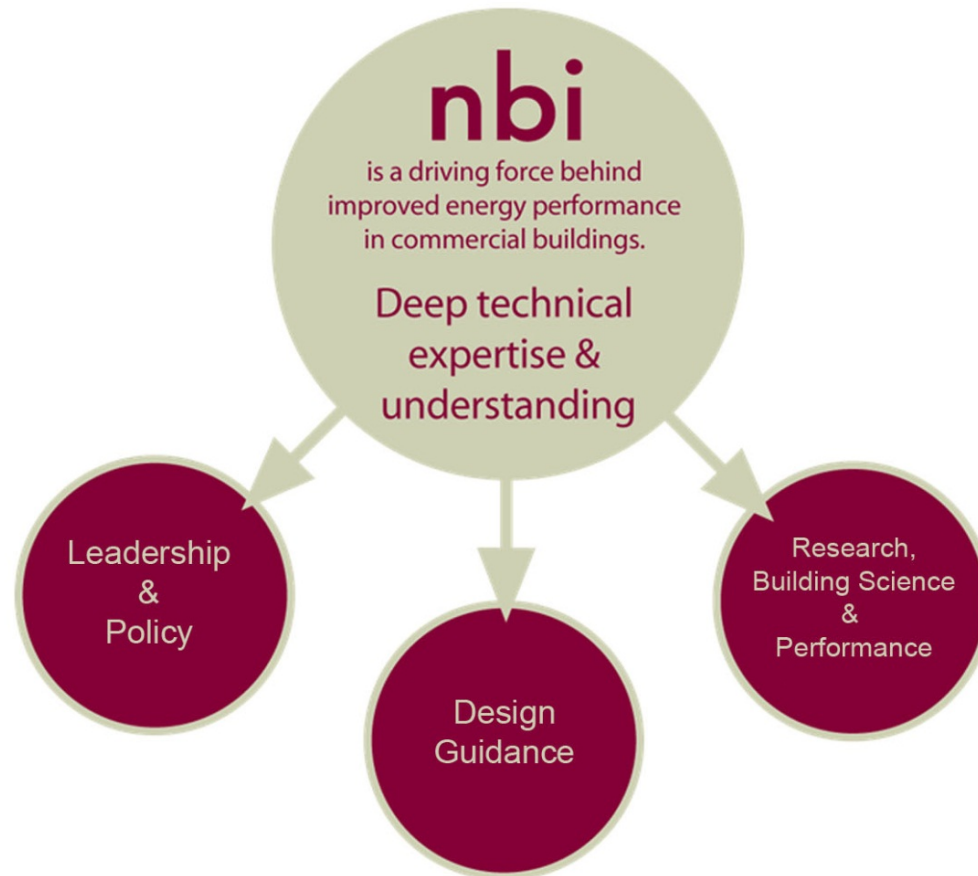


# U.S. Energy Codes: Design, Deploy, and Operate

GBPN Webinar

Dec 11, 2013

# New Buildings Institute

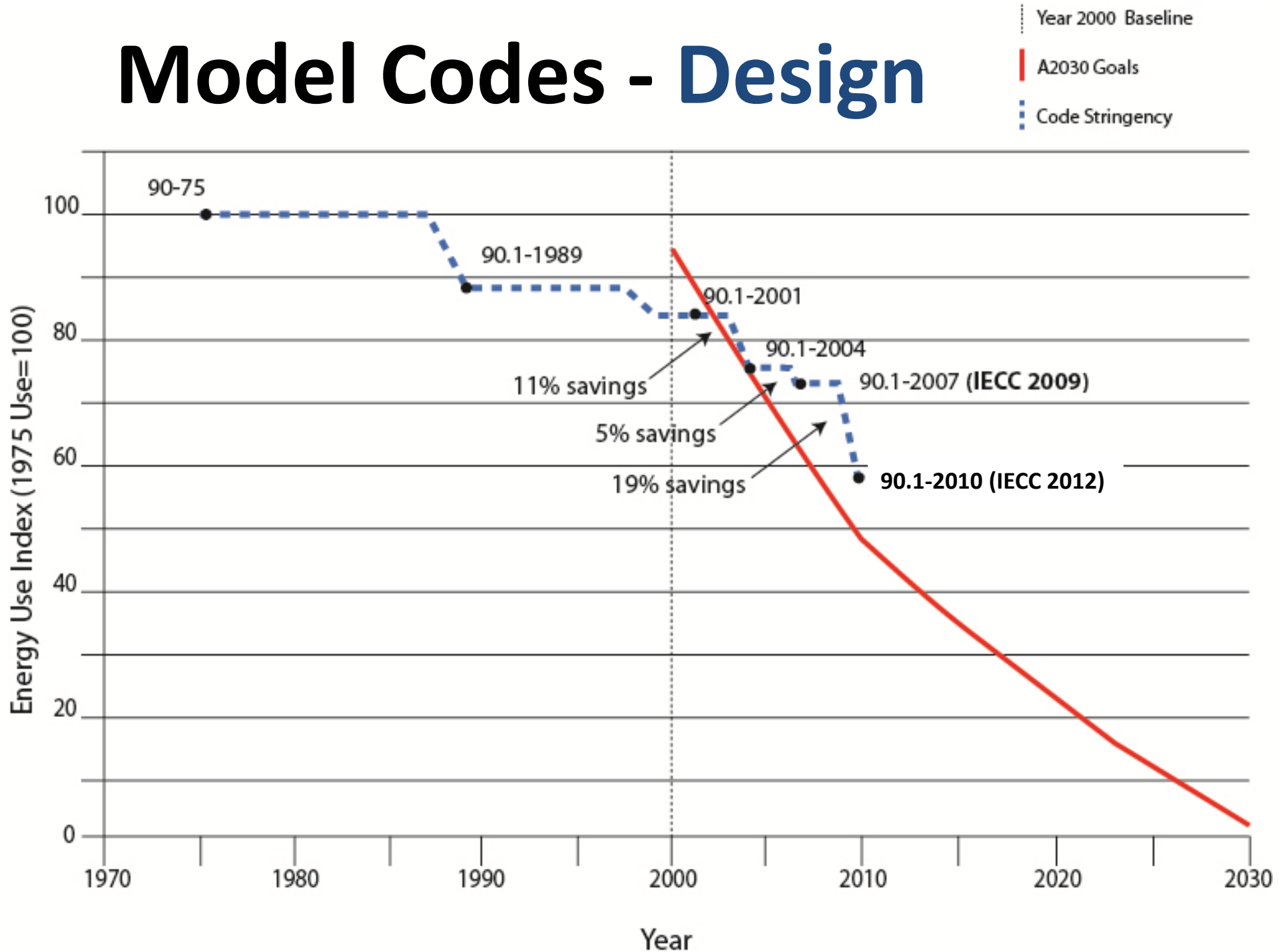


# Design – Operate - Deploy

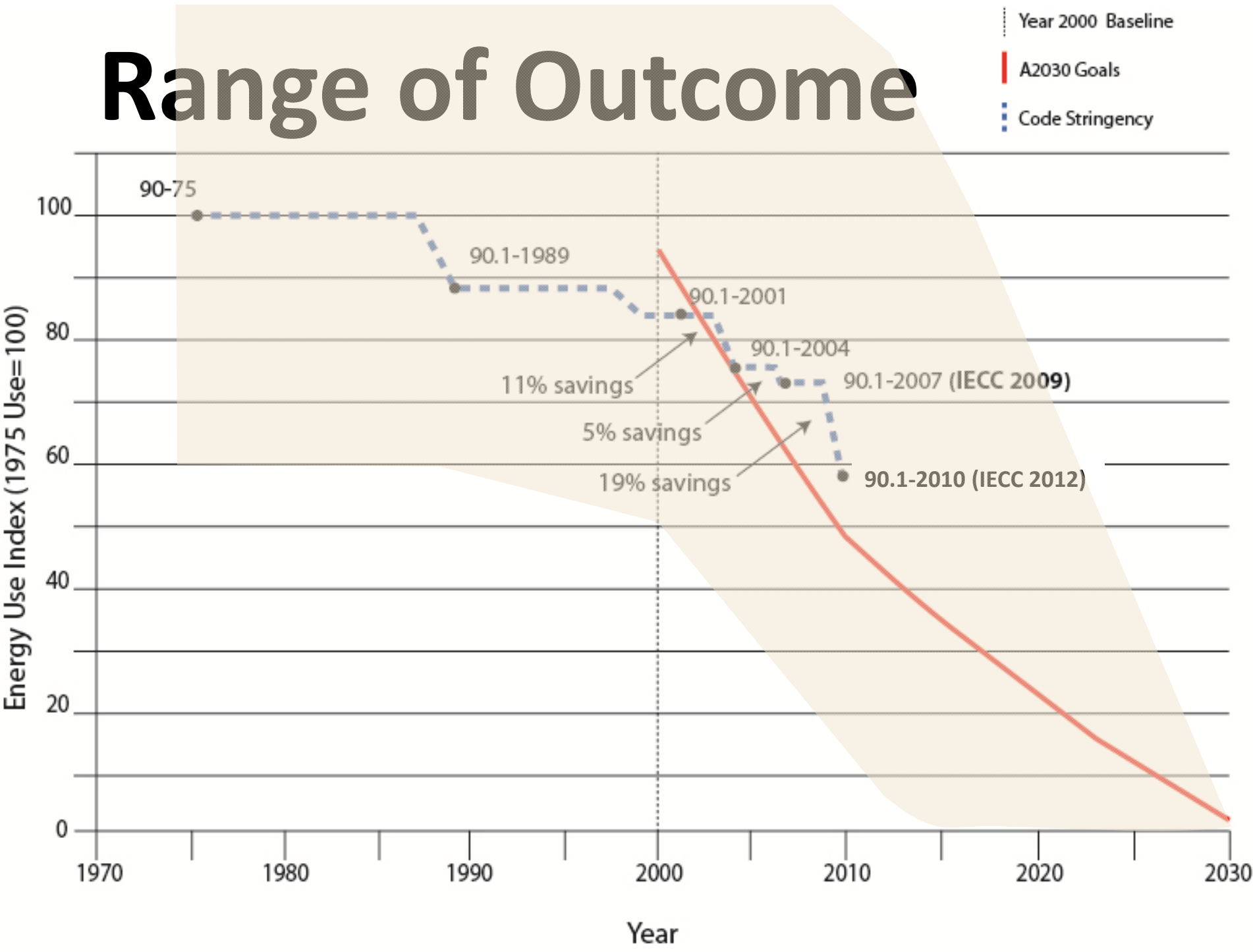
## Drivers to Performance Codes

- **Design** - Reductions to 2030 and Zero Net Energy
- **Operate** – Buildings delivering actual energy savings
- **Deploy** - Adoptions in jurisdictions nationwide and compliance rates to 90%

