U.S. Clean Energy Priorities

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

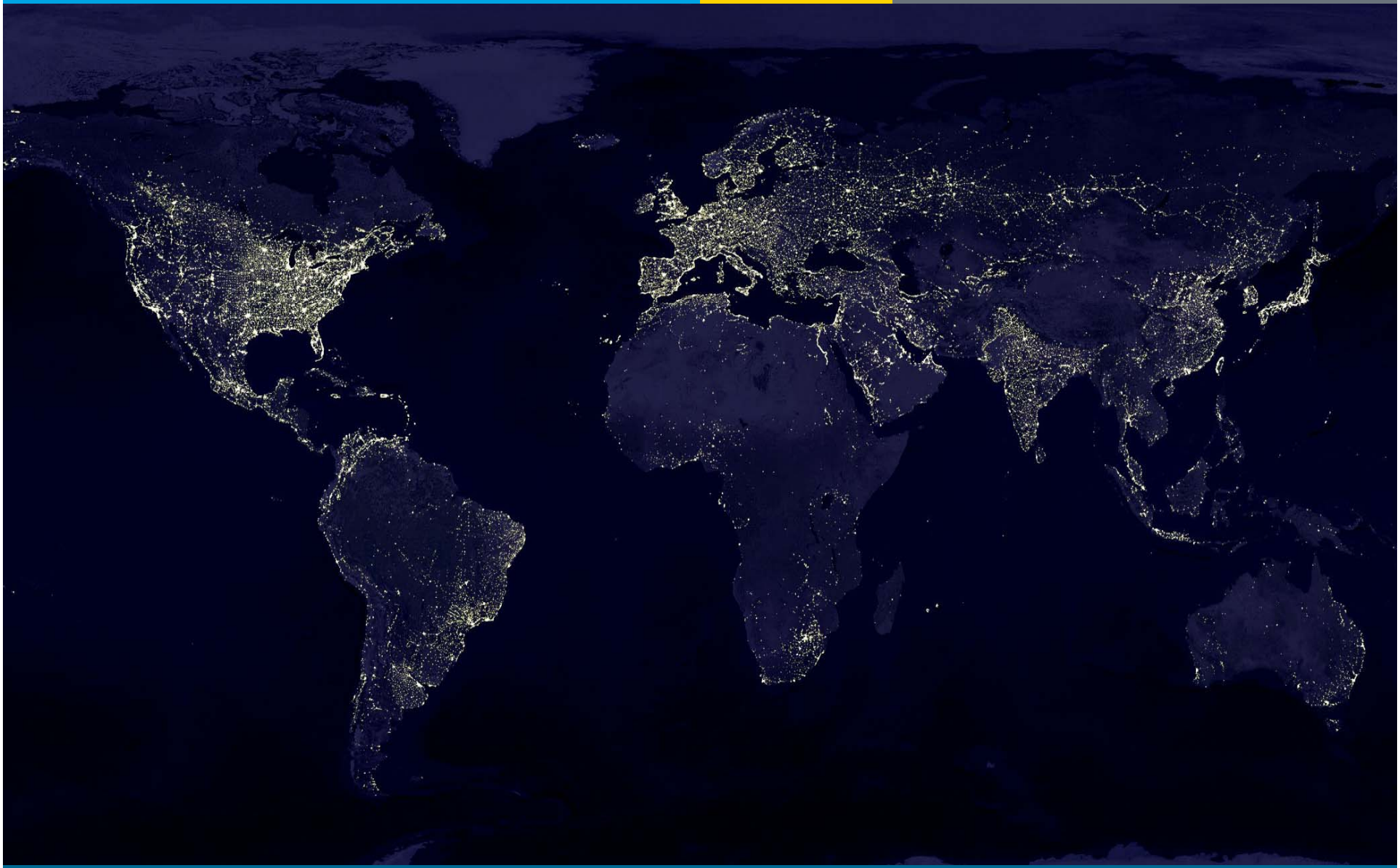
Organization for Economic Cooperation and Development

