

# Driving Global Progress on Clean Energy

Secretary Steven Chu  
Clean Energy Ministerial  
Washington, D.C.  
20 July 2010

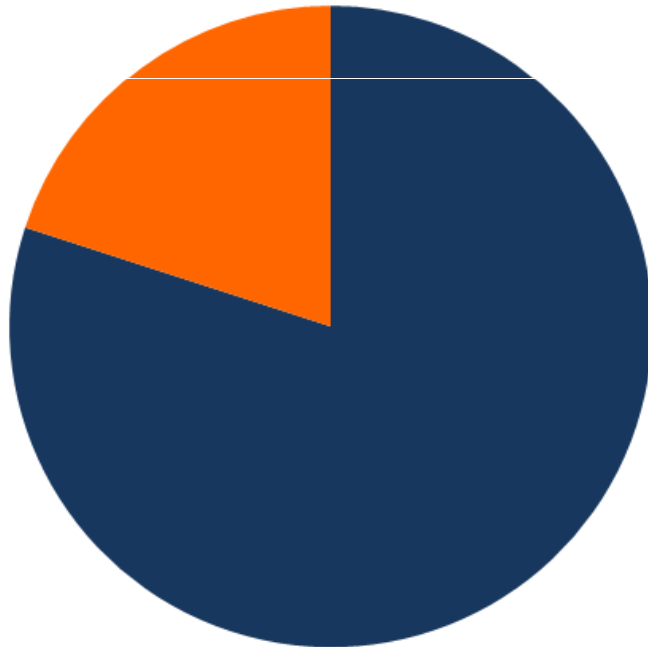


# CLEAN ENERGY

MINISTERIAL

Washington, D.C. July 19-20, 2010

Represented here today:



**80% of world  
energy use**

4 billion people

\$50 trillion in GDP



# CLEAN ENERGY MINISTERIAL

Washington, D.C. July 19-20, 2010

Even as we pursue comprehensive energy legislation here at home and a binding international agreement, we're taking strong action now

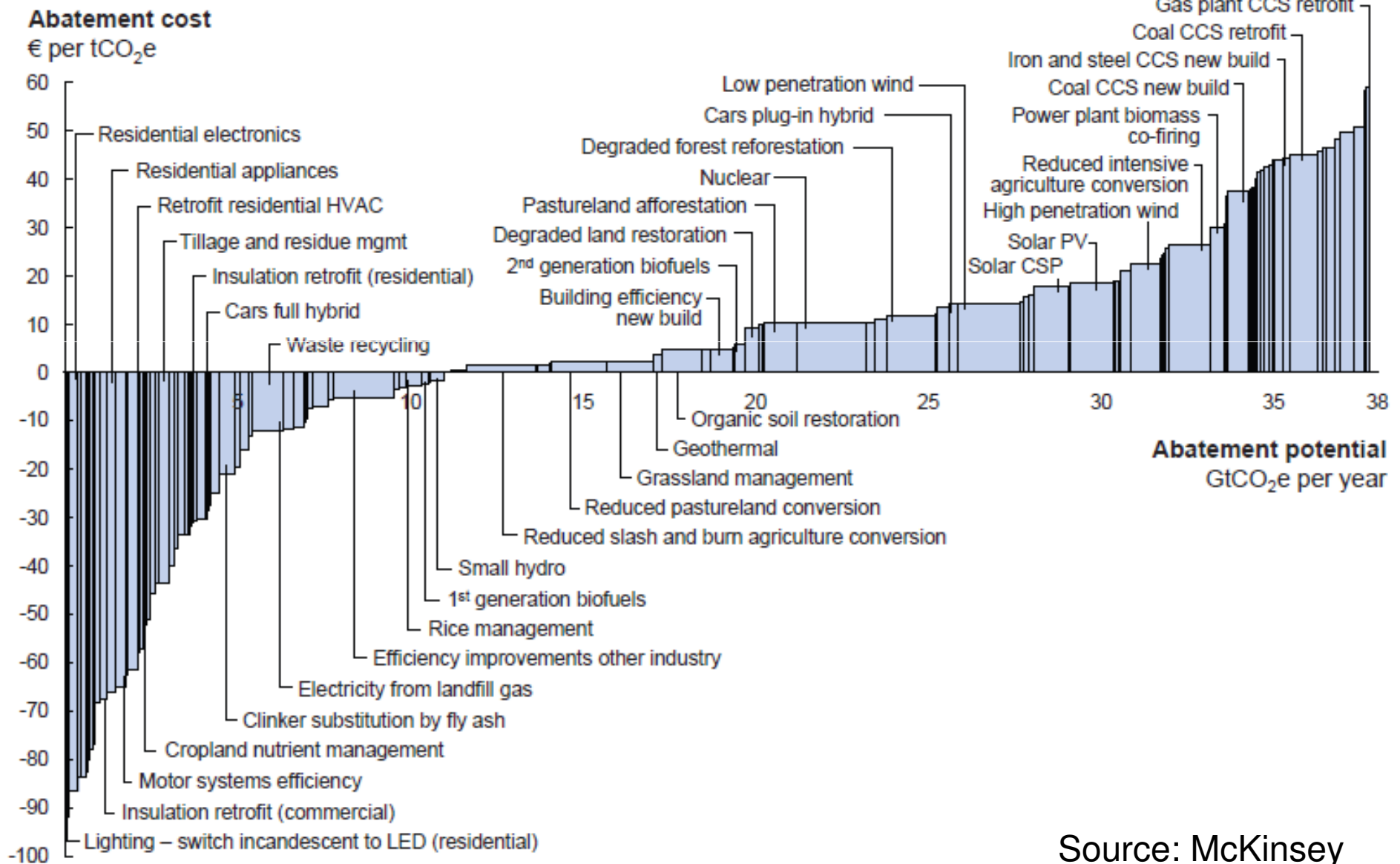
Today, we're announcing significant initiatives in:

