The Energy Efficiency Opportunity

American Council for an Energy-Efficient Economy
Washington, D.C.
7 December, 2010

Meeting the energy and climate challenge holds enormous opportunities for the United States.

For the next few decades, energy efficiency will be one of our best and most immediate options to:

- Create jobs and save money by saving energy

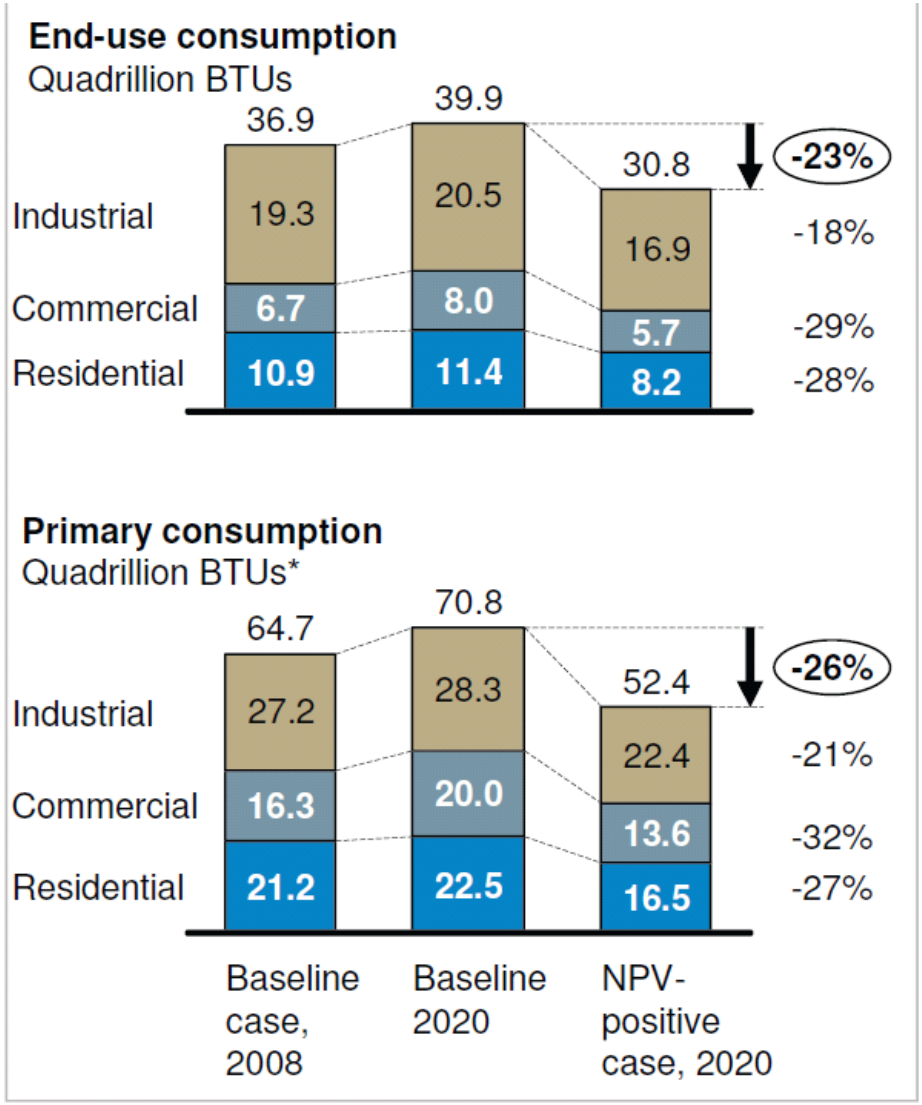
Creating Jobs, Saving Families Money by Making Homes More Efficient

Recovery Act included ~ $11B for building efficiency upgrades and local energy efficiency efforts, including $5B for home weatherization.

"Better Buildings" –initiative to fund building retrofit programs that reach ***whole neighborhoods***

Home Star – Would provide rebates directly to homeowners to create jobs and save energy.

Even if we assume a **20% cost of capital and *no* price on carbon**, the McKinsey study shows that 7.2 Quads of energy (18% of retail costs and ~21% if energy produced) can be saved.