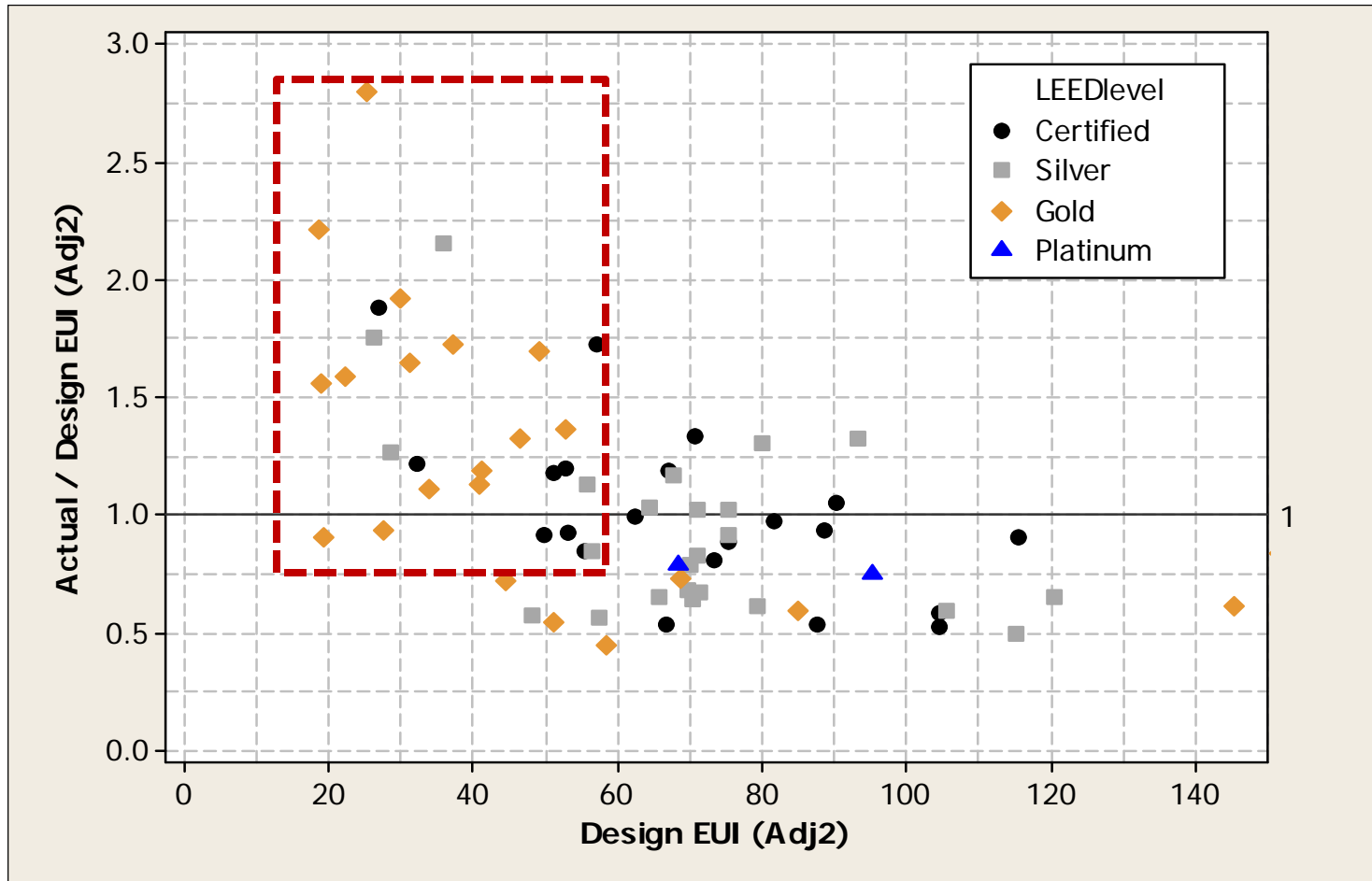
# Model Codes - Design



# Range of Outcome

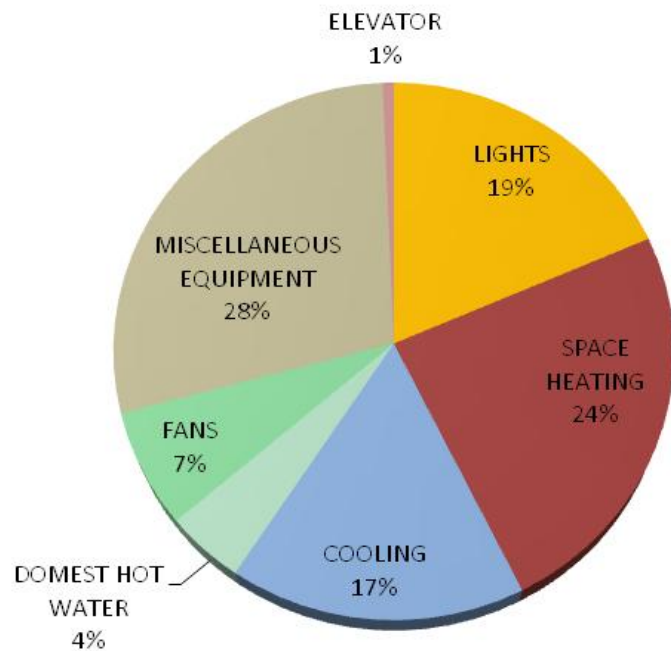


# Variability at lower EUI?