- Energy efficiency
- Clean energy
- Energy access

**Many countries are taking leadership roles**

# Energy efficiency is the “first fuel” of the clean energy revolution

Projected 2030



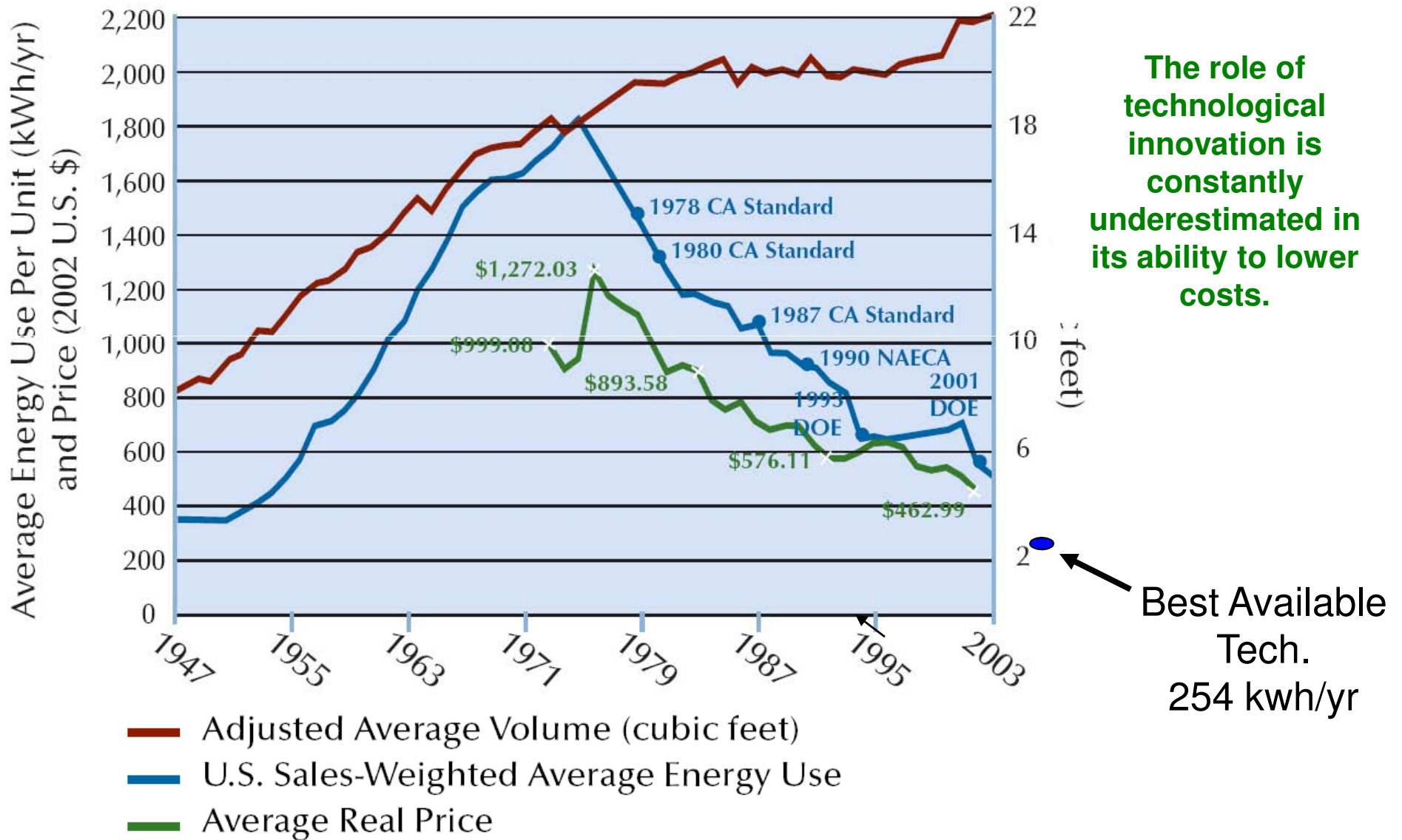
Source: McKinsey

# Today, we're launching the **Global Energy Efficiency Challenge**

Initiatives in: appliances, buildings,  
vehicles, and Smart Grid,



# Standards stimulate technology: Refrigerator efficiency standards and performance



## Refrigerator energy rules to change in 1993

The decision drew quick criticism from the appliance industry, which contends the technology to meet the new standards does not exist and is not likely to by 1993.

"Shell-shocked, that's how we react," said Frederick Hallett, vice president of White Consolidated Industries, maker of Philco and other refrigerator brands.

"This is akin to telling the automobile industry it has to have a mileage standard of 50 miles a gallon," Hallett said, adding that the tougher requirements "will force some refrigerators and freezers off the market" by 1993.