Energy efficiency could reduce annual greenhouse gas emissions by 1.1 giga-tons at a *savings* of $680 Billion, based on Net Present Value (NPV)* estimate.

* NPV calculation assumes industrial retail rate of electricity and a 7% per year discount rate for the cost of capital

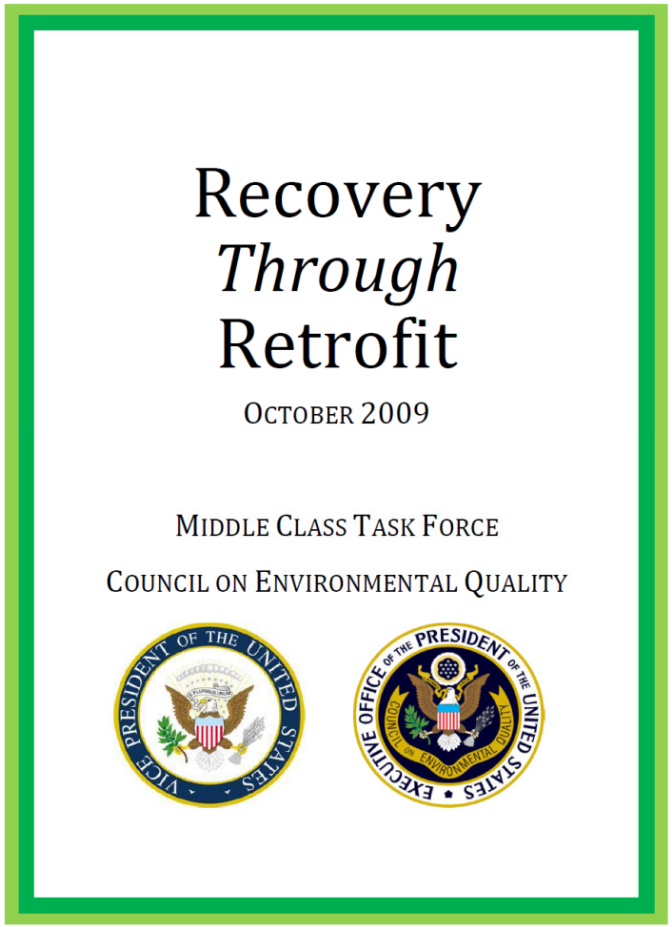
1) Many mainstream economist argue that the McKinsey estimates are wrong.

2) If the McKinsey analysis is correct, there would have to be substantial market failures.

There *are* well-known market failures that prevent energy and money savings from being realized.

1) Inertia and habits
2) Lack of information
3) Lack of investment capital
4) Full energy costs have not been internalized
5) Principal Agent Problems
6) Some cost effective energy measures don't even appear on the radar screen.

Building a self-sustaining industry for home energy upgrades



Initiative to overcome barriers: inconvenience, lack of information, lack of financing.

- **Home Energy Score program:** will give straightforward information about a home's energy usage and recommendations for improvements.

- **PowerSaver Loan pilot program:** will allow homeowners to make efficiency upgrades through affordable federally-insured loans from private lenders.

Converting from conventionally designed power supplies (40-50% efficient) to *switched mode power supplies* (80-90% efficient) can save about 1% of total U.S. electricity consumption. External supplies are usually left plugged when not in use, and consume from 1 - 35 watts of power.

Standby power consumes ~10% of all residential electricity in the U.S. In 2001, President *George W. Bush* signed an executive order directing federal agencies "to purchase products that use no more than one watt in their standby power consuming mode." In 2007, California standard requires external power supply standby power to be 0.5 watts or less.

1987: National Appliance Energy Conservation Act

2000: DOE, ACEEE analysis shows that appliance standards reduced U.S. electricity use by 1.2 Quads = 88 TWh (2.5% of total electricity use).