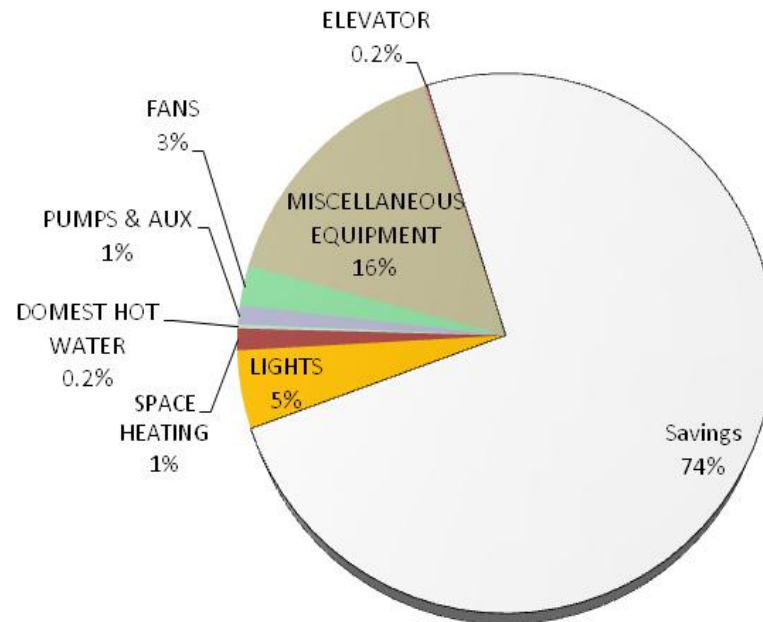


# ZNE Retrofit Example in Portland Oregon - before and after

Percent Energy Consumption by End Use Before Energy Conservation Measures