June 1, 2010

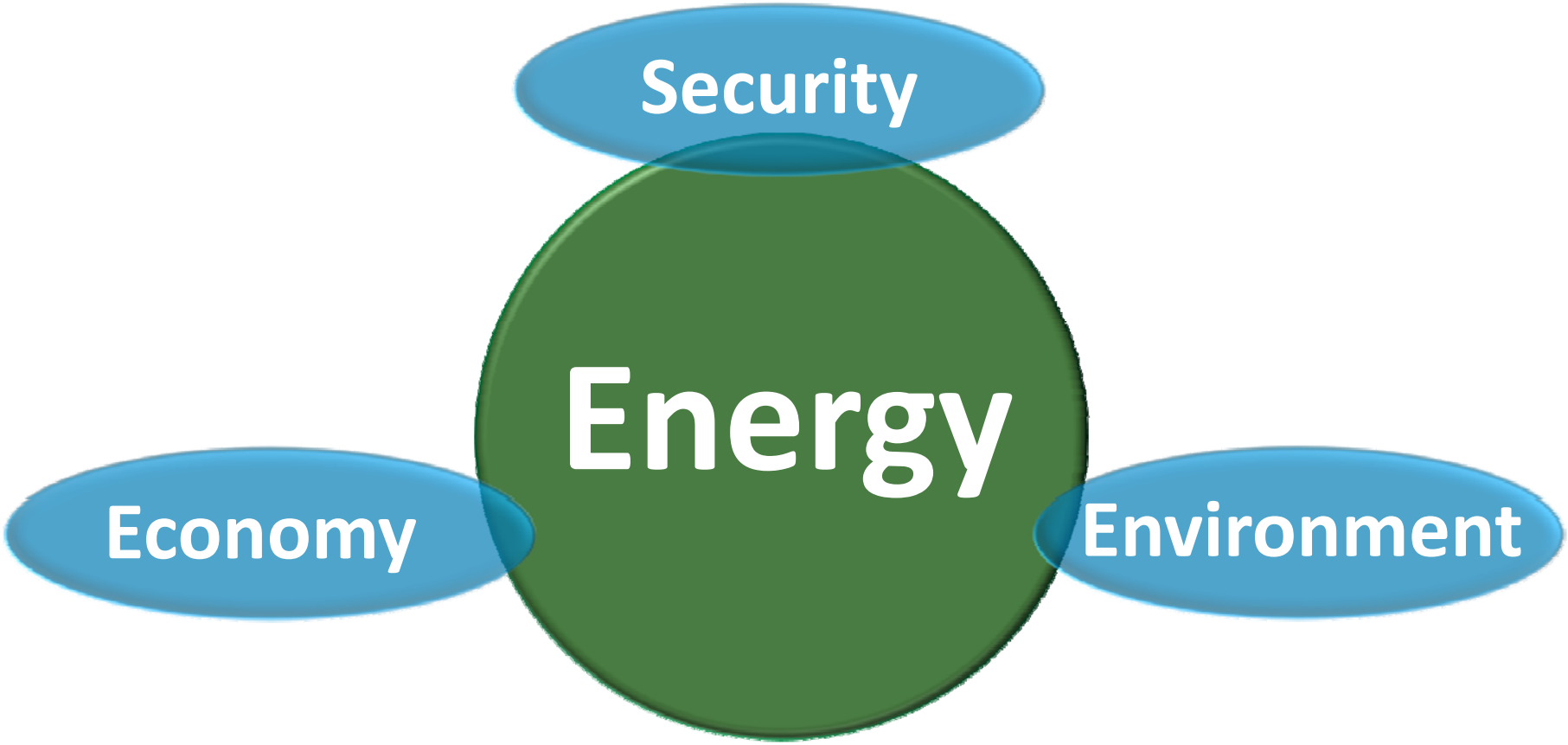
Cathy Zoi

Assistant Secretary for EERE

The World Runs on Energy



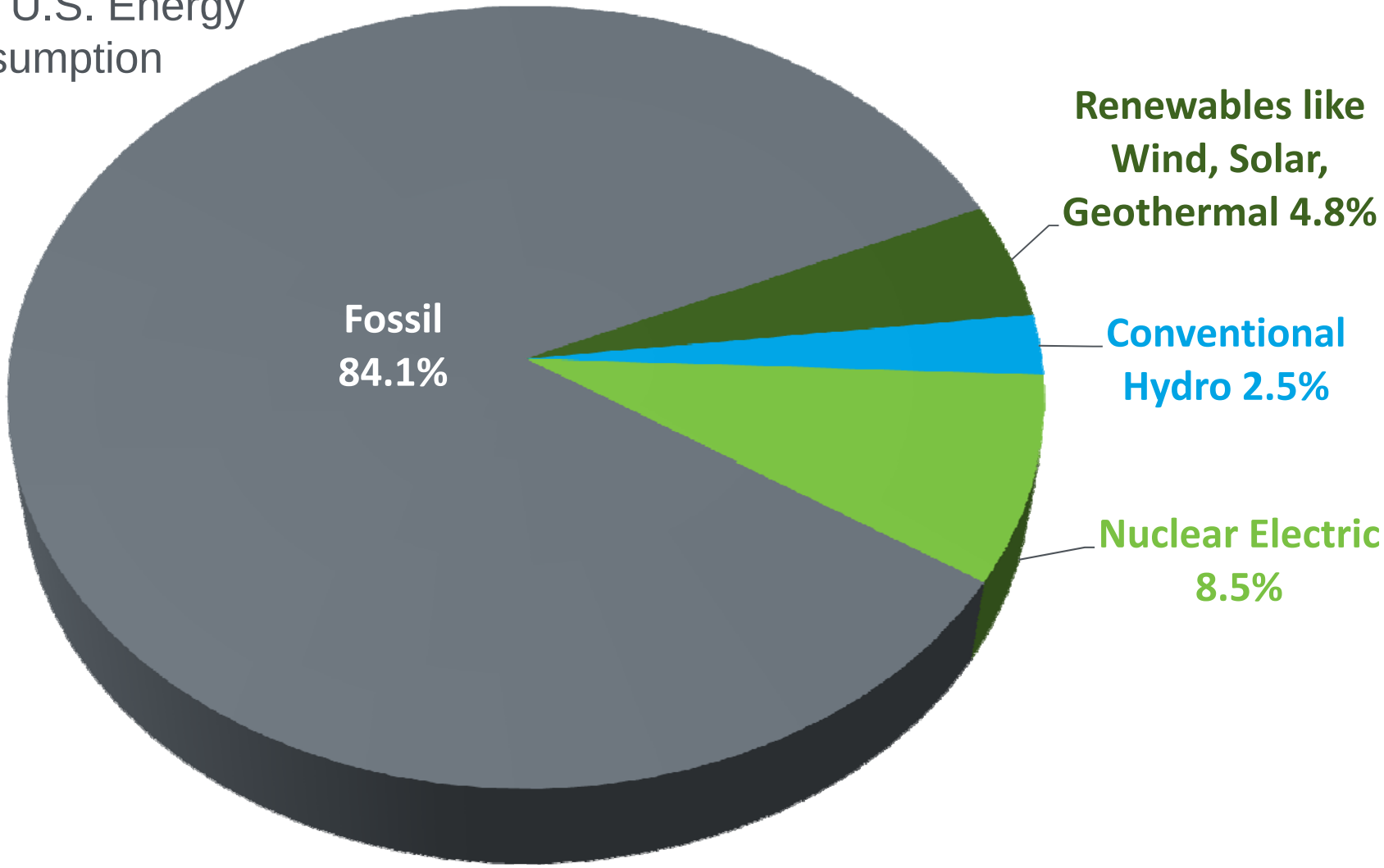
Global Energy Challenges



Energy links major global challenges

Energy Challenge: U.S. Fuel Consumption (2008)

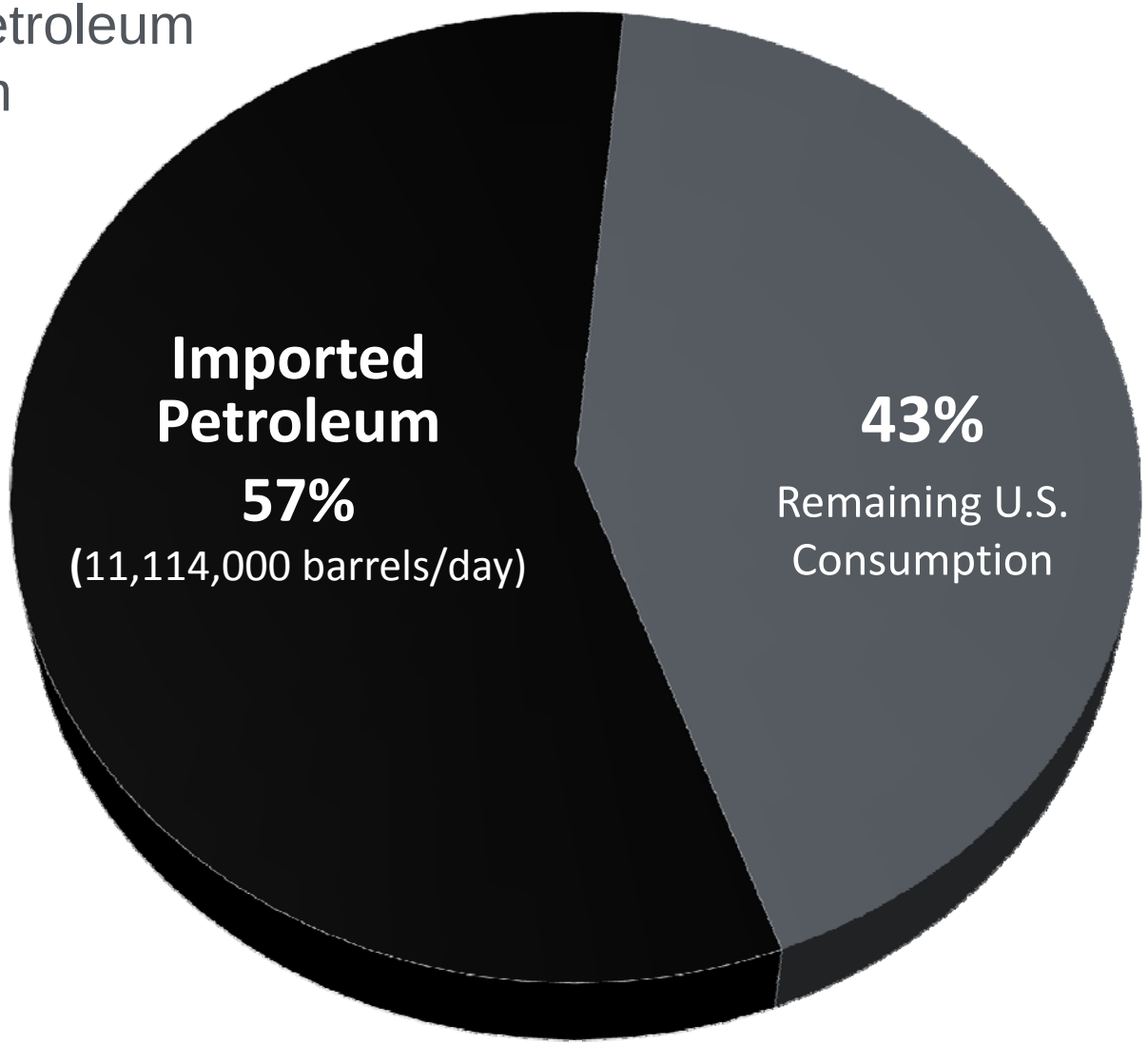
Total U.S. Energy Consumption



Source: EIA ,*Annual Energy Review :2008*

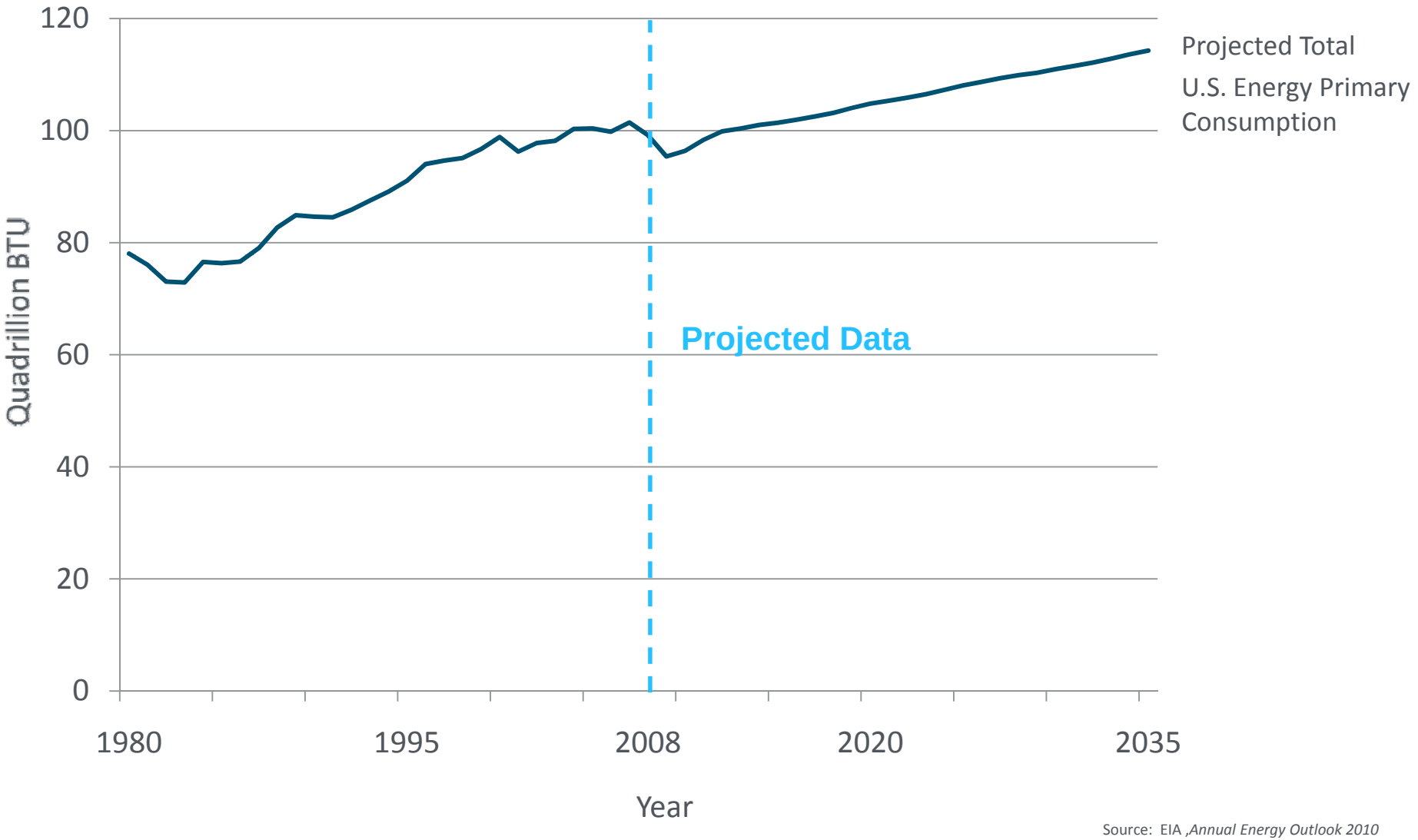
Energy Challenge: U.S. Petroleum Imports (2008)

