The Future of Energy

U.S. DEPARTMENT OF ENERGY

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Assistant Secretary

Office of Policy and International Affairs

Energy Investment Roundtable

Jakarta

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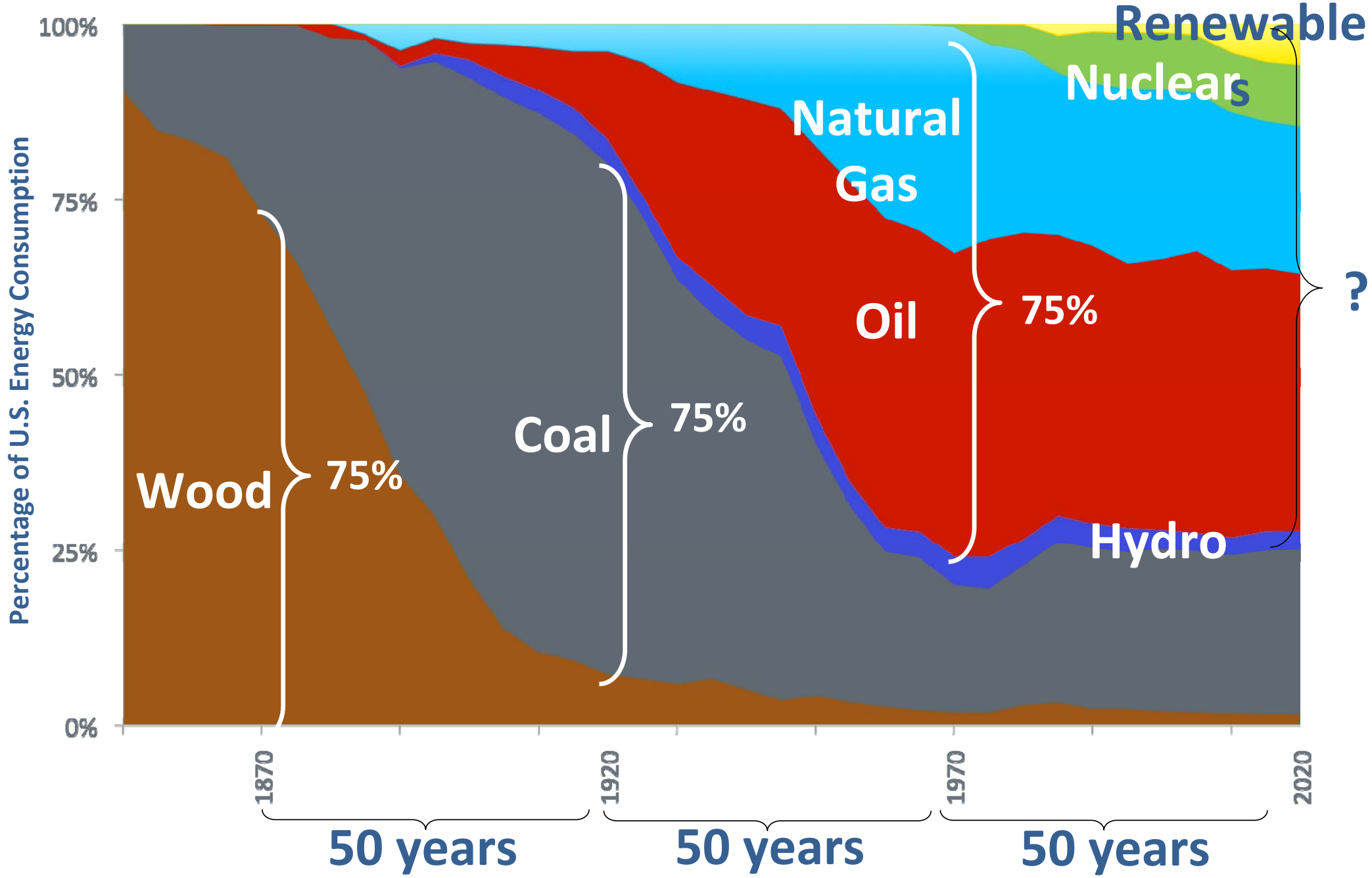
History of Energy Use