Percent Energy Consumption by End Use After Energy Conservation Measures



# Plug loads to 2030

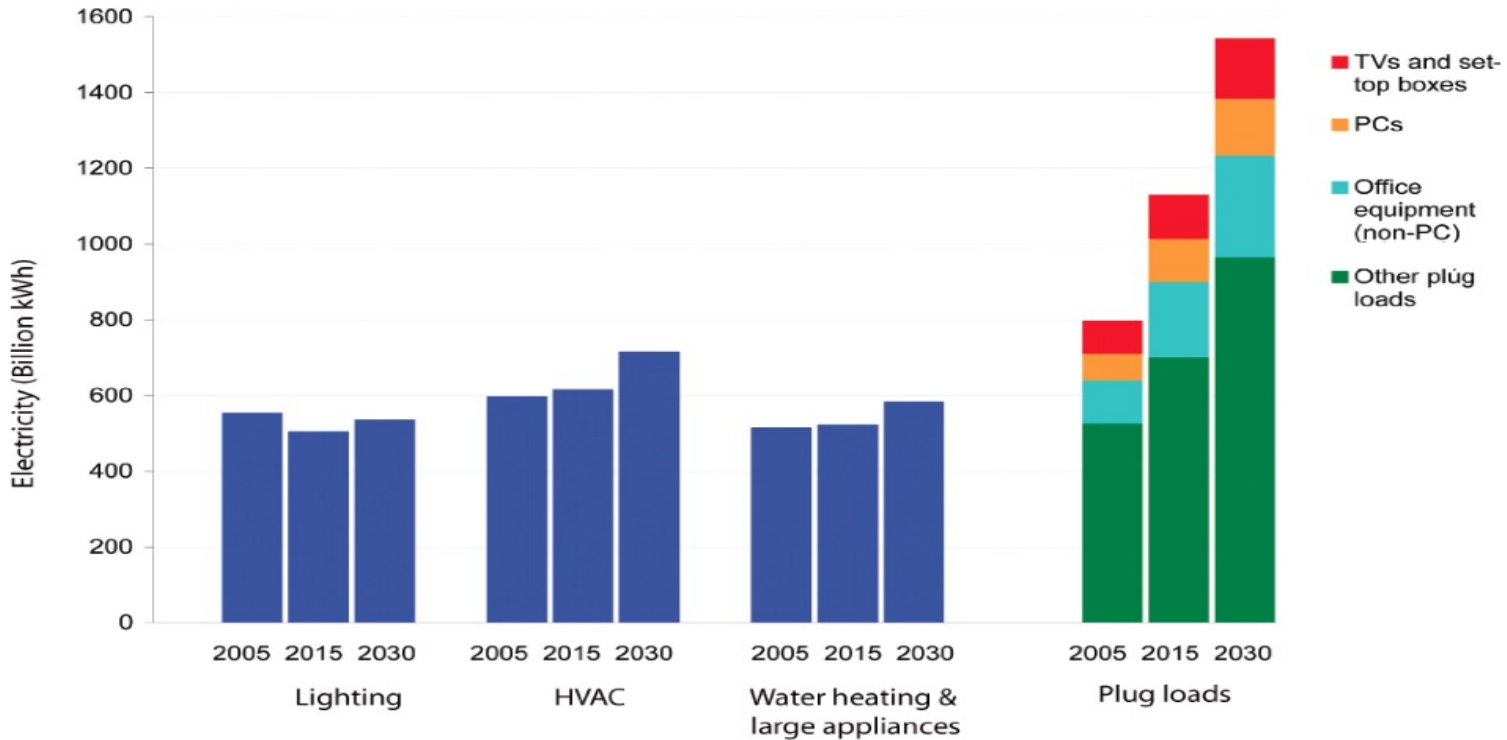
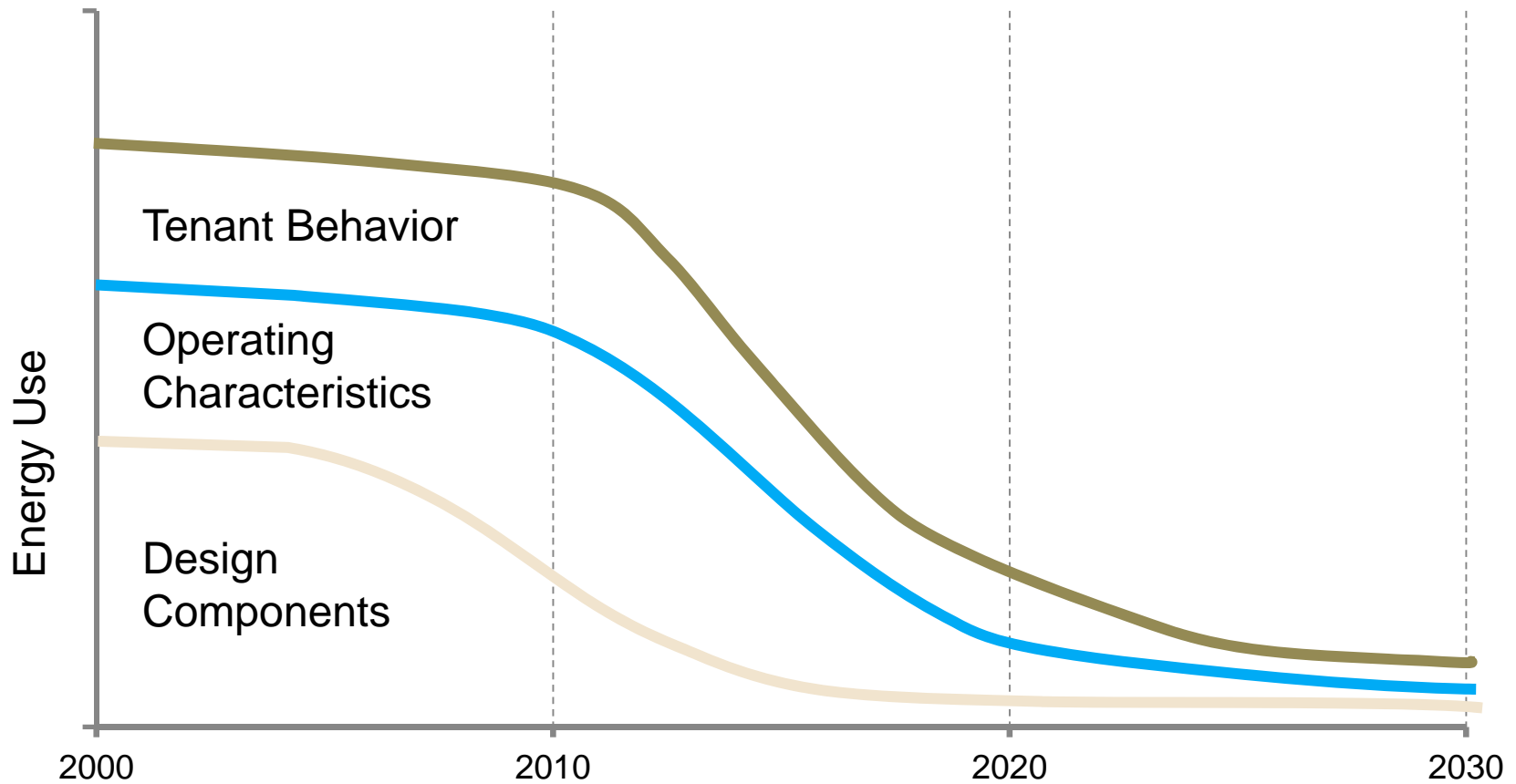