1987 – 2000:

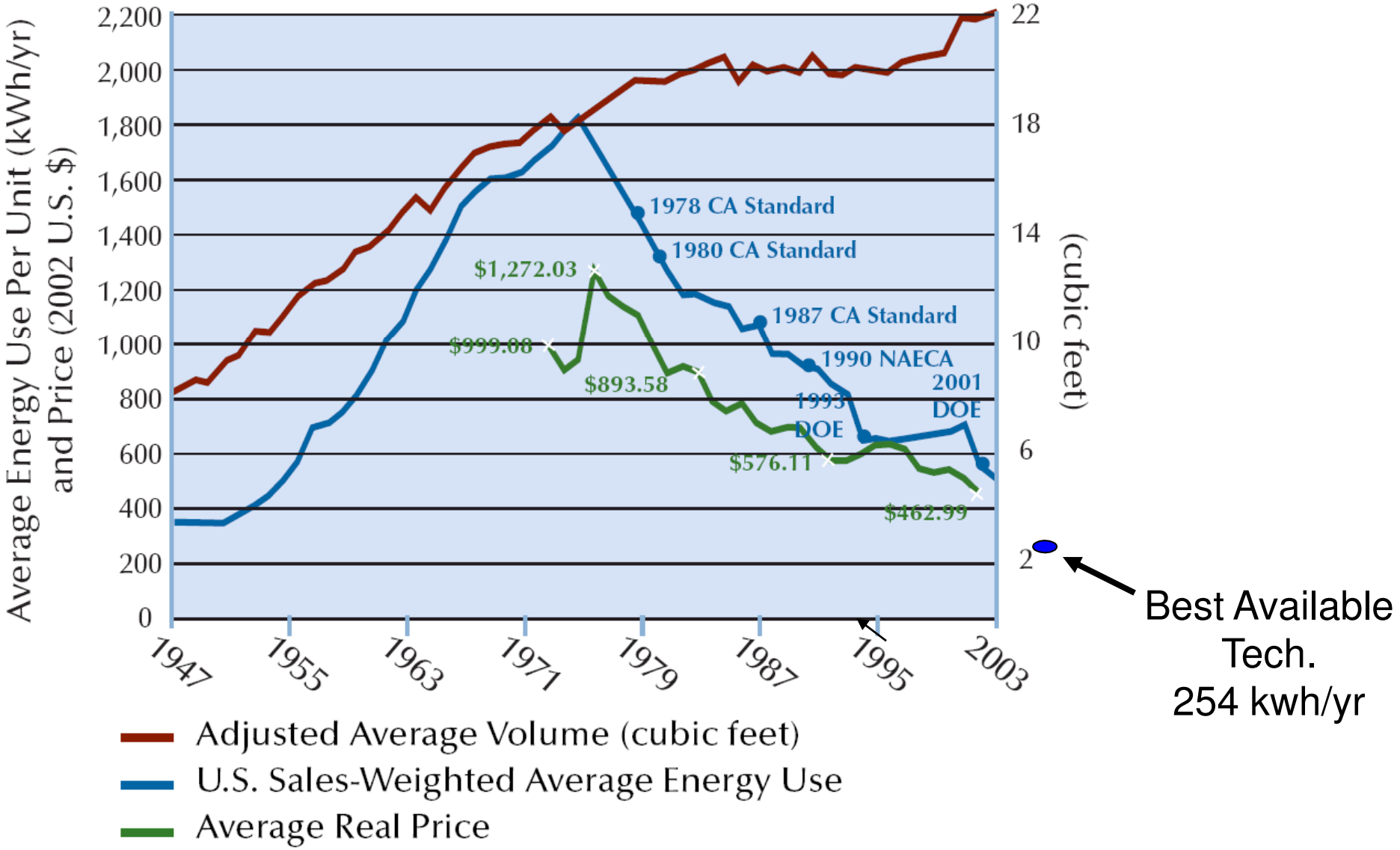
Appliance standards saved ~$50 B in reduced energy bills.
Appliance costs: ~ $15B
Net savings: ~ $35B.

2010: Energy Savings ~ 250 TWh/year (2.8x more)

- **Ronald Reagan** signed the Appliance Energy Conservation Act.
- **George W. Bush** signed the executive order on standby power.

Government actions that help Americans save money should have *enthusiastic bipartisan support*!