Total U.S. Petroleum Consumption



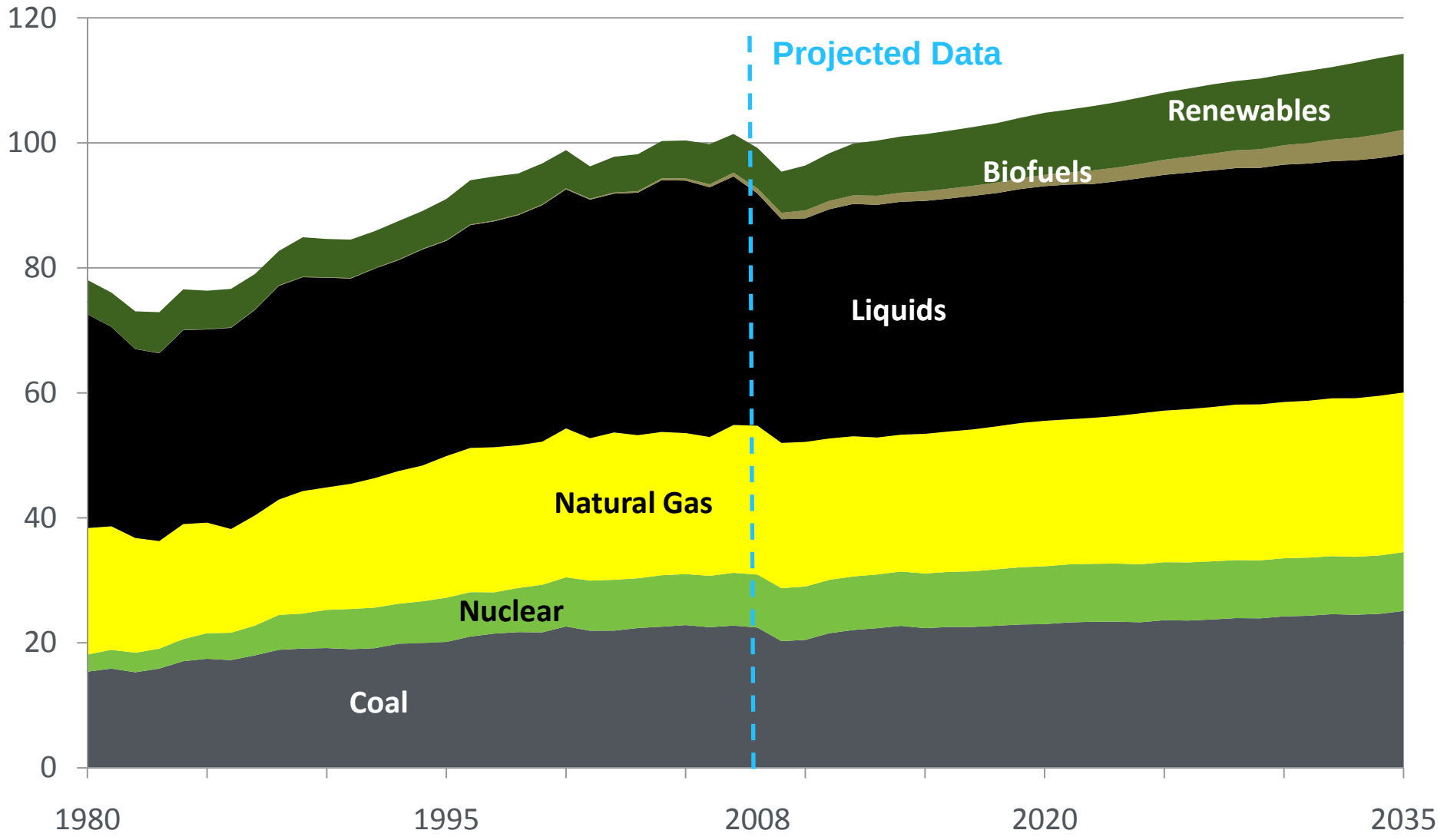
Source: EIA, *Oil : Crude and Petroleum Products Explained,* 2008 data

Energy Challenge: U.S. Demand Growth



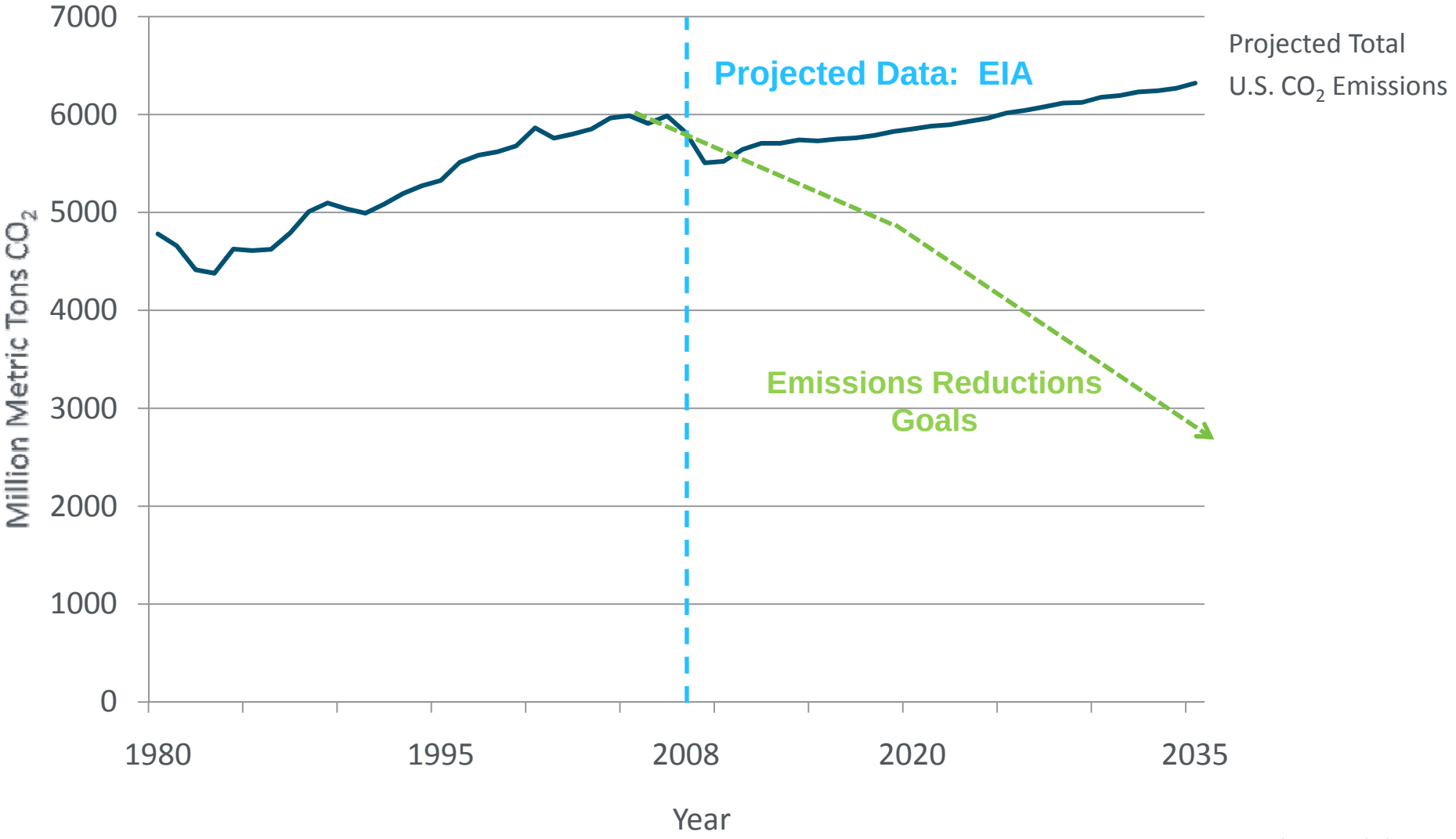
Source: EIA ,*Annual Energy Outlook 2010*

U.S. Energy Mix



Source: EIA, *Annual Energy Outlook 2010*

Environmental Challenge: U.S. Emissions Growth



Source: EIA, *Annual Energy Outlook 2010*

U.S. Challenge: Economy

Americans spend more than **$1 trillion** per year on energy.