Figure 3: Change in Energy Use by System

Source: Graph created by Ecova with data from EIA 2008 Annual Energy Outlook



# Components of energy outcomes



# Energy Codes – Operate

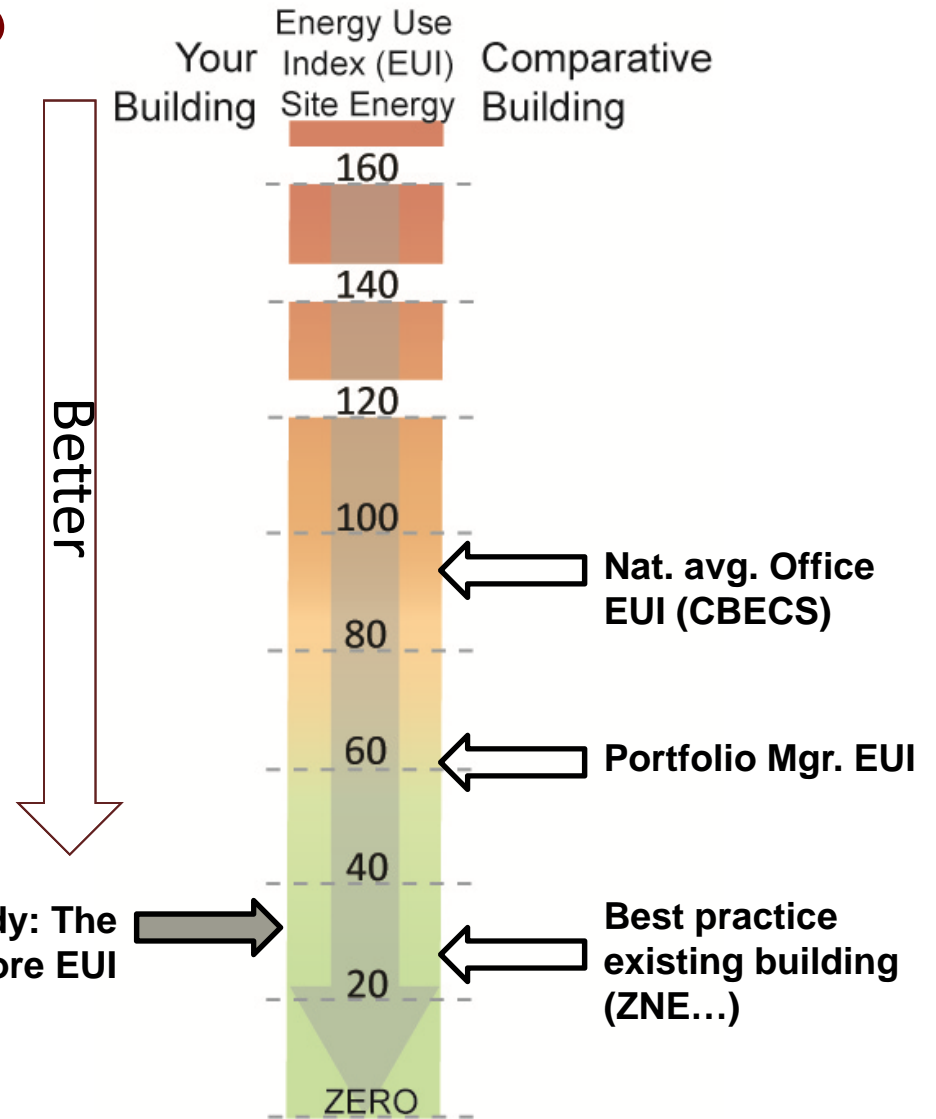
## TARGETS and ENFORCEMENT

### The 2 BIG Challenges

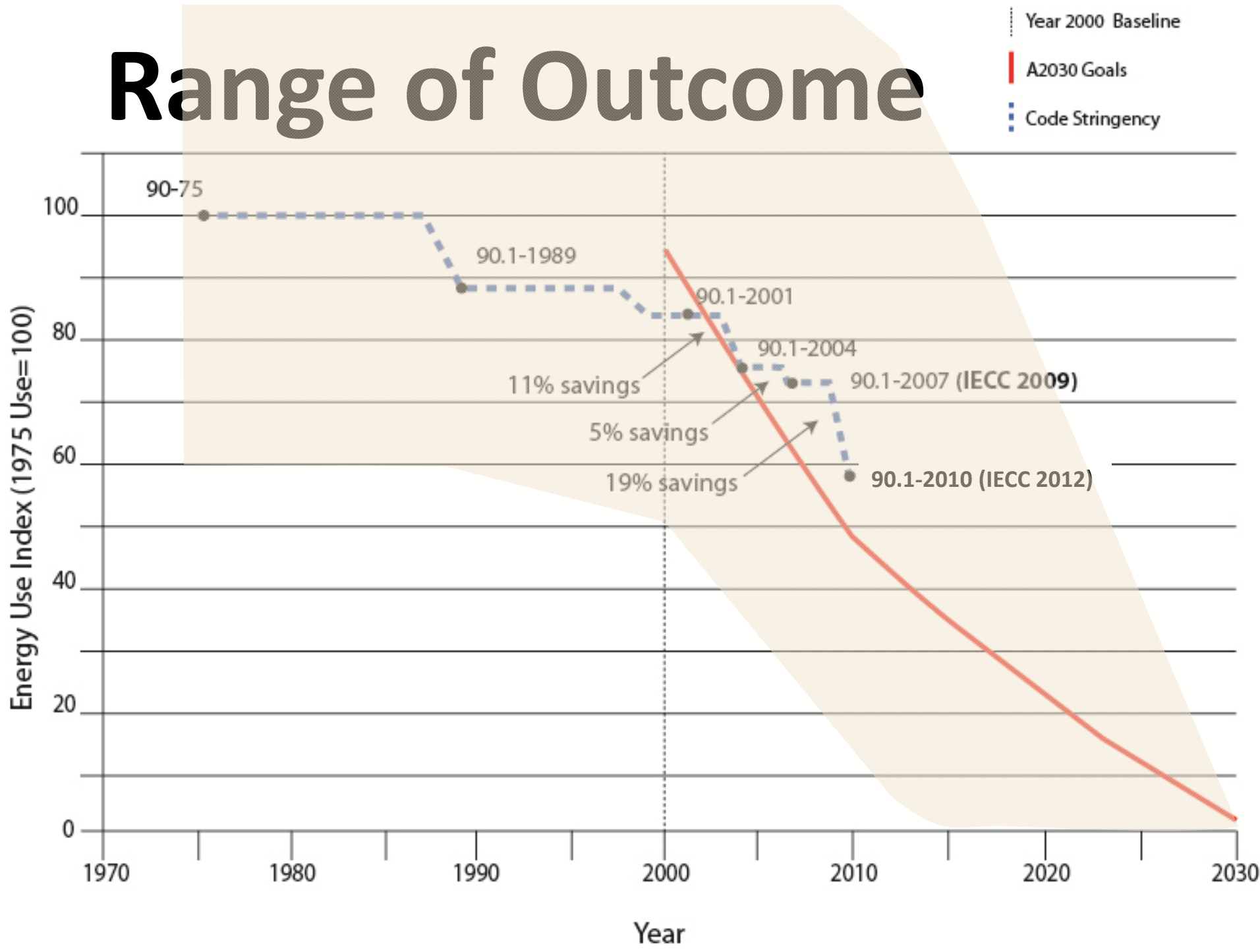
# Setting Targets?