AP; November 28, 1989

## Fridge of future may take step back

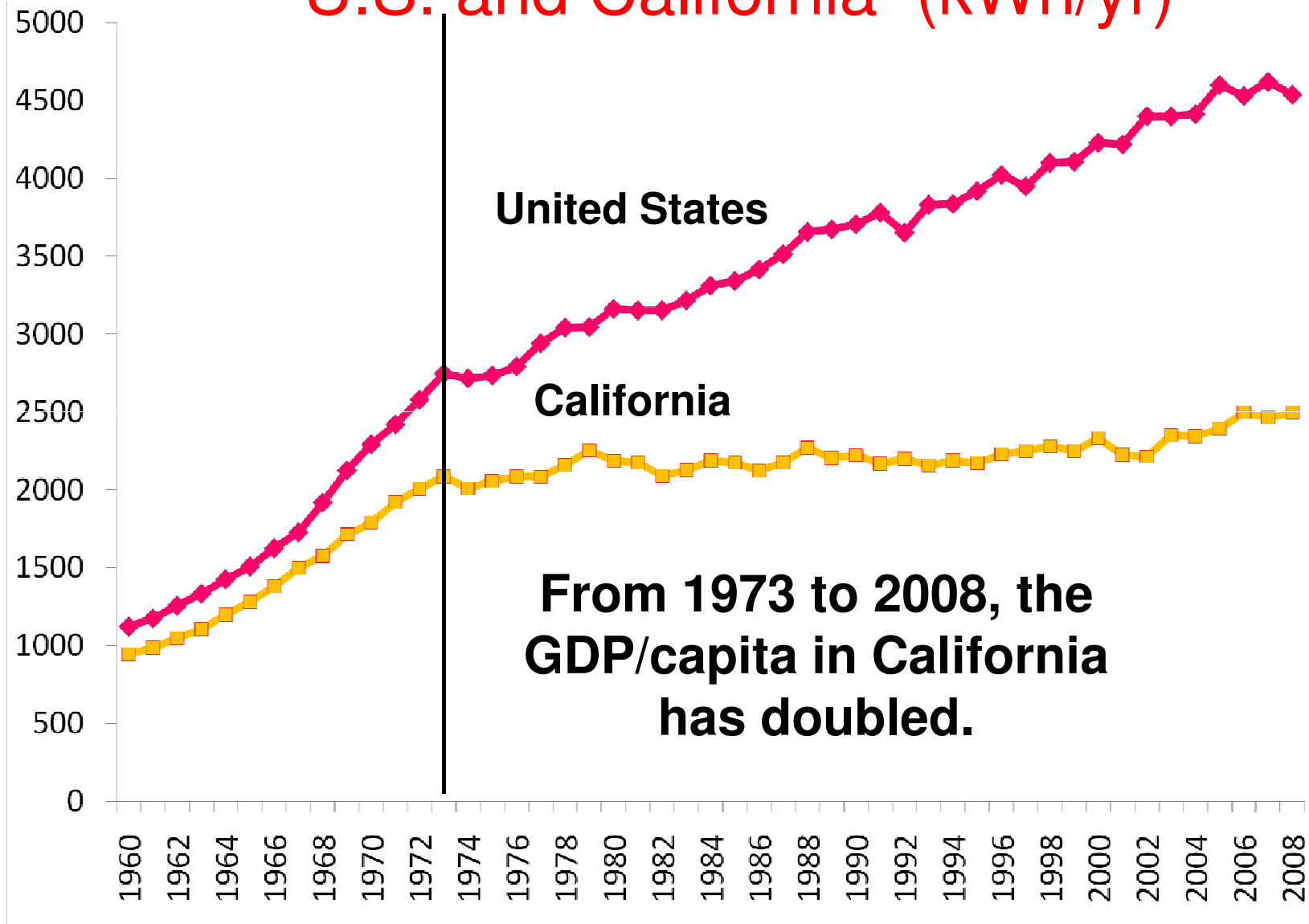
By John Holusha  
N.Y. Times News Service

Robert Gants, another official of the association, said, "We are probably going to end up with heavier, bulkier refrigerators." Prices probably will be higher as well, he said, because of the costs of redesigning the appliances and retooling production lines.

Indeed, according to the association, just redesigning compressors and other parts of the cooling system will add \$100 to \$120 to the price of a typical refrigerator.

(Re: Ozone phaseout)  
March 8, 1989

# Residential electricity use per person – U.S. and California (kWh/yr)



Source: EIA





1 “Rosenfeld” of  
energy savings

=



1 medium-sized  
power plant  
(500 MW)

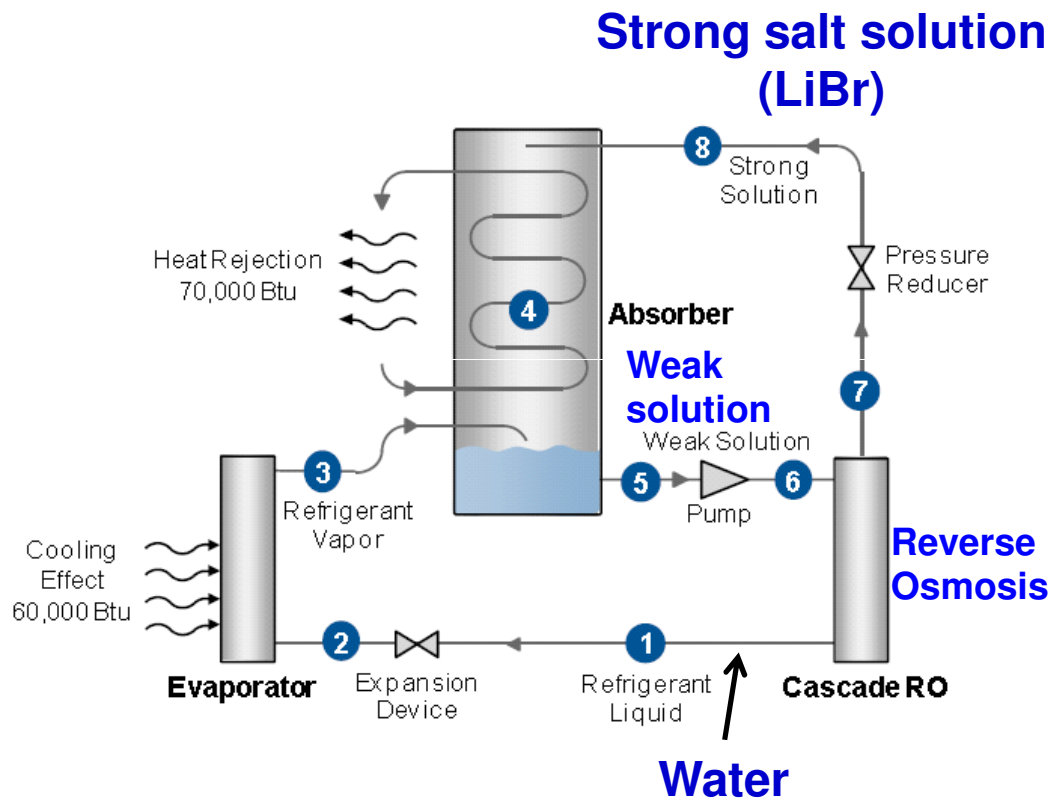
# The Department of Energy is systematically enforcing appliance standards for the first time