In 2008 people were losing financial security…

- House prices fell 9%
- Household wealth fell 17%, more than five times the decline in 1929

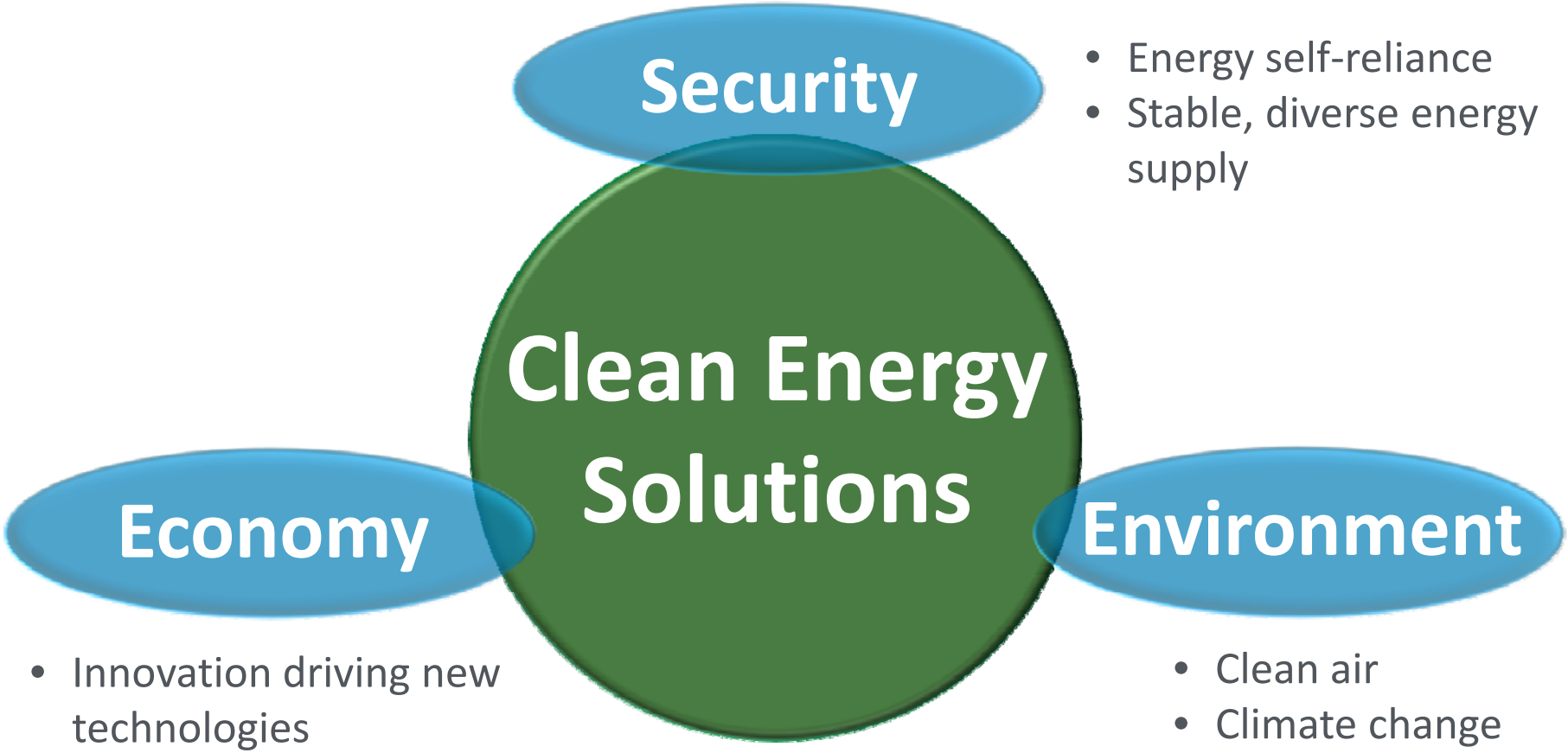
By early 2009 they were losing jobs and savings too…

- 750,000 American jobs lost per month
- Stock market at 1966 levels
- GDP falling at 6% per quarter

Sources: Christina Romer, Chair, Council of Economic Advisors. *Testimony.* October 2009 and National Economic Council Director Larry Summers, April 2010

Realizing Potential: A Clean Energy Vision

Clean Energy provides solutions to global challenges



- Energy self-reliance
- Stable, diverse energy supply

- Innovation driving new technologies
- Long term growth in clean energy
- Green workforce

- Clean air
- Climate change

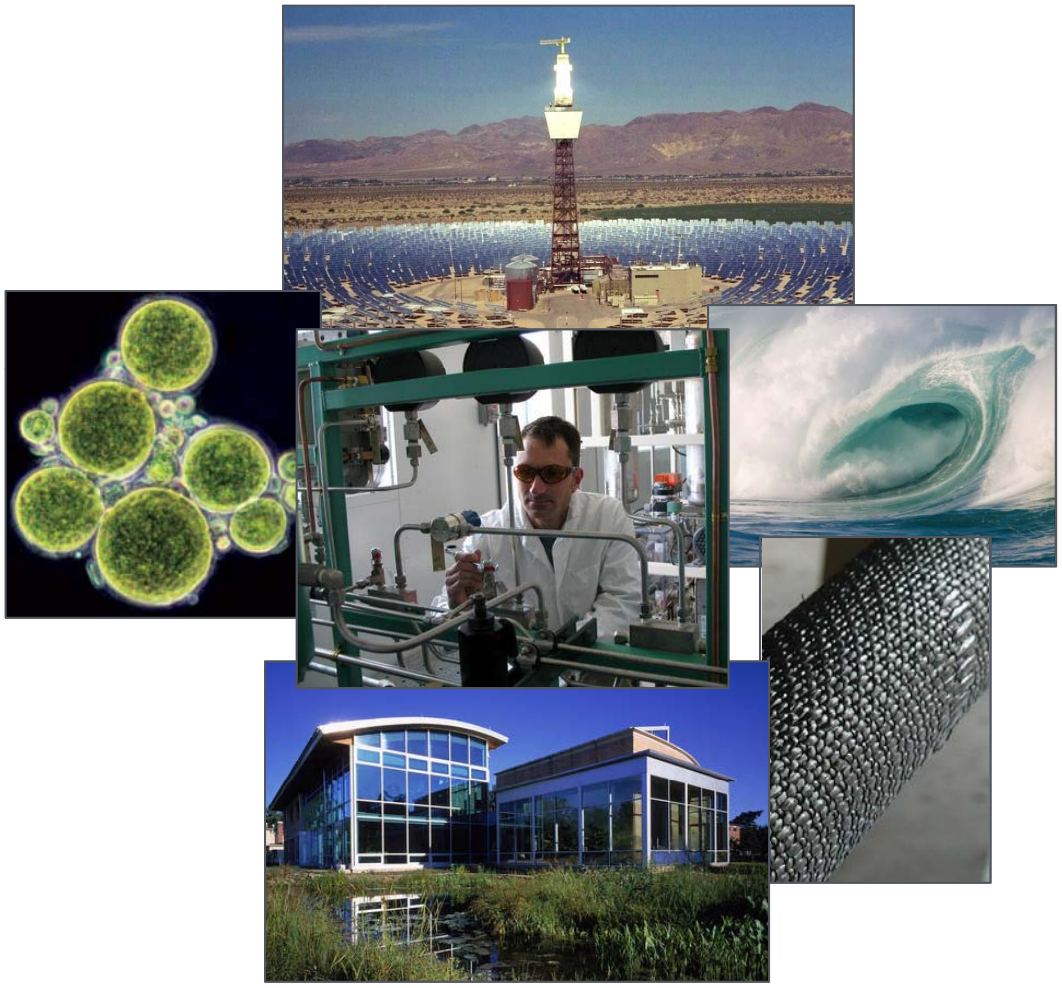
Clean Energy Focus Areas

Energy Efficiency

- Buildings
  - *Residential*
  - *Commercial*
- Industrial
- Vehicles

Renewable Energy

- Solar
- Wind
- Biomass/Biofuels
- Water Power
- Geothermal



Energy Challenge: Improve Efficiency

The U.S. spends **$1.1 trillion** per year on energy

If the U.S. became 20% more efficient, it would:

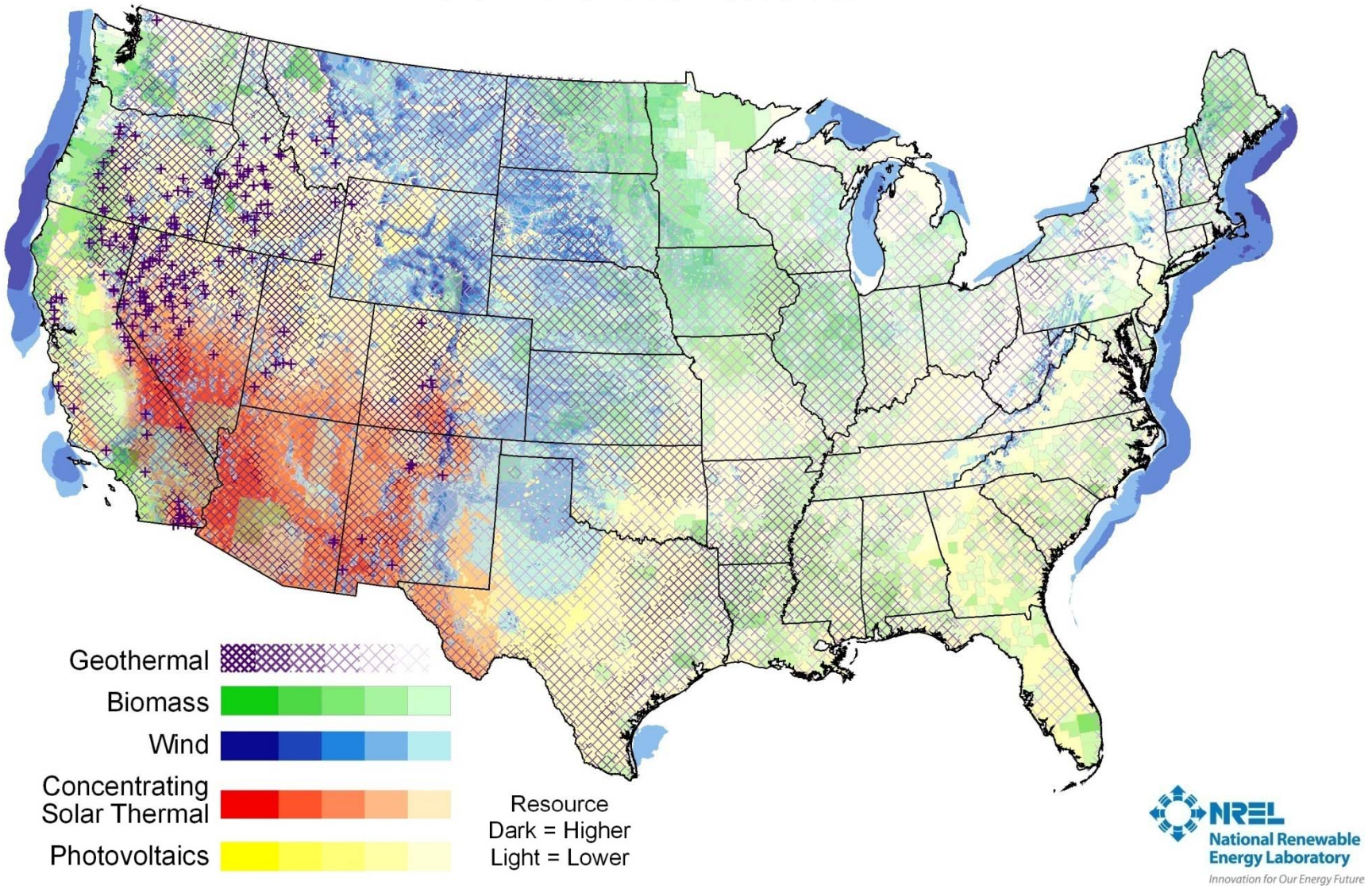
save more than ***$200 billion*** annually and avoid spending billions on new supply.