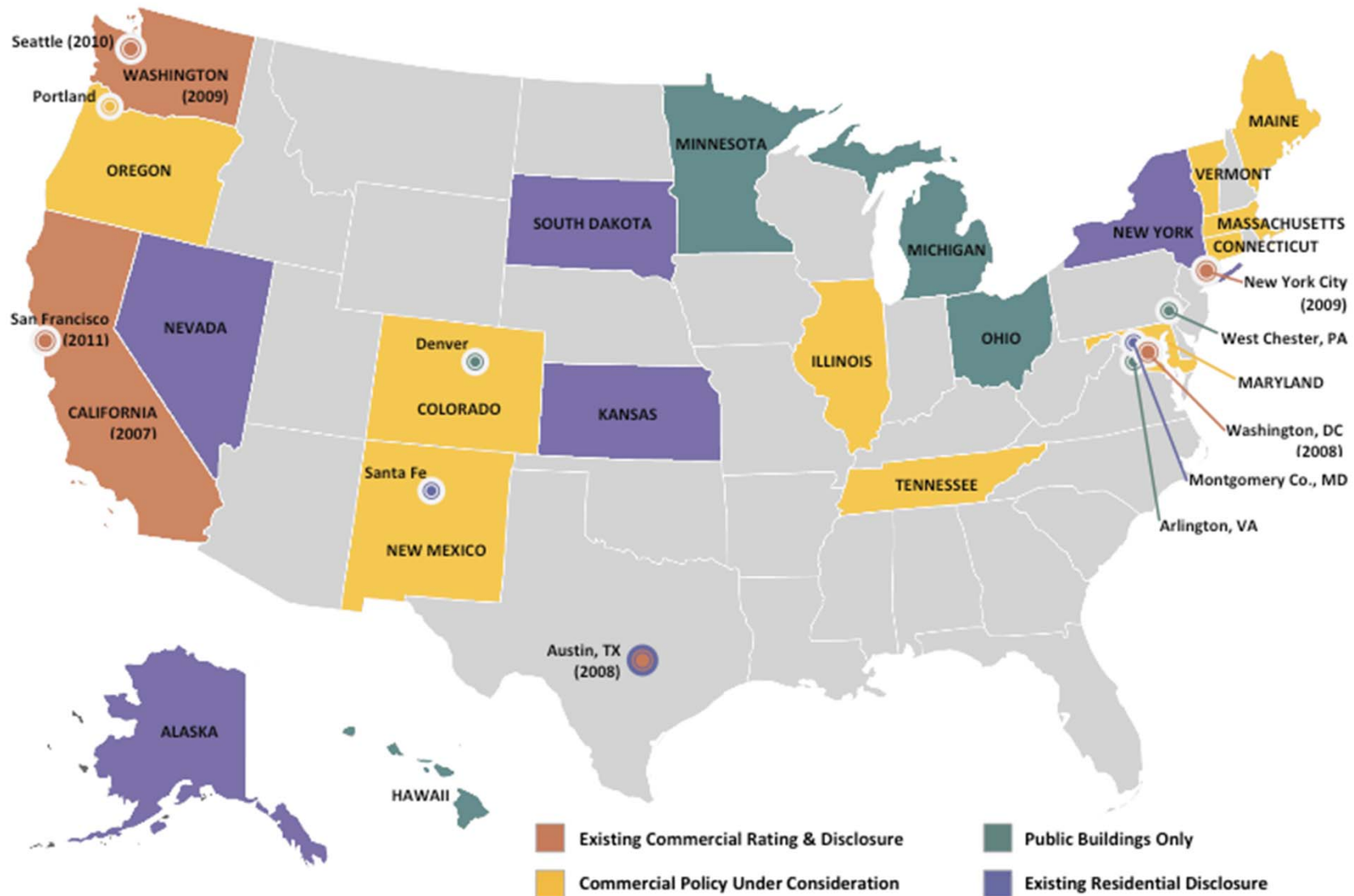
## The Basis for Zero Net Energy (ZNE) Policy



# Range of Outcome



# Building Energy Disclosure



# The Red Line for Energy Codes

Design, Build, Commission.....



**CERTIFICATE OF OCCUPANCY**



Occupancy

# Enforcement Mechanisms

- **Conditional Occupancy – IgCC *(proposed)***
- **Performance/Surety Bond - Seattle**
- **Tax or Utility Rate Structures**
- **Licensing - Boulder**
- **Public Pillory/Accolades**
- **Periodic RetroCx – New York City**
- **Litigation**

# Boulder CO SmartRegs

## The Case for Performance Standards

The City of Boulder's **Climate Action Plan** calls for greenhouse gas emissions reductions across, Boulder residents overwhelmingly approved a Climate Action Tax to fund Climate Action Plan efforts. For more than a decade the city has been incrementally strengthening minimum energy efficiency standards for residential new construction and remodels as well as for commercial construction and renovation. Despite these efforts, Boulder has **not been on track to meet its 2012 Climate Action Plan goals**, and the city determined that it needed **additional policy tools** to encourage market innovation in improving existing residential building energy performance. Rental units make up more than 50 percent of Boulder's dwellings and thus offered a logical next opportunity for energy savings. The city designed its "SmartRegs" ordinances to deliver multiple public and private benefits including improved **building quality and marketability; safer, healthier, and more comfortable** housing; **lower energy bills** for occupants; and reduced greenhouse gas emissions.