Refrigerator energy savings (3%) is greater than ***all*** of US renewable energy generation



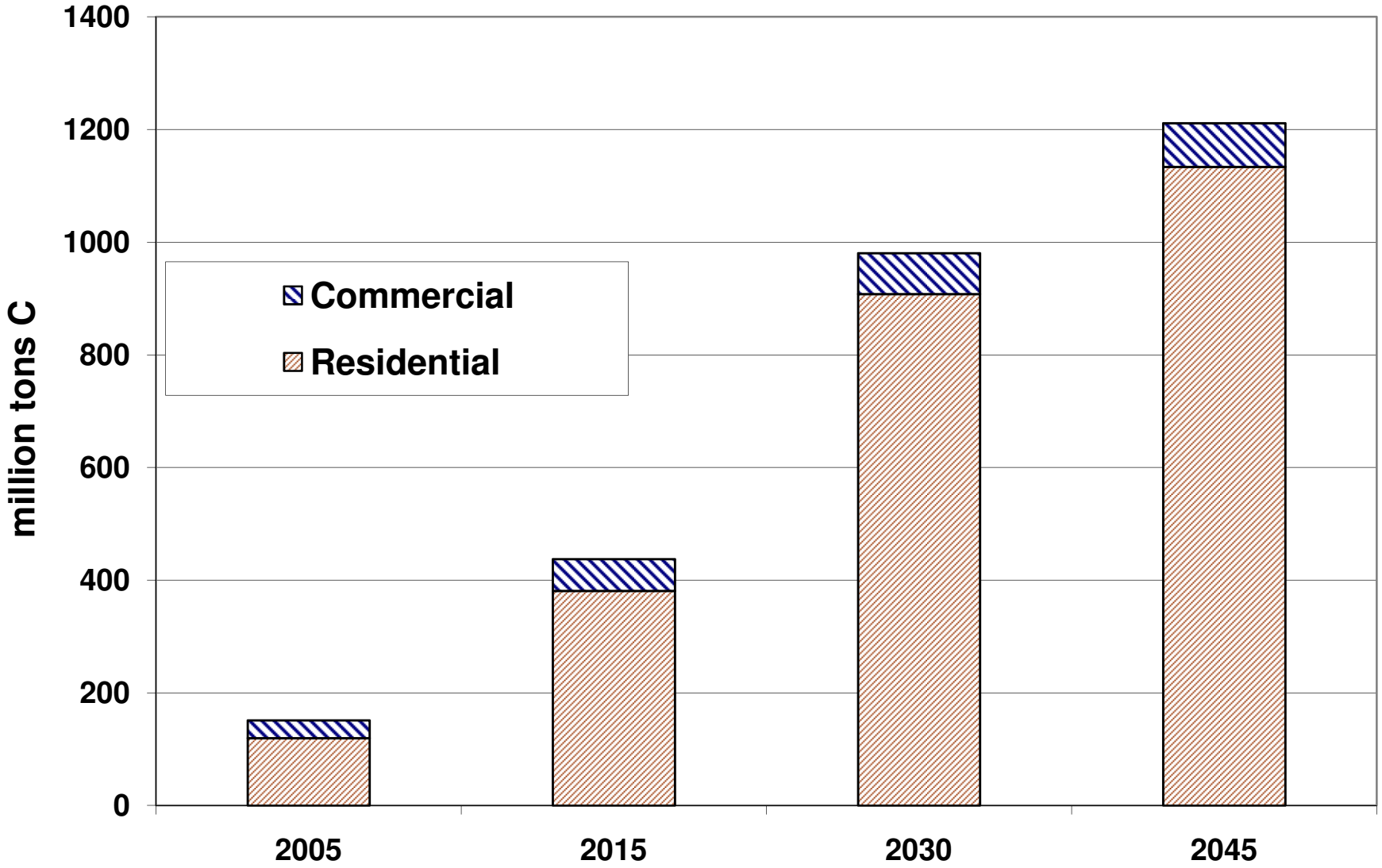
Efficiency: Saving Families Money

Existing appliance standards save the average American family $176 per year on its utility bills.

The Department of Energy is improving and enforcing appliance energy efficiency standards.

This will save consumers between **$250 billion - $300 billion** through 2030.

Cumulative CO_2 Emissions Reduction from Federal Standards for Residential and Commercial Products



Source: LBNL, March 2008

Economic Growth through Export of Energy Efficient Technologies

Today, the Administration is launching a new initiative to boost exports of U.S. clean energy technologies.