We've issued the first:

*test notices, subpoenas, consent decrees, notices of civil penalty, notices of noncompliance, and defeated a court challenge over improper use of the Energy Star logo*

# ARPA-E Goal: Cut cooling energy consumption by 25 – 40%

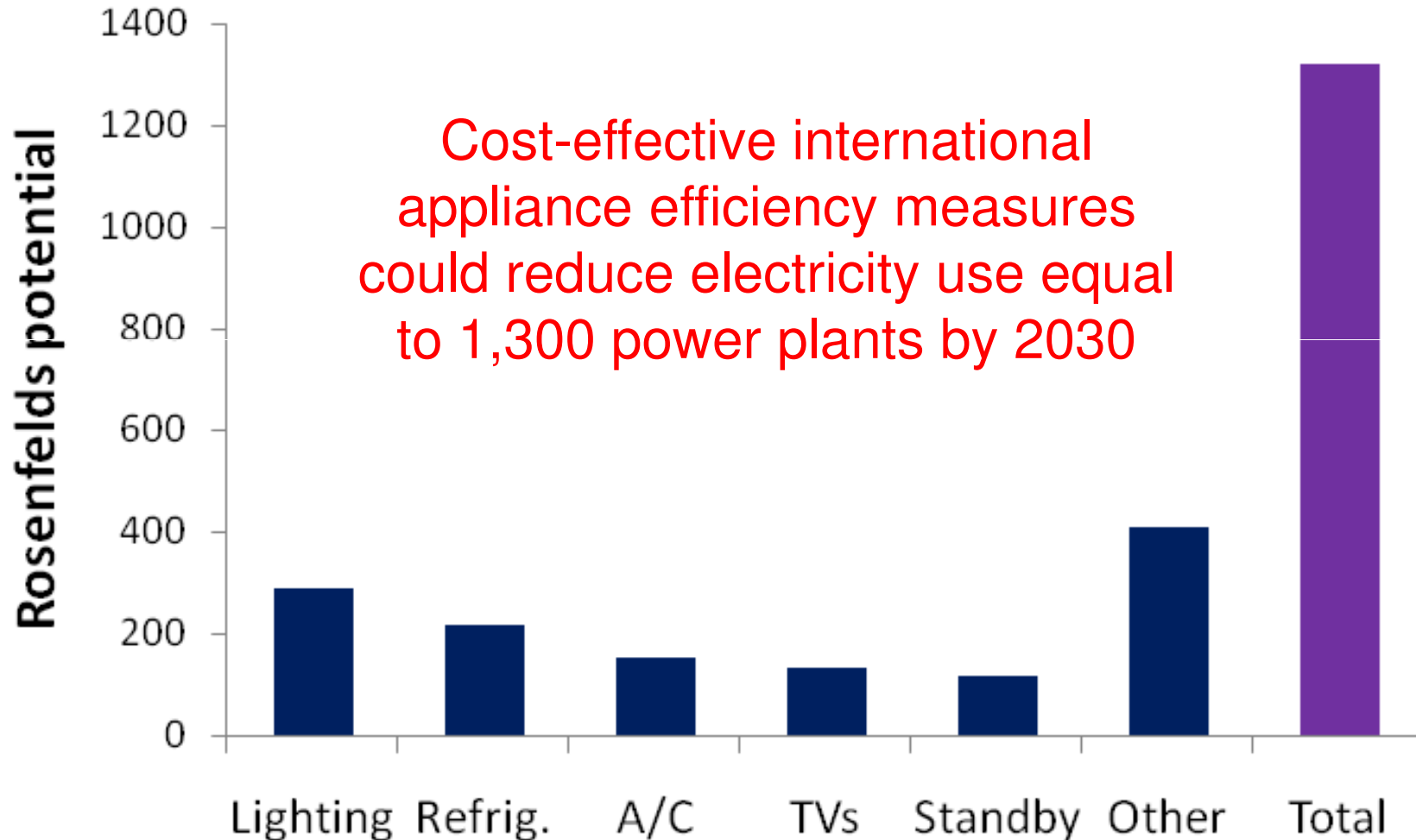


Water (Refrigerant) & LiBr (absorbent)