➔EFFICIENCY FIRST:

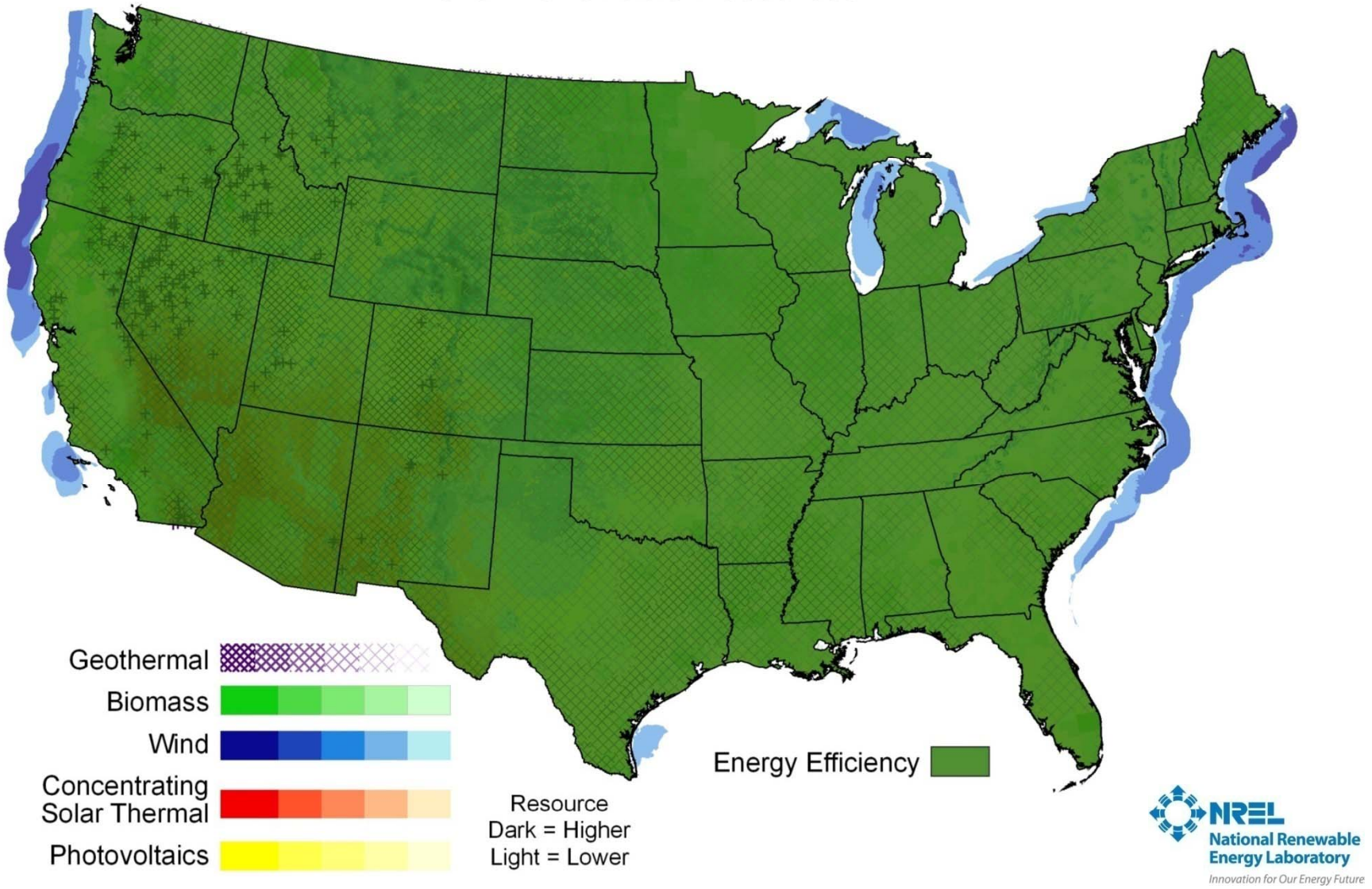
It is a RESOURCE.

Source: McKinsey, *Unlocking Energy Efficiency in the U.S. Economy*, 2009

U.S. Opportunity: Huge Renewable Potential



U.S. Opportunity: Huge Efficiency Potential



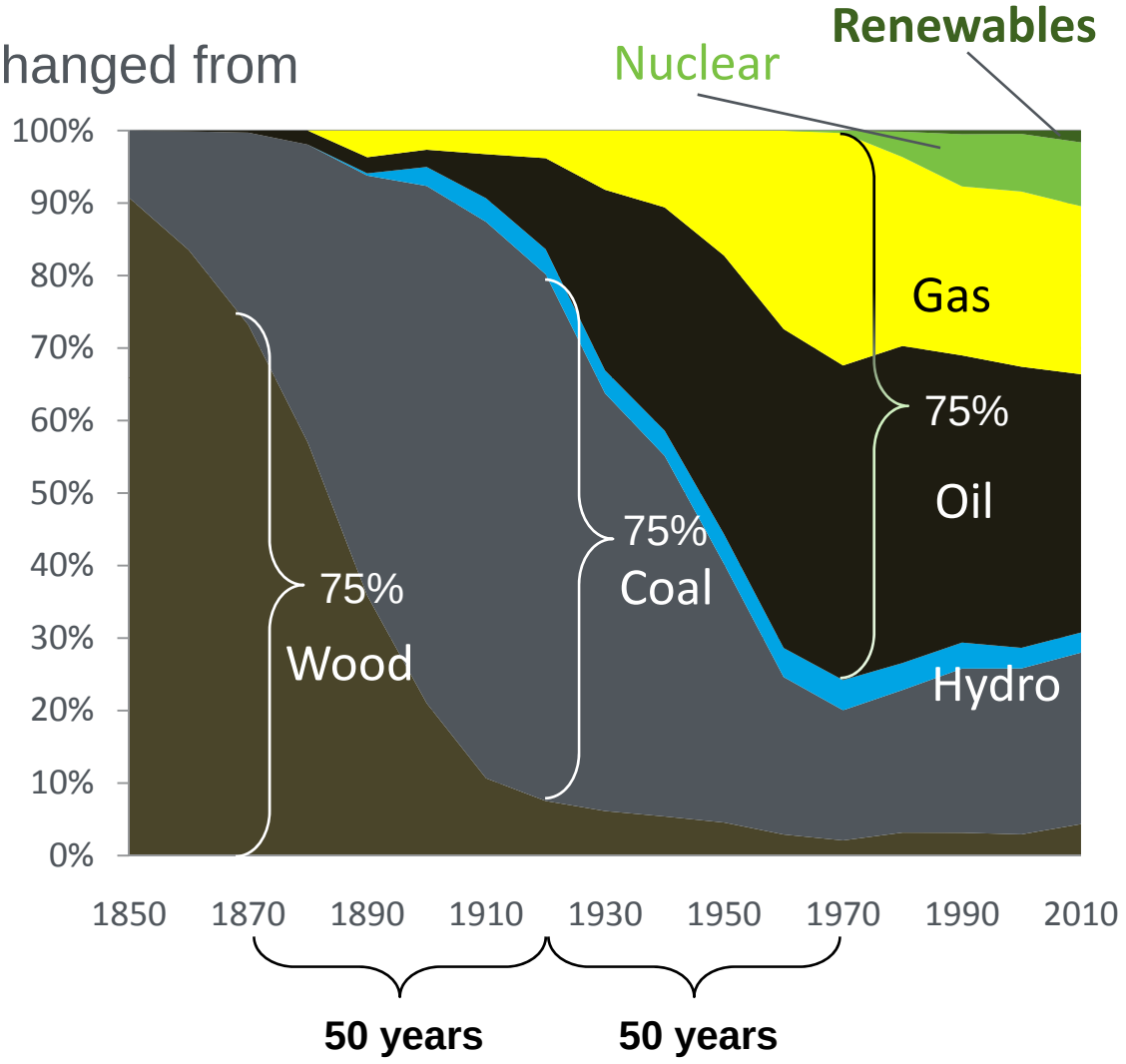
Transformational Change: Historical Context