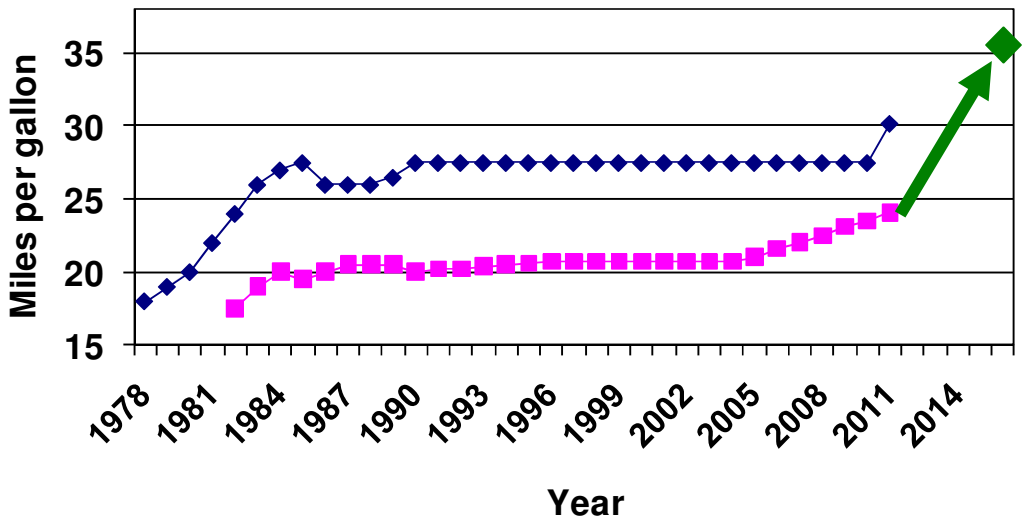
- Improve access to existing markets and create new markets: Energy efficient appliances and machinery will be in increasingly high demand.

- Increase exposure of U.S. companies and technologies abroad

For the next few decades, energy efficiency will be one of our best and most immediate options to:

- Create jobs and save money by saving energy
- Reduce our dependency on oil

President Obama announced a new U.S. automobile and light truck fuel standard -- **35.5 mpg by 2016**



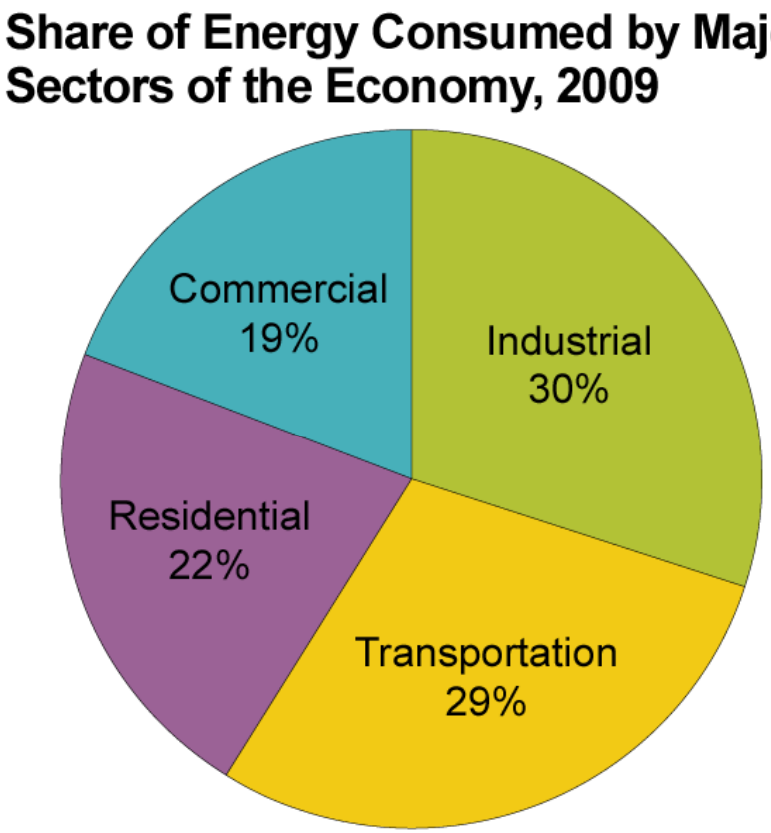
Projected savings ~1.8 billion barrels over the lifetime of vehicles sold in next five years

Also proposed the first-ever fuel efficiency standards for medium and heavy-duty trucks, vans, and buses.