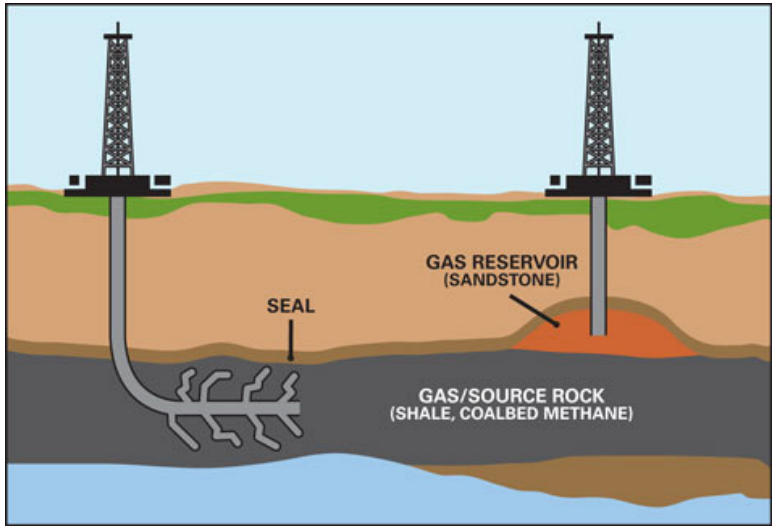


Sources: EIA, *Annual Energy Review: 2008* and EIA, *Annual Energy Outlook: 2009 with Recovery Act Update*

US Government Funded Research

Internet

Google



Shale Gas

U.S. Clean Energy Policy

includes…

(1) Recovery Act Investments

(2) R&D Strategy

(3) Better Standards

Recovery Act: Unprecedented Investment

$90 billion

Largest Federal energy investment in history

Some key elements:

$29 B Energy Efficiency

$21 B Renewable Energy

$10 B Grid Modernization

$6 B Advanced Battery Manufacturing and Biofuels

$3 B Carbon Capture and Storage

$3 B Green Innovation and Job Training

$2 B Clean Energy Manufacturing Tax Credits

RECOVERY.GOV

Portfolio Approach to Energy RDD&D

Basic Science | Feasibility Research | Technology Development | Technology Demonstration | Small Scale Deployment | Large Scale Deployment

DOE: Leading the Way

"It's not enough for our country to invent clean energy technologies – we have to make them and use them too.

Invented in America, made in America, and sold around the world – that's how we'll create good jobs and lead in the 21st century."