In 50 years…¾ U.S. energy changed from

- Wood in 1870
- To Coal in 1920
- To Oil & Gas in 1970

Clean Energy Economy

- U.S. has changed – and can change its energy sources



Sources: EIA, *Annual Energy Review: 2008* and EIA, *Annual Energy Outlook: 2009*

Realizing Potential: Transformational Change

Incremental change will not be enough

Economic, climate, and energy security challenges require ***transformational change***

Transforming the American energy landscape necessitates ***strong POLICY***

Policy Equation for Clean Energy

Substantive Imperative

+

Technology Solution(s)

+

Public Support

=

CLEAN ENERGY POLICY

Building the Clean Energy Economy: Articulating Goals

including…

- Double Renewable Energy Capacity and weatherize a million homes by 2012
- Have 1 Million PHEVs on the road by 2015
- Invest $150 billion over ten years in energy R&D to transition to a clean energy economy
- Reduce GHG emissions
  - 17% by 2020
  - 83% by 2050

Building the Clean Energy Economy: Four Planks

Building the Clean Energy Economy: Four Planks

High Impact Innovation

Investing in the things that matter

- Significant cost reduction
- Significant efficiency improvements

Aggressively pursuing breakthrough technologies

Innovation in Wind: New Turbine Design

Challenge: Reduce turbine costs and increase efficiency

Innovation: Shrouded Wind Turbine

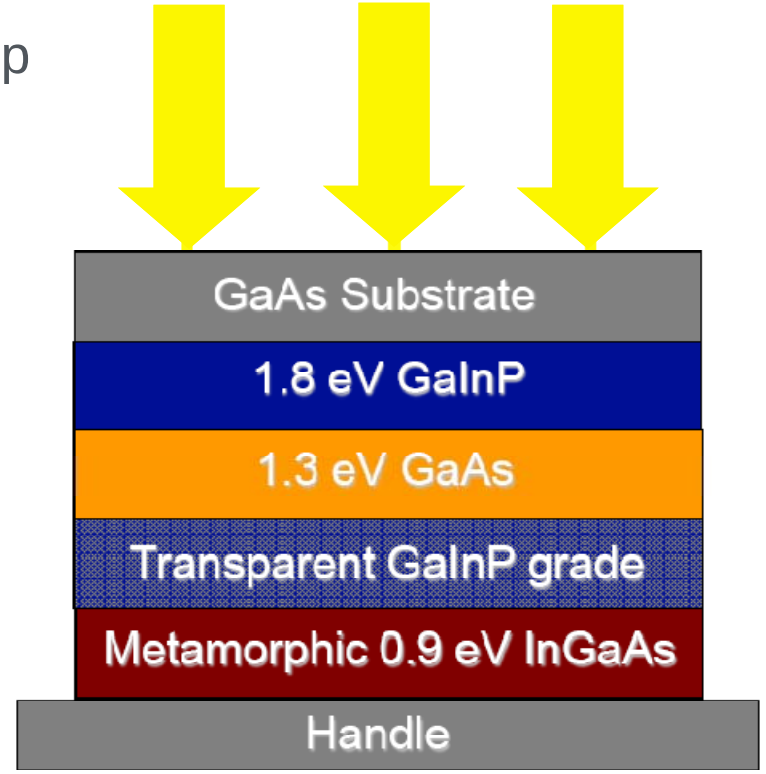
Potential Benefits: Up to 40% lower cost per kilowatt-hour, accelerating compact wind turbine adoption in urban environments; 3x traditional turbine efficiency; Lower maintenance; Higher density per acre

Innovation in Solar PV: Inverted Assembly

Challenge: Need for higher-efficiency solar cells at lower cost

Innovation: PV cell made from the top down instead of bottom up minimizes defects; Cell set a record with efficiency >40%

Benefit: 10%-20% cost reduction in electricity generation expected



Innovation in Lighting: LED Lamp

Challenge: LED solid state lighting poorly reproduced colors

Innovation: Cree LRP-38 LED Lamp has a 92% color rendition due to the multi-chip LED component light source developed through DOE R&D

Benefit: LED produces warm-white light while using up to four times less energy and lasting up to 60 times longer

Innovation in Biofuels: Bioengineered Yeast

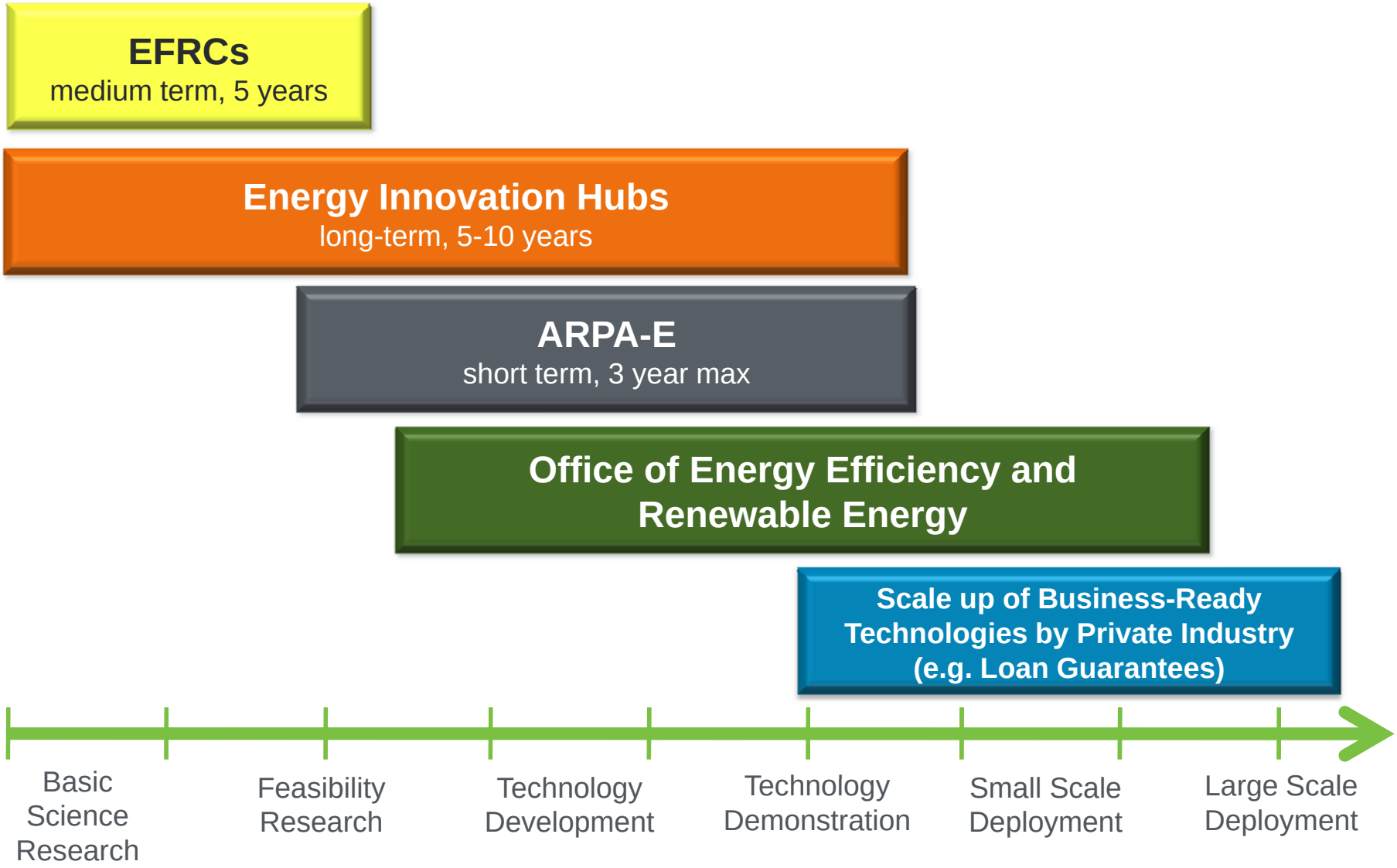
Challenge: Slow cellulose to fuel conversion

Innovation: Improved speed and efficiency of converting cellulose to fuel with a bioengineered microorganism combining 2.5 steps to 1 step

Benefit: Pilot plant will feed ongoing preparation for a demonstration-size facility in Michigan, and future commercialization

Images Courtesy Mascoma

Innovation to Marketplace



Building the Clean Energy Economy: Four Planks

Speed and Scale

Move Innovation to the Marketplace

- Rapidly
- At scale

Demonstrate clean energy ready for prime time - not a niche resource

Speed & Scale

Create a series of large, exemplary projects

Remove perception of *technology* risk

Use policy to eliminate/reduce *investment* risk

Speed & Scale: Efficiency Opportunities

Goal

- Improve Fuel Economy, Reduce Emissions

Scope

- 250 M vehicles (135 M passenger cars)

Policy Steps

- Increased fuel economy standard - 35.5 mpg for cars and light-duty trucks
- Investing $1.5 B in commercial-ready advanced battery manufacturing for electric vehicles and plug-in hybrids
- May 21, 2010 – announced first-ever policy to increase fuel efficiency and decrease GHG pollution from medium- and heavy-duty trucks

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2010*

Speed & Scale: Efficiency Opportunities

Goal

- Improve Building Performance

Scope

- Buildings consume 39% of all U.S. energy
  - 72% of electricity consumption
  - 38% of carbon emissions
- 115 M households
  - 2/3 built before modern building codes
- 5.5 M commercial buildings (~7.5 B m^2)