Now we need to keep the momentum going.

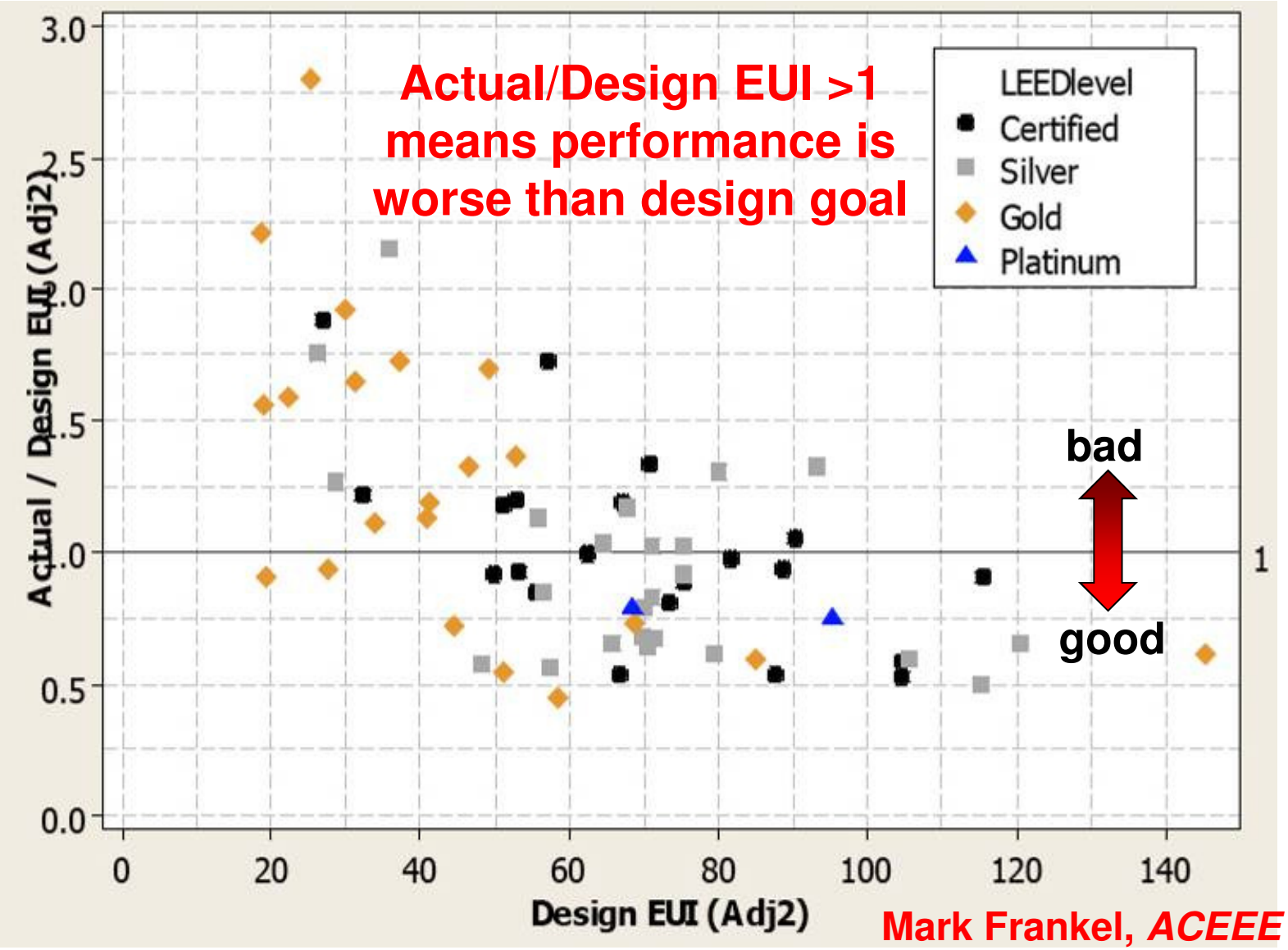
We need a better understanding of how to achieve energy savings that save money.