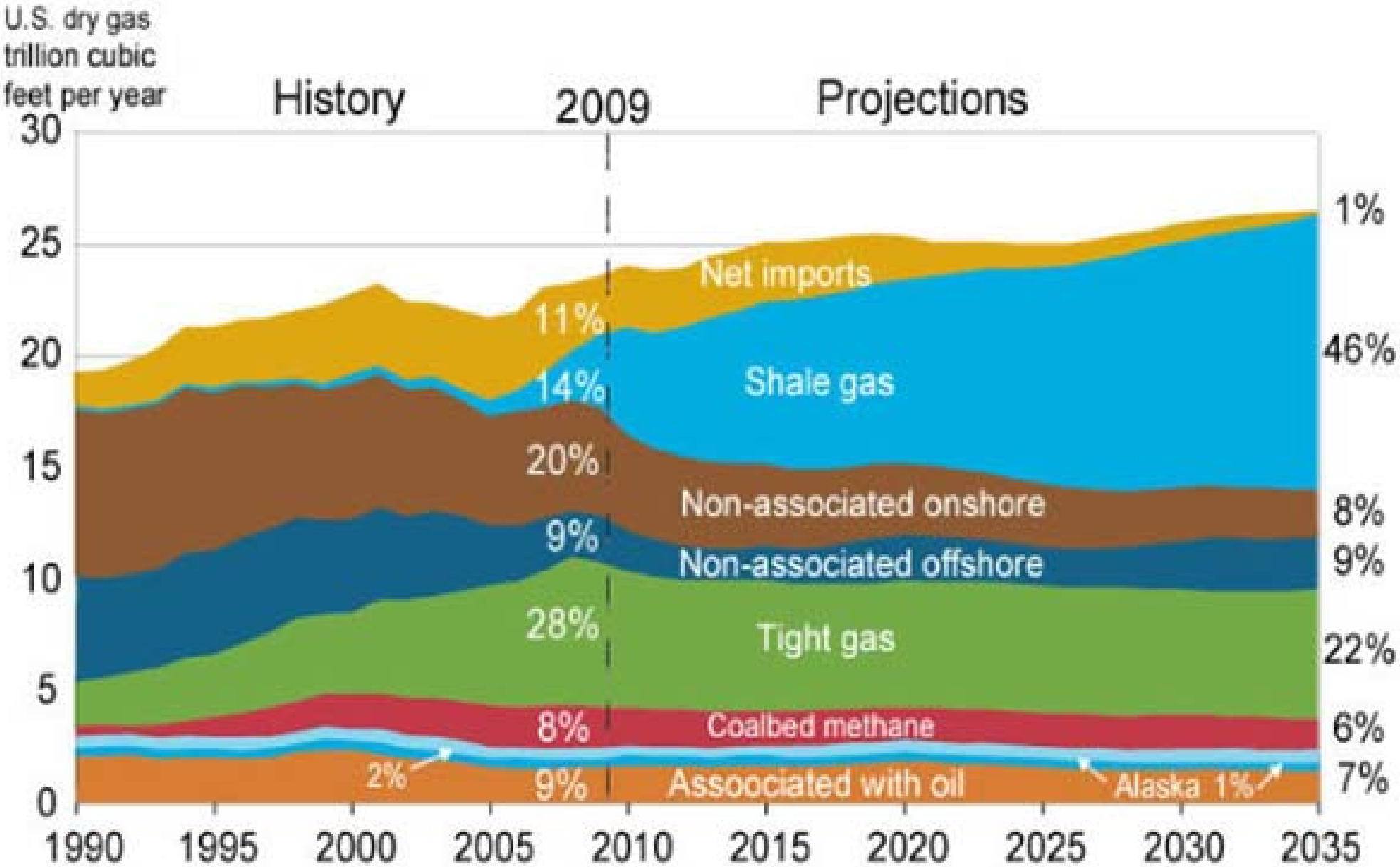
- Steven Chu
Secretary of Energy

ARPA-E: Game-Changing Technologies

Supported more than 180 projects, including:

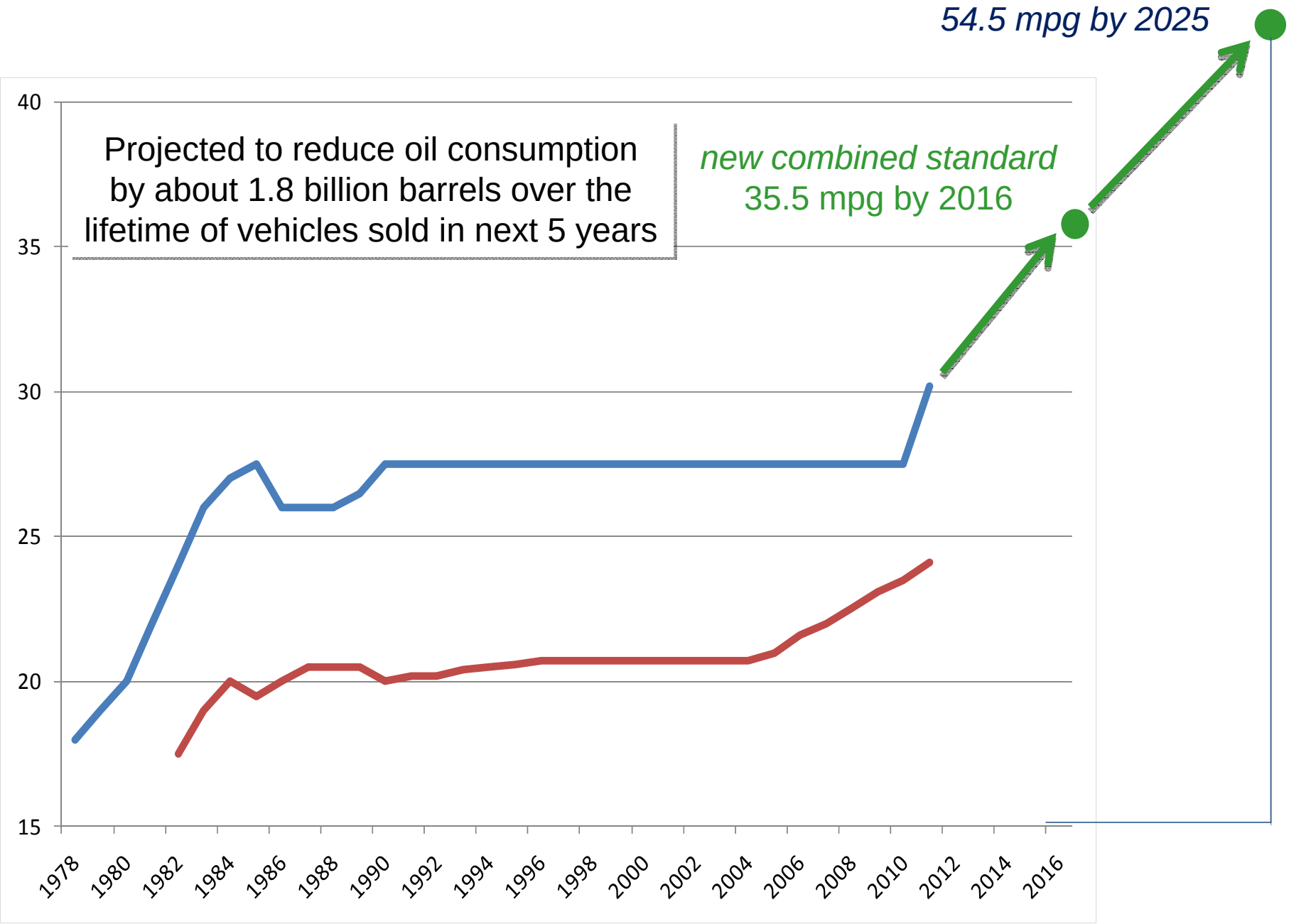
- Bacteria that can make fuel for cars out of carbon and electricity;
- Improved energy storage devices for the grid;
- Next generation batteries that will make the electric car cheaper than gasoline cars with a longer range