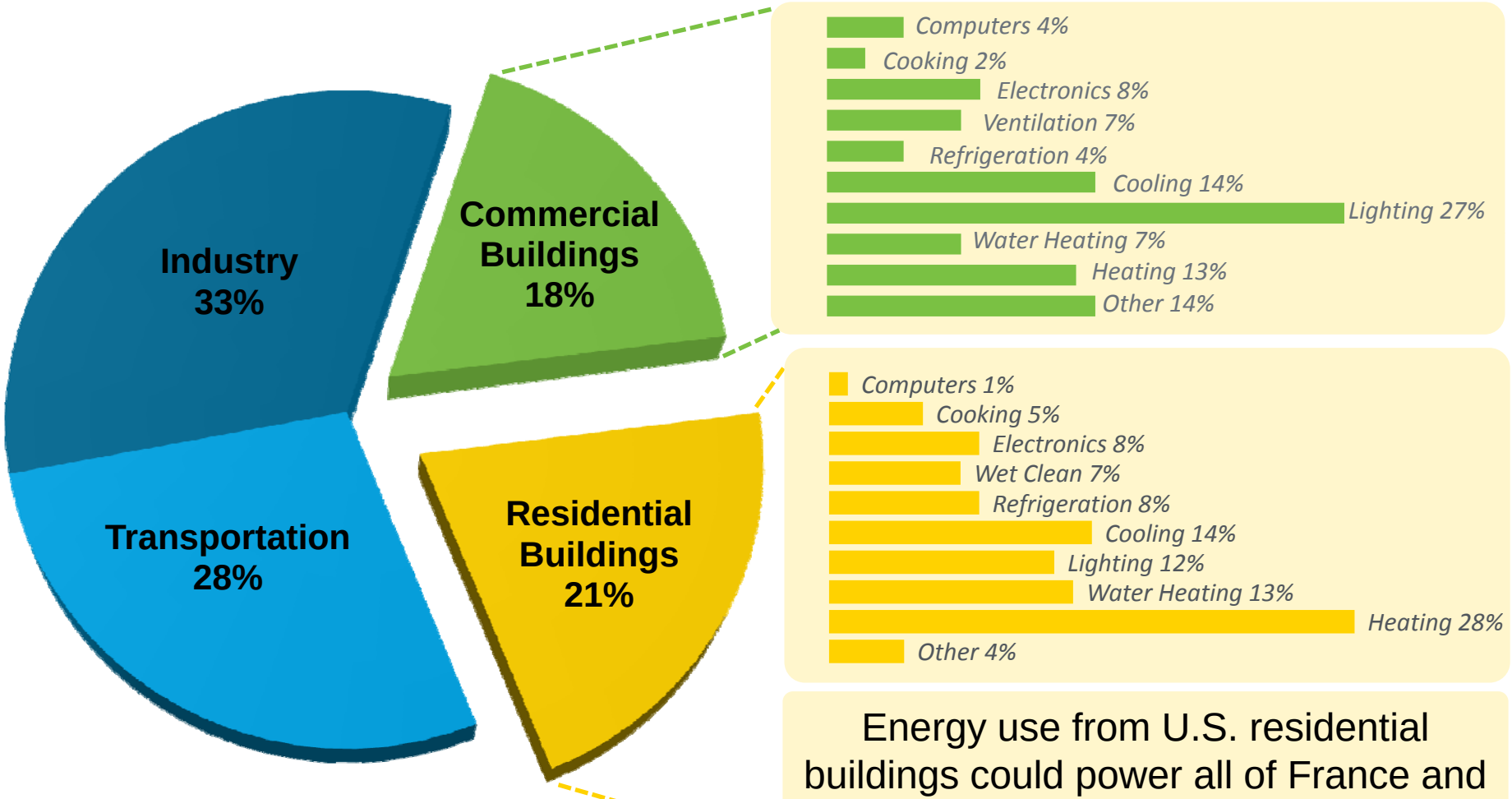
Policy Steps

- Accelerating appliance standards
  - Issued 8 final rules since March 2009
  - Expected to issue 10 additional rules by 2012
- Building a Retrofit Industry: Retrofit Ramp-Up, Home Star, WAP

Sources: Buildings Energy Data Book 2009; EIA *Annual Energy Outlook* 2010

Speed & Scale: Efficiency Opportunities

2006 U.S. Buildings Primary Energy Consumption



Energy use from U.S. residential buildings could power all of France and the UK for over one year

Sources: U.S. DOE, *Buildings Energy Data Book*, 2009 and EIA , *International Energy Statistics*

Speed & Scale: Accelerating Appliance Standards

New efficiency standards since March 2009
will save between **$250 and $300 billion** through 2030

New standards include >20 products

Speed & Scale: Building a Home Retrofit Industry

Retrofit Ramp-up

$452 M building retrofit program reaching **whole neighborhoods** and **building sustainable models**

Coverage: 250,000 – 300,000 homes

Home Star

50% point-of-sale rebate directly to homeowners, making homes comfortable, saving money on energy bills, and creating jobs

Coverage: 3 – 4 million homes

Speed & Scale: Double U.S. Renewable Capacity

Grants in Lieu of Tax Credits (1603)

- 30% tax credit for renewables available when project is in service
- $3.5 B awarded

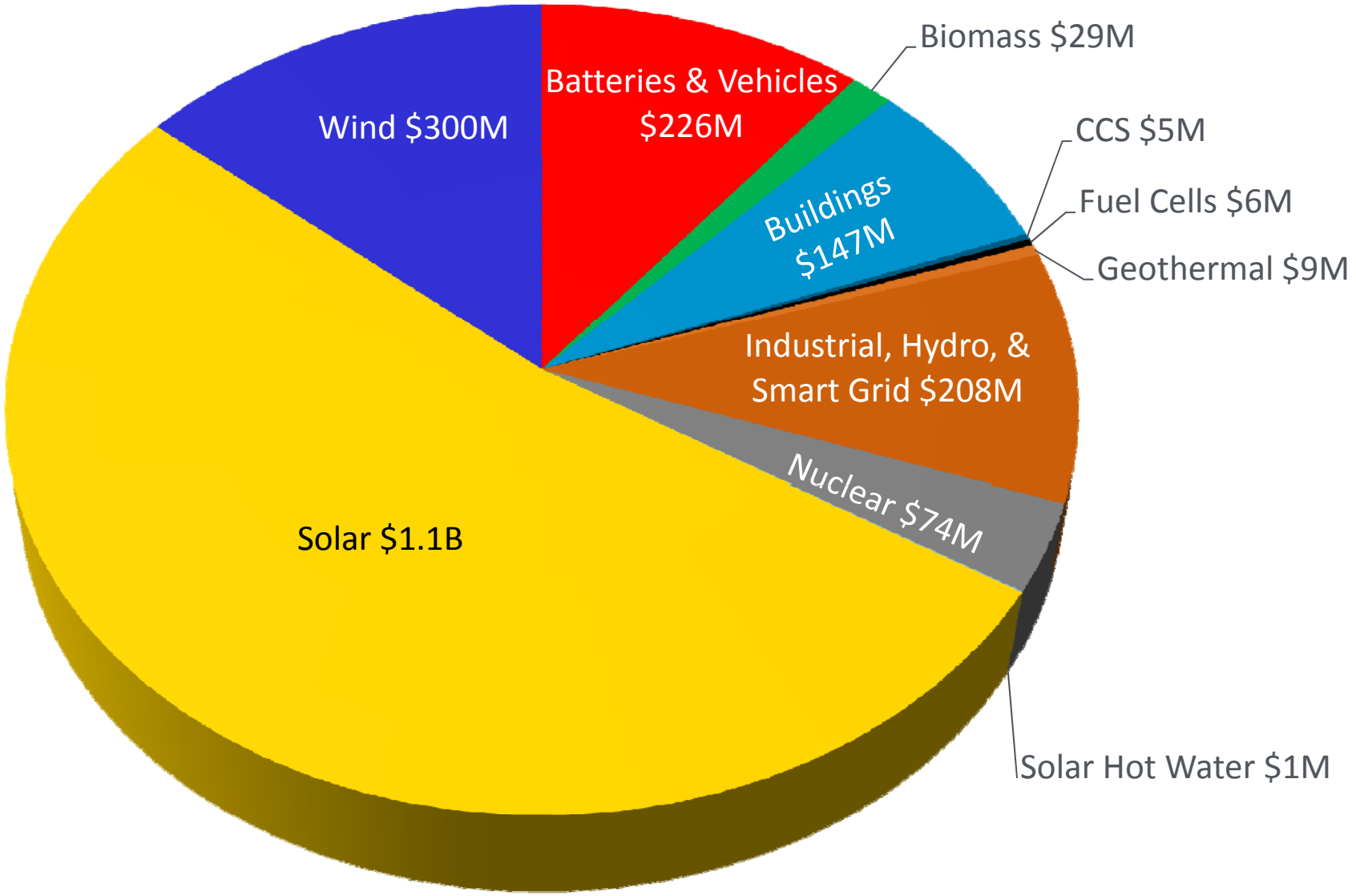
Advanced Manufacturing Tax Credits (48C)

30% tax credit for 183 major clean energy manufacturing projects across 43 states

Loan Guarantee Program

Loans made for the first time since the 1980s (committed to about $2.2 B in guarantees)

Speed & Scale: Manufacturing Tax Credits (48C)