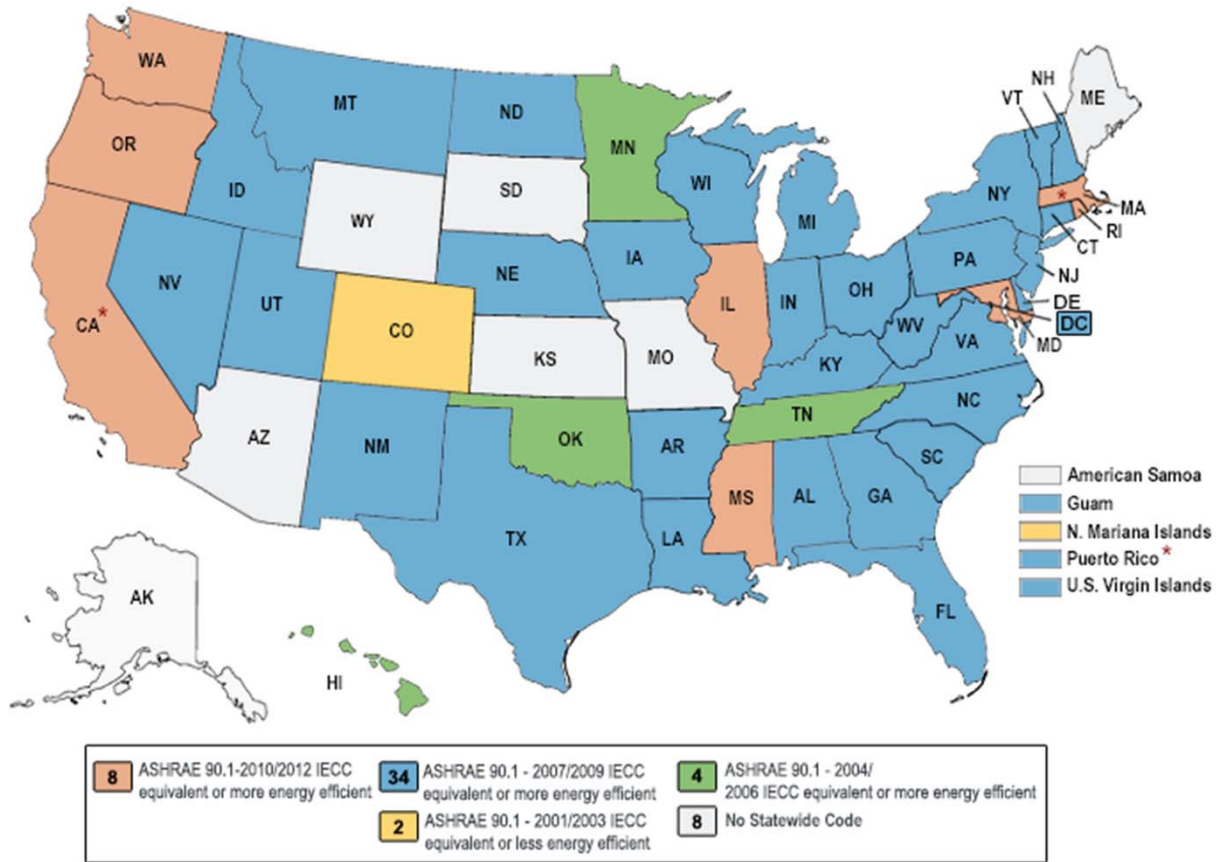


# Boulder CO SmartRegs

## SUCCESS

- One year after the regulations went into effect, the city had handily exceeded its first-year goals of 1,000 units inspected and 500 units achieving compliance.
- Some property owners are voluntarily choosing to upgrade beyond the minimum requirements.
- Given its broad support and successful early rollout, SmartRegs shows promise for overcoming transaction costs and reducing barriers to energy efficiency gains in the residential rental sector.

# Energy Code – Deploy (Adoptions)



# Energy Code – Deploy(Compliance)

## 90% Compliance Pilot Studies

US Department of Energy, Final Report June 2013

**BARRIERS:** The top barriers to compliance continue to be:

1. Lack of training
2. Lack of resources
3. Lack of compliance information on plan submissions

# RE 188 in the 2015 IECC

- RE-188 would allow homes to comply by achieving a target ERI score AND
- Meeting the code's mandatory measures, hot water pipe insulation requirements, and prescriptive envelope requirements from the 2009 IECC.

## Target ERI by Climate Zone

Climate Zones 1-2: 52

Climate Zone 3: 51

Climate Zone 4: 54

Climate Zone 5: 55

Climate Zones 6: 54

Climate Zones 7 -8: 53

# Goals of the Concept

- Provide a platform to move the code toward net-zero
- Increase compliance for residential energy codes.
  - Develop format that would encourage third party inspection
  - Reduce jurisdiction manpower requirements to review energy



# Design - Operate - Deploy

- **Design** – Net zero: consumption = production (i.e performance)
- **Operate** – “Performance” is the only option
- **Deploy** – “Performance” is easier to enforce but challenged by targets & enforcement

# U.S. Congress



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