Energy Innovation Hub: Energy efficient buildings



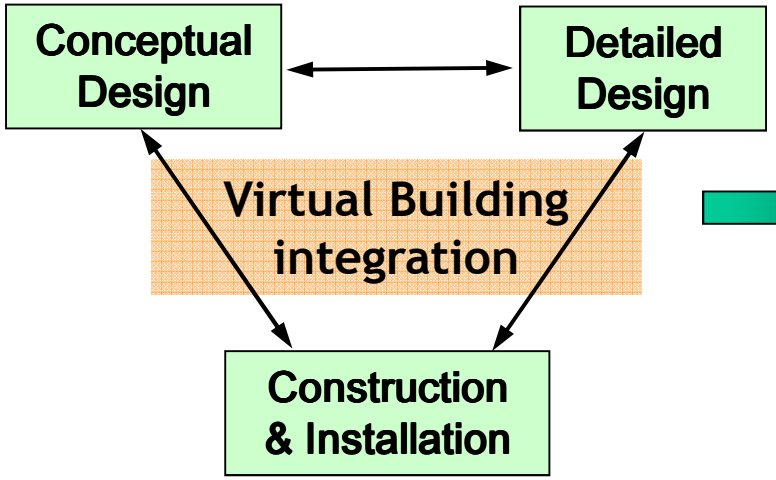
- RD&D on highly efficient building components, systems, and models
- For retrofit and new construction, and for single buildings and district-wide systems.

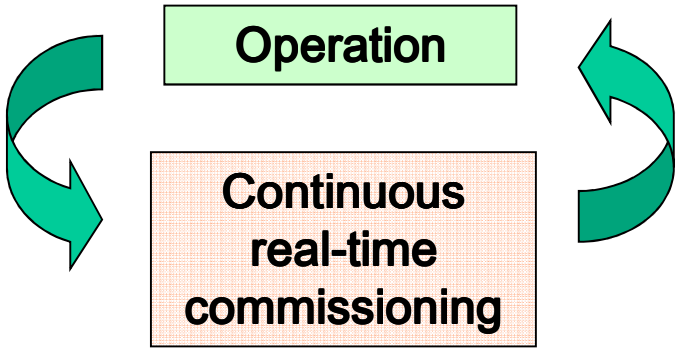
We need ratings based on **measured** performance



Mark Frankel, *ACEEE* (2008)

Buildings consume 40% of energy in U.S.:
A new way of designing and constructing buildings





Computer-aided design tools with Embedded Energy Analysis

Computer-controlled operation with Sensors and Controls for Real-Time Optimization

- Oxygen sensor
- Air pressure sensor
- Air temperature sensor
- Engine temp. sensor
- Throttle position sensor
- Knock sensor

Buildings consume 40% of energy in U.S.:
A new way of designing and constructing buildings

Computer-aided design and operation will lead to enhanced comfort, energy savings

and

cost savings.

Energy Efficiency ⇔ Money Saved

- Oxygen sensor
- Air pressure sensor
- Air temperature sensor
- Engine temp. sensor
- Throttle position sensor
- Knock sensor

EIA is expanding energy consumption surveys; adding new offices dedicated to energy consumption and efficiency statistics and analysis

- Residential Energy Consumption Survey (RECS)
  - 1X = ~5,000 households; 3X = ~15,000 households
- Commercial Building Energy Consumption Survey (CBECS)
  - 1X = ~6,500 buildings; 1.5X = ~9,700 buildings (contingent on congressional appropriations)
- Manufacturing Energy Consumption Survey (MECS)
  - ~12,000 industrial establishments; every 2 vs. 4 years (contingent on congressional appropriations)
- Electric utility surveys (3,300 electricity sellers/distributers)
  - Demand Side Management (DSM) programs (800)
  - Smart grid data collection
    - advanced metering infrastructure (AMI)
    - pricing programs

- The cost of oil will rise in the coming decades.
- The risks of climate change are becoming increasingly apparent. We *will* live in a carbon constrained world.
- China, EU countries and others see the economic opportunity and are moving aggressively.

America ***still*** has the opportunity to lead the world in a new industrial revolution and secure our future prosperity, but time is running out.

The train is leaving the station.