Novel approaches to cooling, including an absorption-osmosis cooling cycle

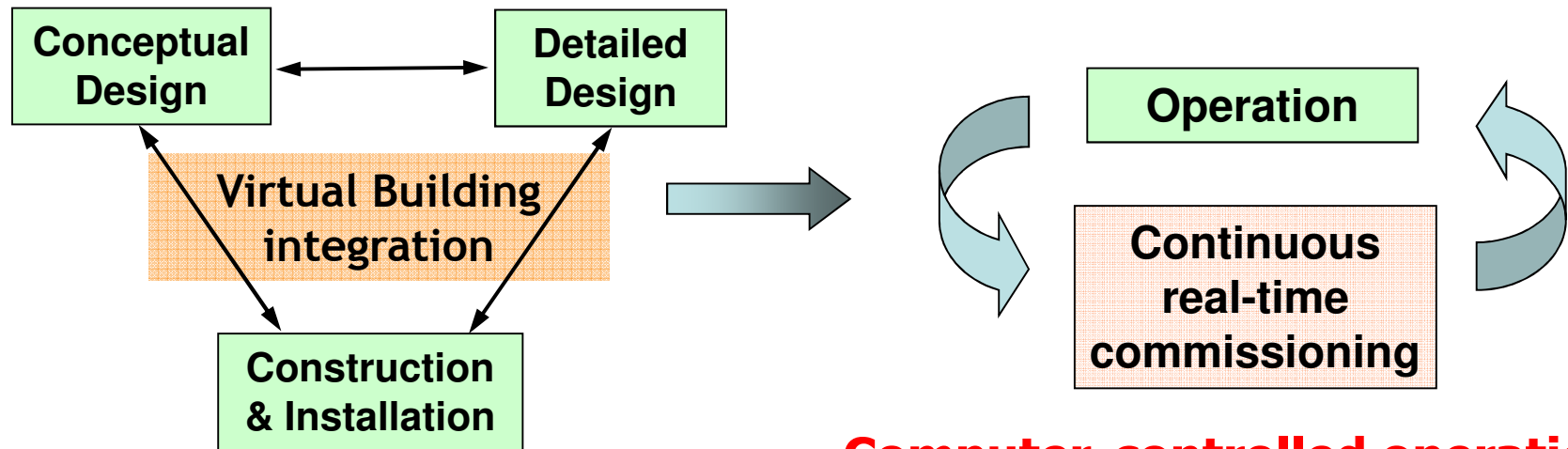


The **Super-efficient Equipment and Appliance Deployment initiative** will help transform the global appliance market



Source: LBNL, July 2010.

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



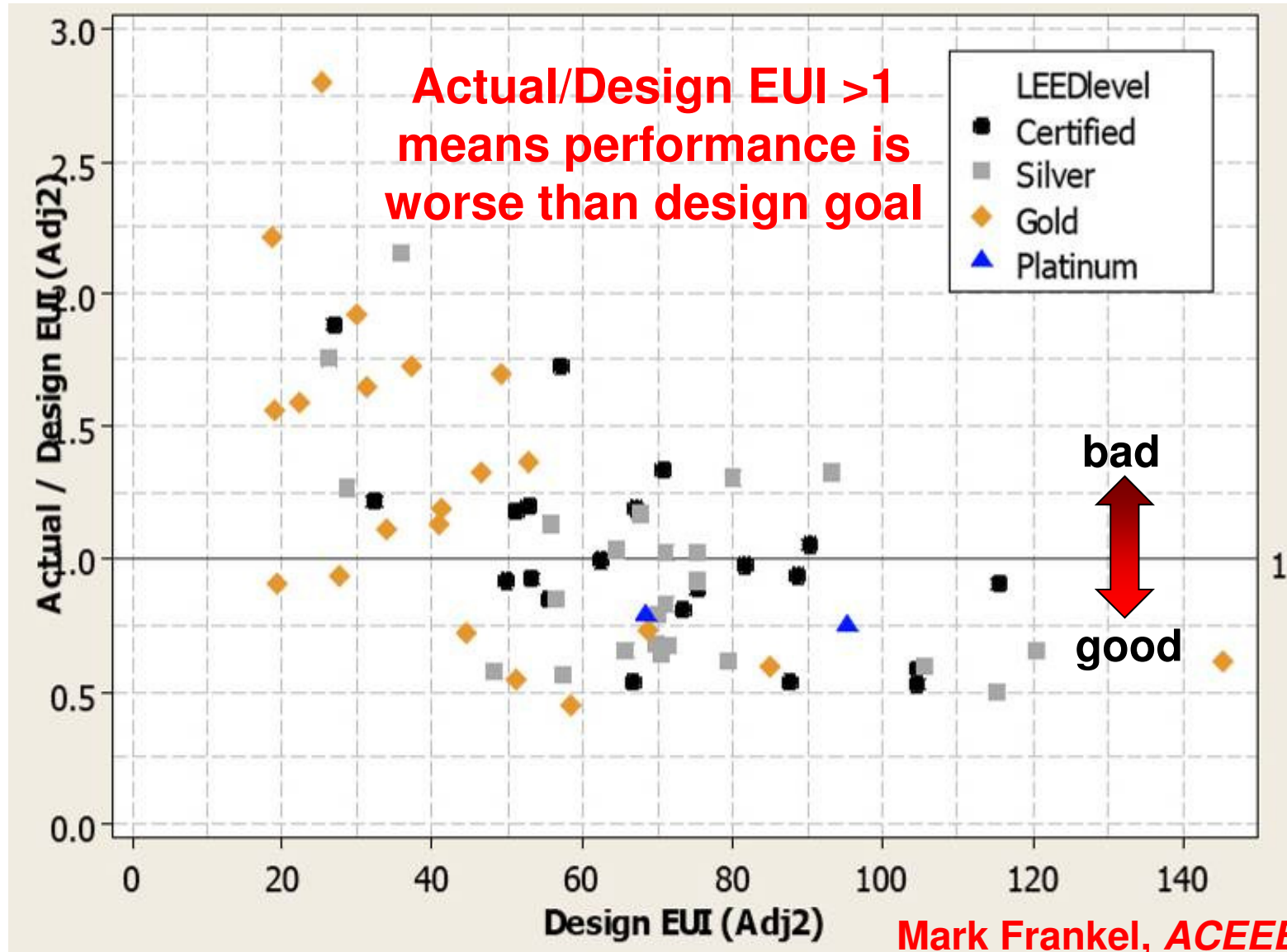
**Computer-aided design tools  
with Embedded Energy Analysis**

**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

# We need ratings based on **measured** performance



Mark Frankel, ACEEE (2008)



Dallas, Texas

Retrofitting urban roofs and pavements with solar-reflective materials is equal to eliminating carbon emissions from all automobiles for 11 years.

