Potential Energy, Cost, and Greenhouse Savings from Energy Codes

The Sweeping Benefits of Building Energy Efficiency
America’s Homes & Commercial Buildings use:

✓ 42% of all energy
✓ 54% of natural gas
✓ 71% of electricity

And account for 39% of US manmade GHGs
AFTER MORTGAGE, PRINCIPAL & INTEREST, ENERGY IS THE HIGHEST COST OF HOME OWNERSHIP

Average U.S. Homeowner Costs 2007-2008
Buildings Last 70, 80, Even 100 Years

• Failing to address building efficiency will hinder sound national energy efficiency goals for 4-5 generations.

• “Build It Right the First Time” – Efficiency retrofits far more costly than the same improvements at initial construction.

• At today’s energy costs, an average home’s energy bills will total $170,000!!!
Buildings Energy Codes Are the Most Effective Way to Boost Efficiency (... and CO2)
CODES ARE ESSENTIAL TO REDUCING WASTED ENERGY FROM BUILDINGS

66% COVERED BY CODES

- Heating 31%
- Cooling 12%
- Lights 11%
- Water Heating 12%
- Ventilation 6%
- Water Heating 7%
- Cooling 13%
- Heating 14%
- Lights 26%
Americans WANT – & Will Pay More For – Efficient homes

Nine out of ten buyers would rather buy an energy-efficient home... and they are willing to pay up to 3% more!

(Source: National Association of Home Builders)
But How Do They Know When They’re Choosing a New Home?

No evident difference to a new homebuyer, but...
These Homes Look – And Are – Identical. . . Except for the Code They Meet!

No evident difference to a new homebuyer, but...

2006 IECC

2012/2015 IECC

This House Cost $1,250 More

...Far Less Than 2-3%!
Which Home Would You Choose?
Better Codes = Better Homes

38% more efficient

$10,081 in energy savings over a typical 30-year mortgage after fully recouping $1,250 added cost.

Savings will continue to accrue over the home’s 80- to 100-year life

2012/2015 IECC
Lower Energy Bills Quickly Recoup Efficiency Outlays

Moving from 2006 to 2012/2015 IECC for new Colorado homes...

$5,435
net energy savings over mortgage term after fully recouping cost

1 - 2 years
average time for energy savings to break even with homeowner outlays with 10% down payment on a thirty year loan @ 5%

Source: DOE
**Codes Put Thousands in Homeowner Wallets**

DOE study uses a life-cycle approach, balancing first costs against longer-term energy savings over typical 30-year mortgage – but savings continue for decades more

<table>
<thead>
<tr>
<th>IECC Climate Zone</th>
<th>30-Year Life-Cycle Savings ($US)</th>
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<tbody>
<tr>
<td></td>
<td>IECC 2009 vs. 2006</td>
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<tr>
<td>1</td>
<td>$2,877</td>
</tr>
<tr>
<td>2</td>
<td>$2,443</td>
</tr>
<tr>
<td>3</td>
<td>$1,944</td>
</tr>
<tr>
<td>4</td>
<td>$2,259</td>
</tr>
<tr>
<td>5</td>
<td>$2,466</td>
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<tr>
<td>6</td>
<td>$3,094</td>
</tr>
<tr>
<td>7</td>
<td>$3,622</td>
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<tr>
<td>8</td>
<td>$9,147</td>
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Codes Stabilize Grids; Delay the Need For New Power Plants

The 2011 Prediction:
Continued savings of the magnitude of recent efficiency gains in building energy codes and appliance standards “will completely offset the anticipated growth in demand in the residential, commercial, and industrial sectors combined, eliminating the need for additional power plants to serve these sectors through 2025.”

Institute for Electric Efficiency White Paper  May 2011

The 2014 Evidence:
“Improvements in energy efficiency for buildings & appliances appear to have broken the traditional connection between electricity demand & economic growth.”

Duke Energy CEO Lynn Good, 1/6/2014 Financial Times interview
And . . . Building Energy Codes Reduce CO2 Emissions
A Win-Win from Converging Two Paths

The Codes Path
After 20 Years of Meager Gains, EECC formed in 2007.
3 Code Cycles Later, a 38-54% Efficiency Boost for Homes & Commercial Buildings.

The Carbon Path
17 Years After Kyoto Protocol, EPA Proposes Clean Power Plan
In 2014, Prospects for the Clean Power Plan Suffered Potentially Fatal Blow . . . but

Codes Can Help Reduce GHGs
Reducing GHGs Can Help Codes
EPA proposes new rule June 2014 under CAA’s Section 111(d)

Each state given CO2 target/emission standard, based on:
- Existing CO2 reduction strategies underway,
- State’s fuel mix/electricity market
Rare EPA Mood: 4 Business Friendly BSER “Building Blocks”

1. Power plant efficiency reductions **inside the fence line**, OR
2. Redispatch: use natural gas combined cycle instead of coal,
3. Generate w/nuclear & renewables,
4. Employ **demand side energy efficiency**
“The combination of all four blocks best represents the BSER because it achieves greater emission reductions at a lower cost, takes better advantage of the wide range of measures that states, cities, towns and utilities are already using to reduce CO2 from EGUs and reflects the integrated nature of the electricity system and the diversity of electricity generation technology.”
What Does It Mean to Our Nation

Alliance to Save Energy: “If all states had adopted the 2012 IECC in 2012 and achieved full compliance by 2013 ...”

– 3.5 quadrillion Btu annual energy savings by 2030.

– $40 billion annual energy cost savings by 2030.

– 200 million metric tons of carbon dioxide emissions avoided annually by 2030.
<table>
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<th>Equivalents</th>
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<tbody>
<tr>
<td>3.5 quadrillion Btu annual energy savings by 2030.</td>
<td>=</td>
<td>Enough to heat 3.5 million average homes each year</td>
</tr>
<tr>
<td>$40 billion annual energy cost savings by 2030.</td>
<td>=</td>
<td>Value of all 32 NFL teams = $32.7 billion. (Forbes)</td>
</tr>
<tr>
<td>200 million metric tons of carbon dioxide emissions avoided annually by 2030.</td>
<td>=</td>
<td>Annual CO2 emissions from 39,215,686 cars or</td>
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<td></td>
<td></td>
<td>Annual CO2 emissions from 47.4 coal fired power plants (U.S. EPA)</td>
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CODES ARE THE MOST COST EFFECTIVE MEANS OF GREENHOUSE GAS REDUCTION
The 2012 IECC “represents the largest, one-step efficiency increase in the history of the national model energy code.”

In fact, DOE found that the 2012 IECC represents a whopping 32% improvement in US energy savings over the 2006 IECC.
MUCH ADO ABOUT BUILDING ENERGY EFFICIENCY: RECAPPING THE PAYOFFS FROM STRONGER CODES

– Generates immediate positive cash flow to owners
– Only incentive for rental property efficiency
– Improves building quality = greater occupant comfort
– Delays need for new power plants by reducing overall demand on electricity grids; particularly peak load
– Helps stabilize energy cost to all homeowners, businesses, manufacturers (particularly those using gas as feedstock)
– Locks long lasting benefits in for generations
– Reduces dependence on America’s energy imports – expands capital/jobs here in US
– Employs the most cost-effective means of GHG reductions