US Natural Gas Supply, 1990-2035



Source: EIA, *Annual Energy Outlook 2011*

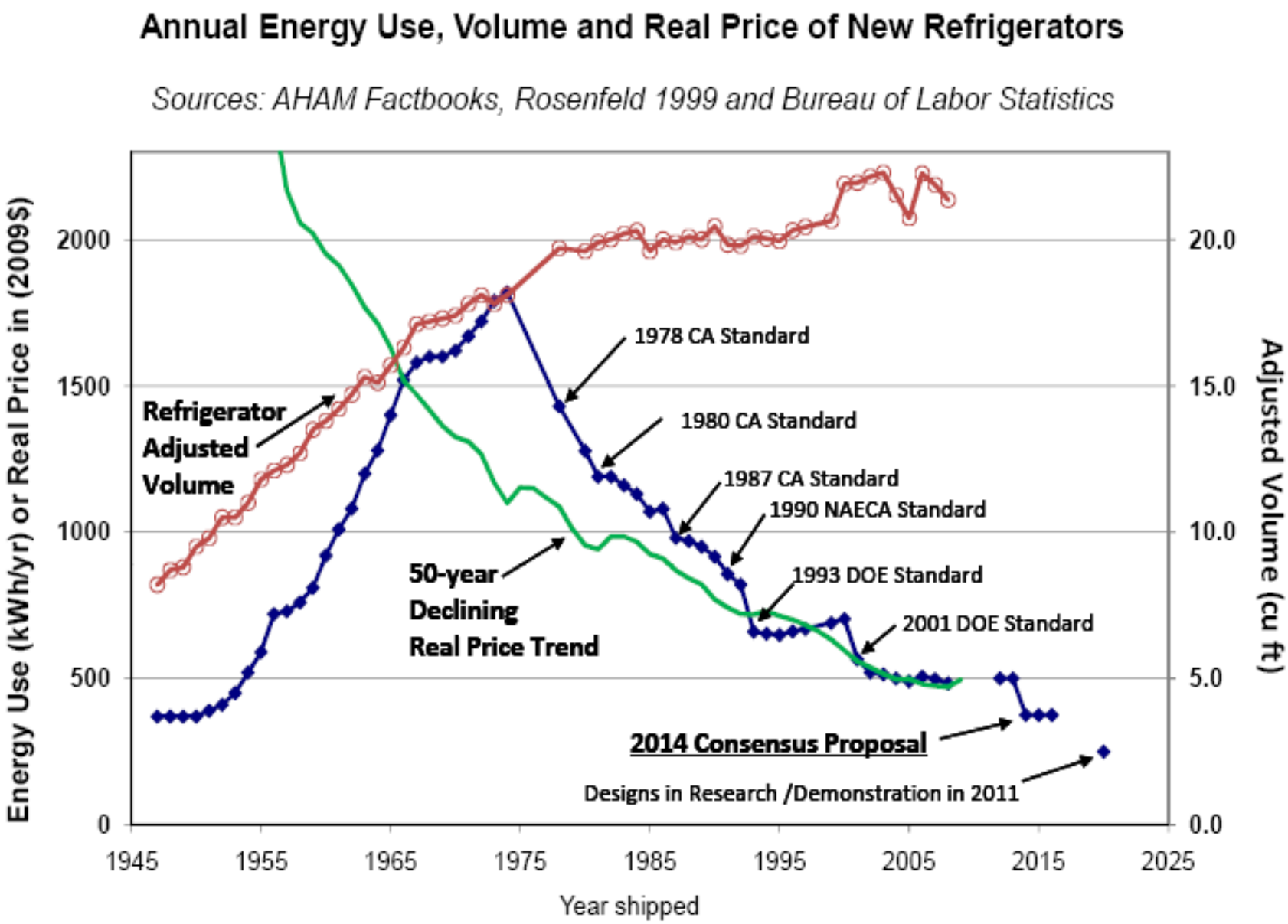
New Fuel Standards



Appliance Standards: Saving Energy Saves Money

- America's consumers save $20 billion each year – or $175 per household -- thanks to existing appliance efficiency standards.
- This is an energy savings equivalent to 70 coal power plants.
- DOE is improving and enforcing appliance energy efficiency standards. This will save consumers between **$250 billion - $300 billion** through 2030.

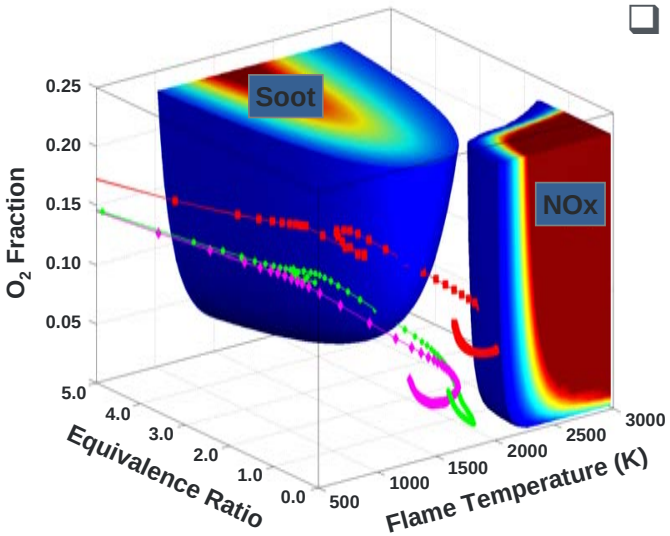
As Standards Go Up, Cost Comes Down and Quality Improves



Advanced Vehicles

The Benefit of Electric Vehicles

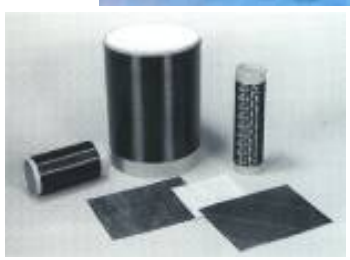
DOE's Vehicle Technologies Program



- **Advanced Combustion Engines, Emission Controls, and Waste Energy Recovery**
- **Electric and Hybrid Electric Vehicle Systems**

- **Biofuels/Fuel Blends**

- **Advanced Materials**



Reclaiming Leadership in Advanced Batteries

Research discoveries made by scientists at Argonne National Lab allowed them to develop a new lithium-manganese ion battery.