## White roofed buildings:

Sunlight energy is reflected back into space rather than heating up buildings and homes in the summer.

Santorini, Greece



The **Global Superior Energy Performance Partnership** will help large buildings and industrial facilities manage their energy use

Includes a “Cool Roofs Task Group”



**TARGET**

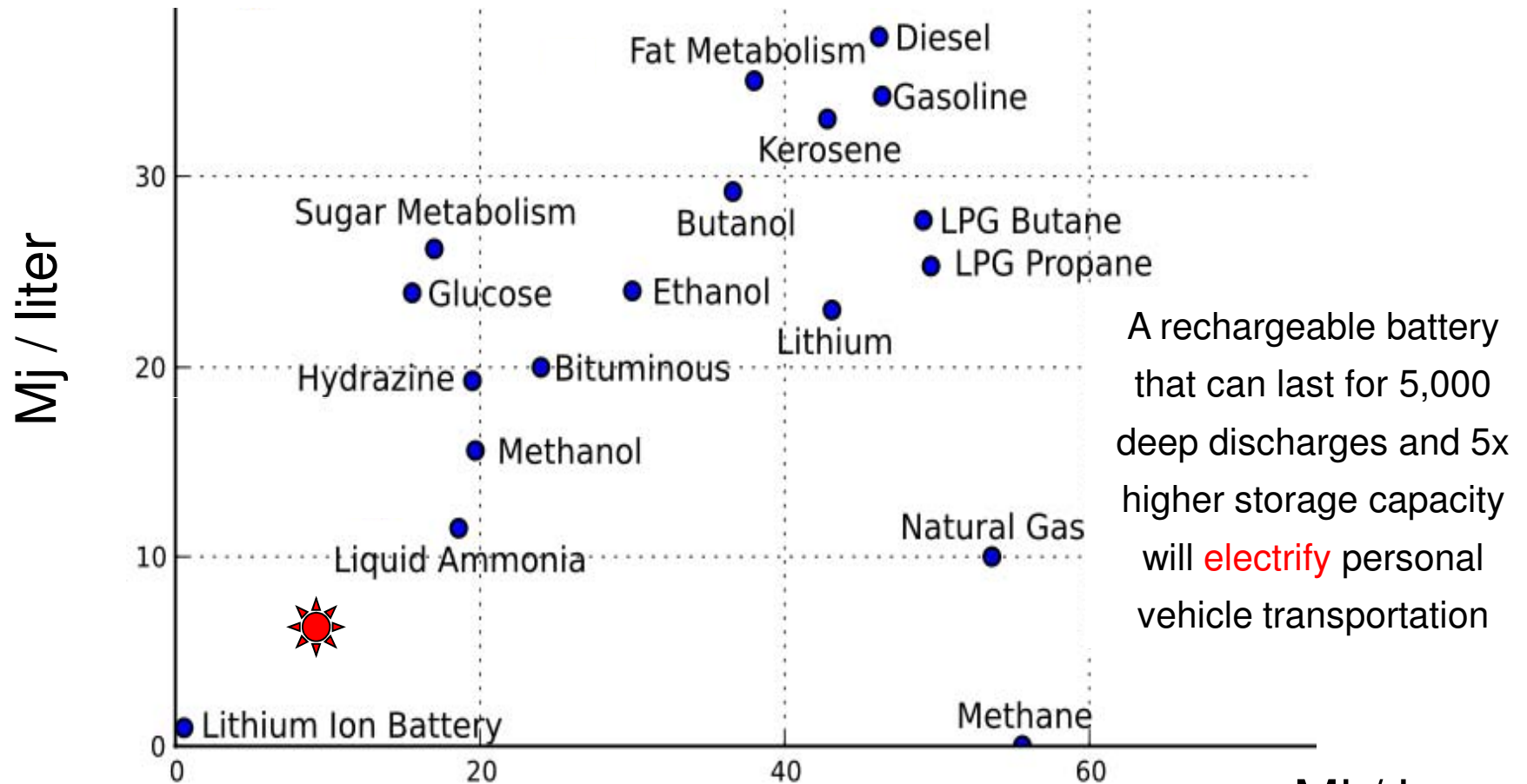


Pilot companies have over \$600 billion in annual sales





# Energy densities of chemical fuels and the best commercial battery



Body Fat

38 MJ/kg

35 MJ/liter

Kerosene, jet fuel

43 MJ/kg

32 MJ/liter

Lithium ion battery

0.54 MJ/kg

0.9 MJ/liter

MJ / kg

Question: What does a Boeing 777 have in common with a Bar-tailed Godwit?