160 of 183 selections are shown, representing over $2B

Speed & Scale: Capturing the Sun with CSP

Speed & Scale: Harnessing the Wind Offshore

Building the Clean Energy Economy: Four Planks

Talent: New Leaders in Clean Energy

Talent: Jobs – April 2010

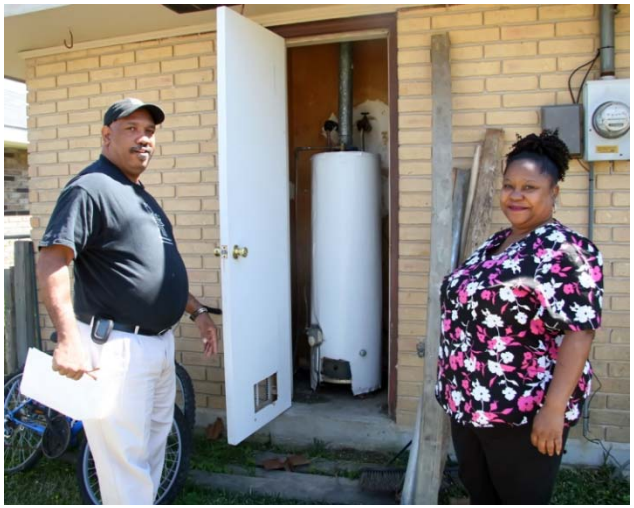
- Gained 290,000 jobs (230,000 in the private sector)
  - Largest monthly increase in four years
  - Manufacturing (44k), professional and business services (80k), health care (20k), and leisure and hospitality (45k) jobs increased
- Jobs *growth* for four consecutive months

HOWEVER

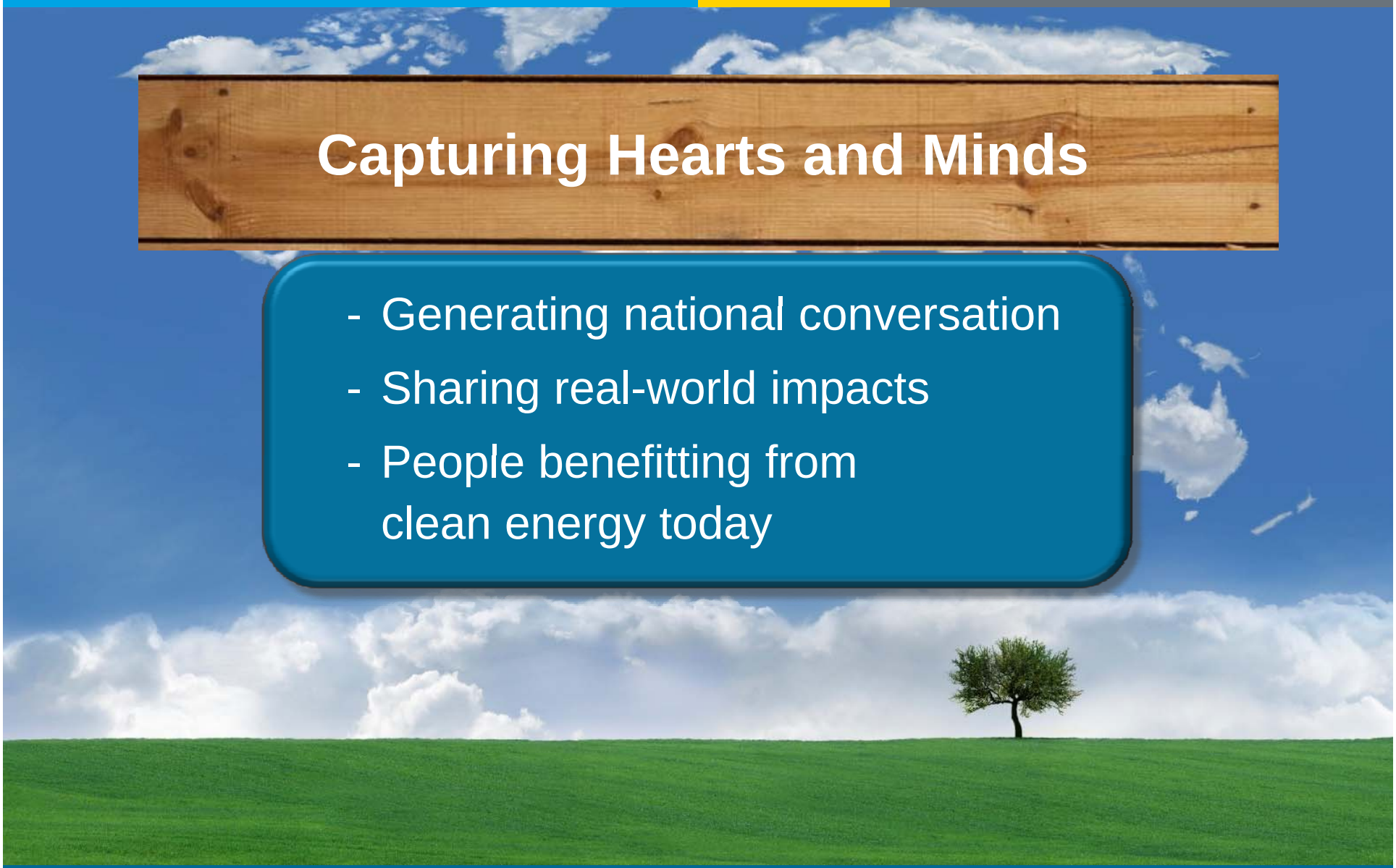
- 15.3 million unemployed (9.9 % unemployment)
  - 6.7 million jobless for over 27 weeks

Source: U.S. Department of Labor, Bureau of Labor Statistics, *Employment Situation Summary*, May 2010

Talent: A Whole Clean Energy Economy



Building the Clean Energy Economy: Four Planks



Capturing Hearts and Minds

- Generating national conversation
- Sharing real-world impacts
- People benefitting from clean energy today

Hearts & Minds: Stories Across the Country

Hearts & Minds: A Nationwide Energy Community

eere.energy.gov/energyempowers

Building the Clean Energy Economy

The 4 clean energy planks support development of **Strong Policy**

2009 Government Policy – A Great Start

The Recovery Act is making an **$80 billion** down payment on the clean energy economy

- Creating jobs immediately
- Investing in energy infrastructure to provide lasting value

Progress toward economic recovery

- 6% gain in GDP, first quarter 2010
- Markets have risen by 75% since March 2009
- Economy producing jobs again: 290,000 in April, 2010

But MORE is needed.

EERE International Goals

- Accelerate the **identification and development** of clean energy solutions
- Develop **markets for** clean energy technologies in key countries and regions
- Develop **human capacity** for deploying clean energy technologies at scale

EERE International Engagements

Multilateral

- **Biofuels** – Global sustainability analysis
- **ECPA** – Energy and Climate Partnership for the Americas
- **EDIN** – Energy Development in Island Nations
- **APEC** – Asia-Pacific Economic Cooperation
- **APP** – Asia-Pacific Partnership on Clean Development & Climate
- **MEF** – Major Economies Forum on Energy and Climate
- **Climate REDI** – Renewable Energy and Efficiency Deployment Initiative
- **IPEEC** – International Partnership for Energy Efficiency Cooperation
- **IPGT** – International Partnership for Geothermal Technology
- **IEA** – Working Groups and Implementing Agreements
- **IPHE** – International Partnership for the Hydrogen Economy
- **IRENA** – International Renewable Energy Agency

Bilateral

- European Union
- China
- India
- Brazil
- Israel
- Canada
- Japan
- Mexico
- Russia
- Kazakhstan

IEA Implementing Agreements (IAs)

- IAs serve to pool resources for research, development and deployment of clean energy technologies
- EERE participates in dozens of IAs focused on energy efficiency and renewable energy, including:
  - **Biomass**
  - **Building Efficiency**
  - **Geothermal**
  - **Wind & Water Power**

And many others…

*Partial list

International Partnership for Energy Efficiency Cooperation (IPEEC)

- 15 member countries representing developed and developing economies
- Work Plan focuses on buildings and industrial energy efficiency, including financing, capacity building, and training
- Developed under close collaboration with IEA
- Inaugural Policy Committee meeting held in Washington, DC on May 11, 2010

Climate REDI
(Renewable Energy Deployment Initiative)

- Secretary Chu announced Climate REDI in Copenhagen at the climate talks on December 14, 2009

- Climate REDI will accelerate the deployment of renewable energy and energy efficient technologies in developing countries to:
  - Reduce greenhouse gas emissions
  - Fight energy poverty
  - Improve public health

Clean Energy Ministerial: July 19-20, 2010

The **Clean Energy Ministerial** will bring together ministers from more than 20 countries to collaborate on policies and programs that accelerate the world's transition to clean energy technologies.

>70% of global GDP 80% of global GHG emissions


Australia


Belgium


European Commission


Brazil


Canada


China


Denmark


France


Germany


India


Indonesia


Italy


Japan


Korea


Mexico


Norway


Russia


South Africa


Spain


United Arab Emirates


United Kingdom


United States

America's Clean Energy Future

"...To protect our planet, now is the time to change the way that we use energy. Together, we must confront climate change by ending the world's dependence on fossil fuels, by tapping the power of new sources of energy like the wind and sun, and calling upon all nations to do their part. And I pledge to you that in this global effort, the United States is now ready to lead."

President Obama

April 5, 2009
Prague, Czech Republic

Thank You

Cathy Zoi

Assistant Secretary for

Energy Efficiency and Renewable Energy

U.S. DEPARTMENT OF ENERGY