- 50-100% cathode energy density increase
- Less costly to manufacture
- Safer

Solar Power

2 Major Forms of Solar Power Generation

Photovoltaics

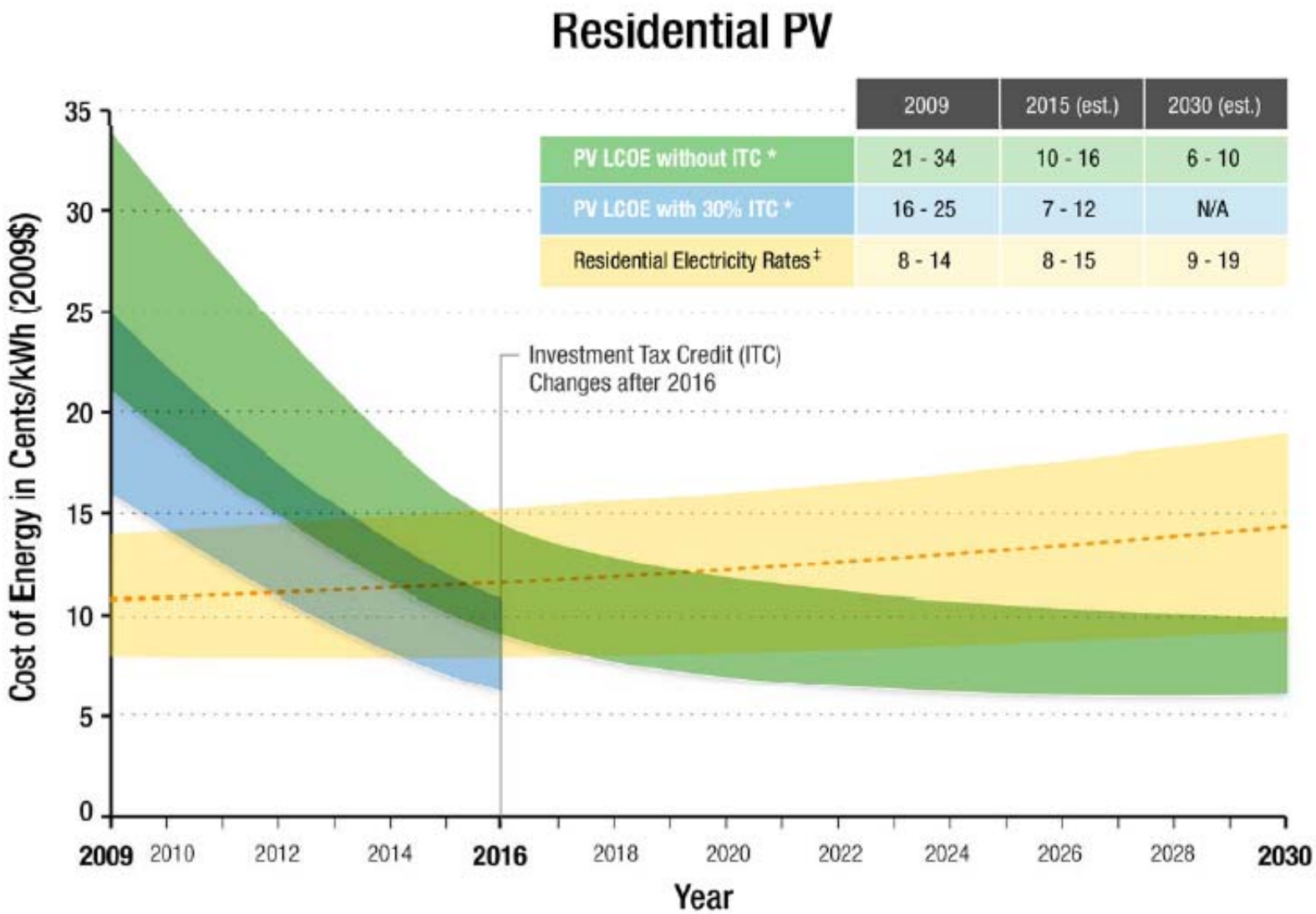
Use superconductors to harness solar energy to create power

Concentrated Solar Power

Directs sunlight using reflective surfaces to magnify thermal energy to create power

SunShot: Cost Competitive Solar by 2020

DOE's SunShot Initiative aims to reduce the cost of solar energy by 75% before 2020.



	2009	2015 (est.)	2030 (est.)
PV LCOE without ITC *	21 - 34	10 - 16	6 - 10
PV LCOE with 30% ITC *	16 - 25	7 - 12	N/A
Residential Electricity Rates‡	8 - 14	8 - 15	9 - 19

The US is Competing to Win in the Clean Energy Economy

"Yet, as the global clean energy opportunity grows, so does the competition. China, Korea, Germany, and other countries have decided that energy technologies are critical to their national and economic security in the 21st century...

The good news is: the United States is making gains in the clean energy race. Last week, Bloomberg New Energy Finance announced that the United States has reclaimed the title from China of global leader in clean energy investments."

Secretary of Energy Steven Chu
January 18, 2012