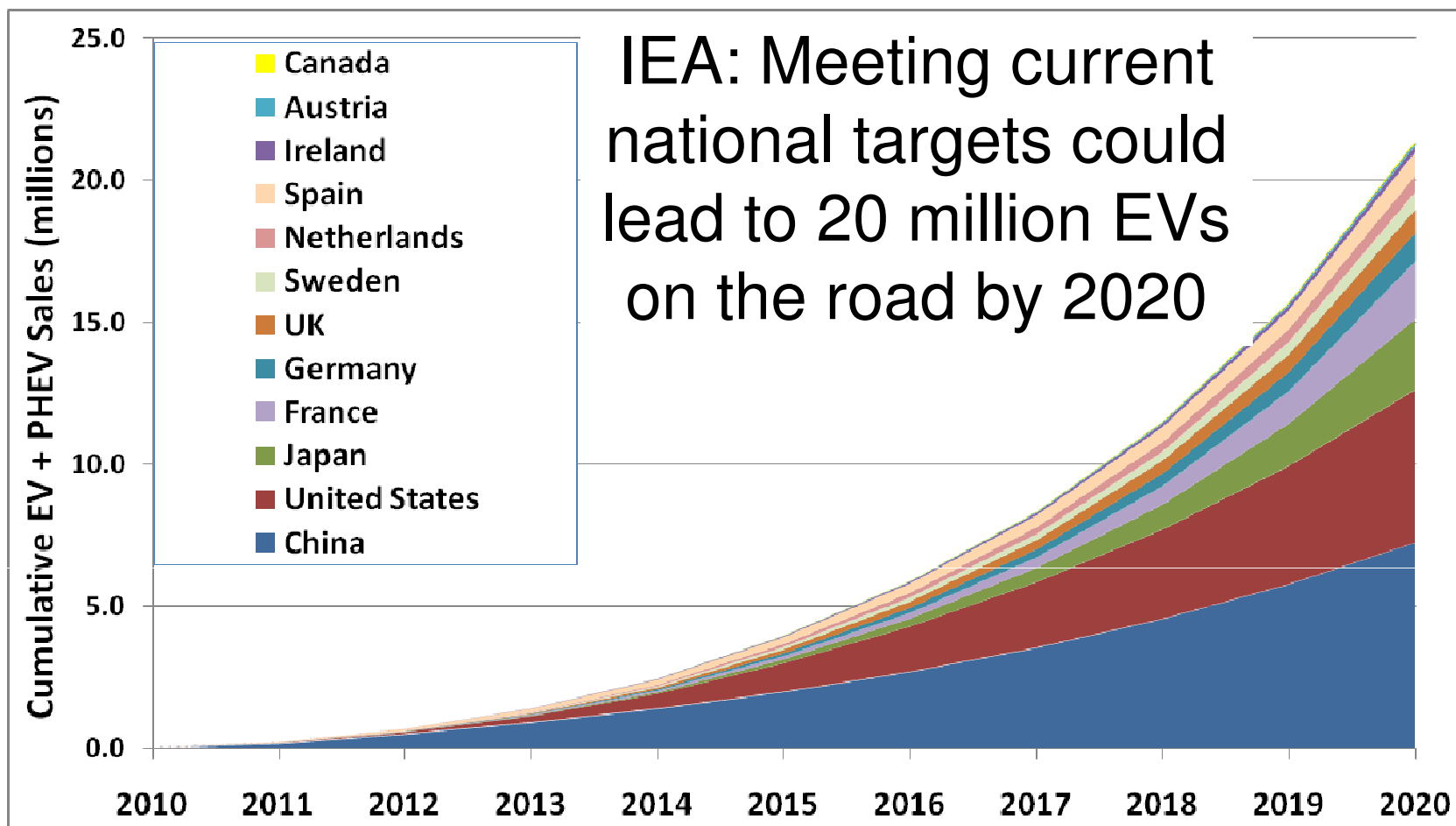
Boeing 777



Bar-tailed Godwit

Answer: Both can fly non-stop 11,000 km.

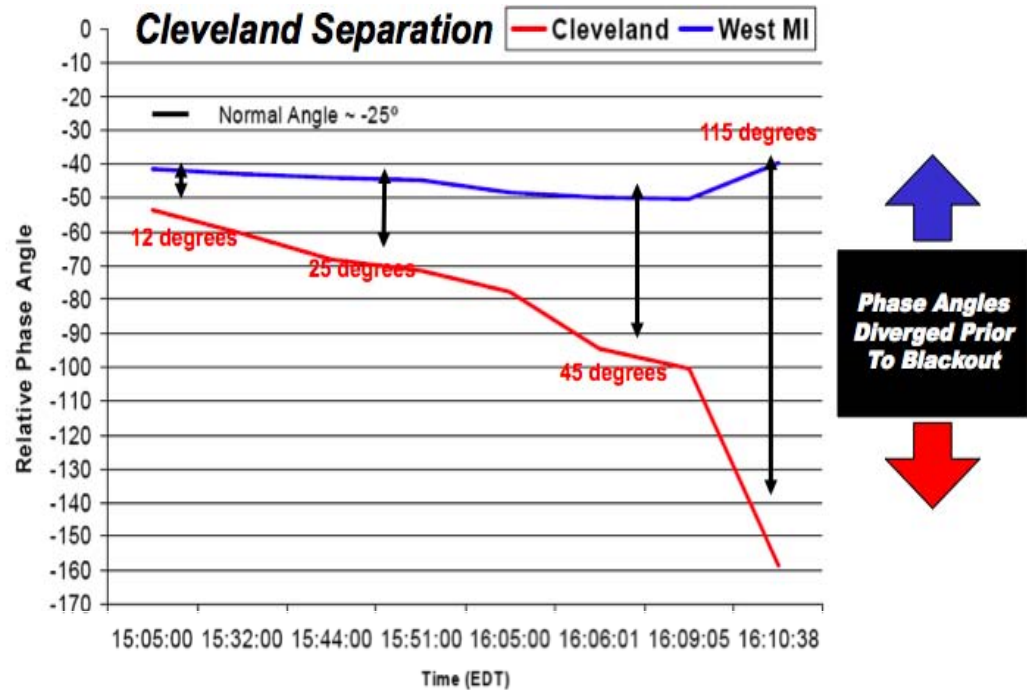
At take-off, the fuel weighs  $\sim 50\%$  of their total weight.



The **Electric Vehicles Initiative** will help countries deliver on their electric vehicle targets

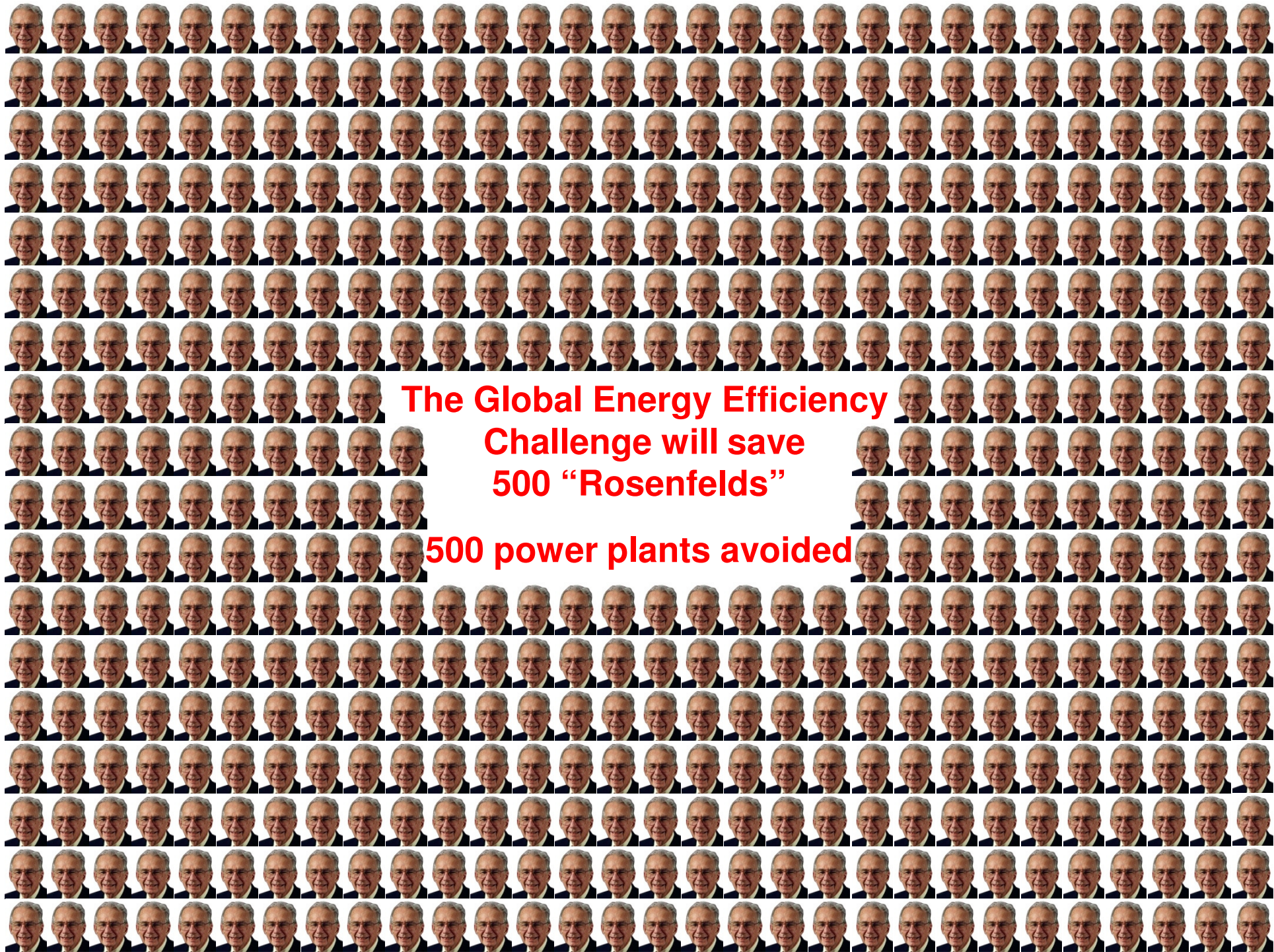


Smart meters give consumers more control over their energy use



Blackouts have precursors. Phasors would have given grid operators 30-40 minutes warning and prevented 2003 blackout in U.S.

The **International Smart Grid Action Network** will promote seamless global smart grid development



**The Global Energy Efficiency  
Challenge will save  
500 "Rosenfelds"  
500 power plants avoided**

# The Clean Energy Education and Empowerment Women's Initiative

Leaders from academia, government, & industry committed to empowering women and girls through education and energy



Less than 20% of the professional energy workforce today is comprised of women

We are making announcements today on:

## Clean Energy Supply

### Renewable Energy

*Denmark, Germany and Spain*

### Carbon capture, use & storage

*United Kingdom and Australia*



## Energy Access

### Ethanol for domestic use

*Brazil*

### Solar LEDs

*United States and Italy*



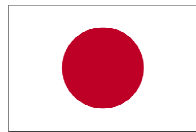


# I'm pleased to thank the hosts of the next Ministerials

**CLEAN ENERGY**  
MINISTERIAL

**2011: United Arab Emirates**

**2012: United Kingdom**



## Earthrise from Apollo 8 (December 24, 1968)



"We came all this way to explore the moon and the most important thing is that we discovered the Earth."

Bill Anders, Apollo 8 Astronaut