



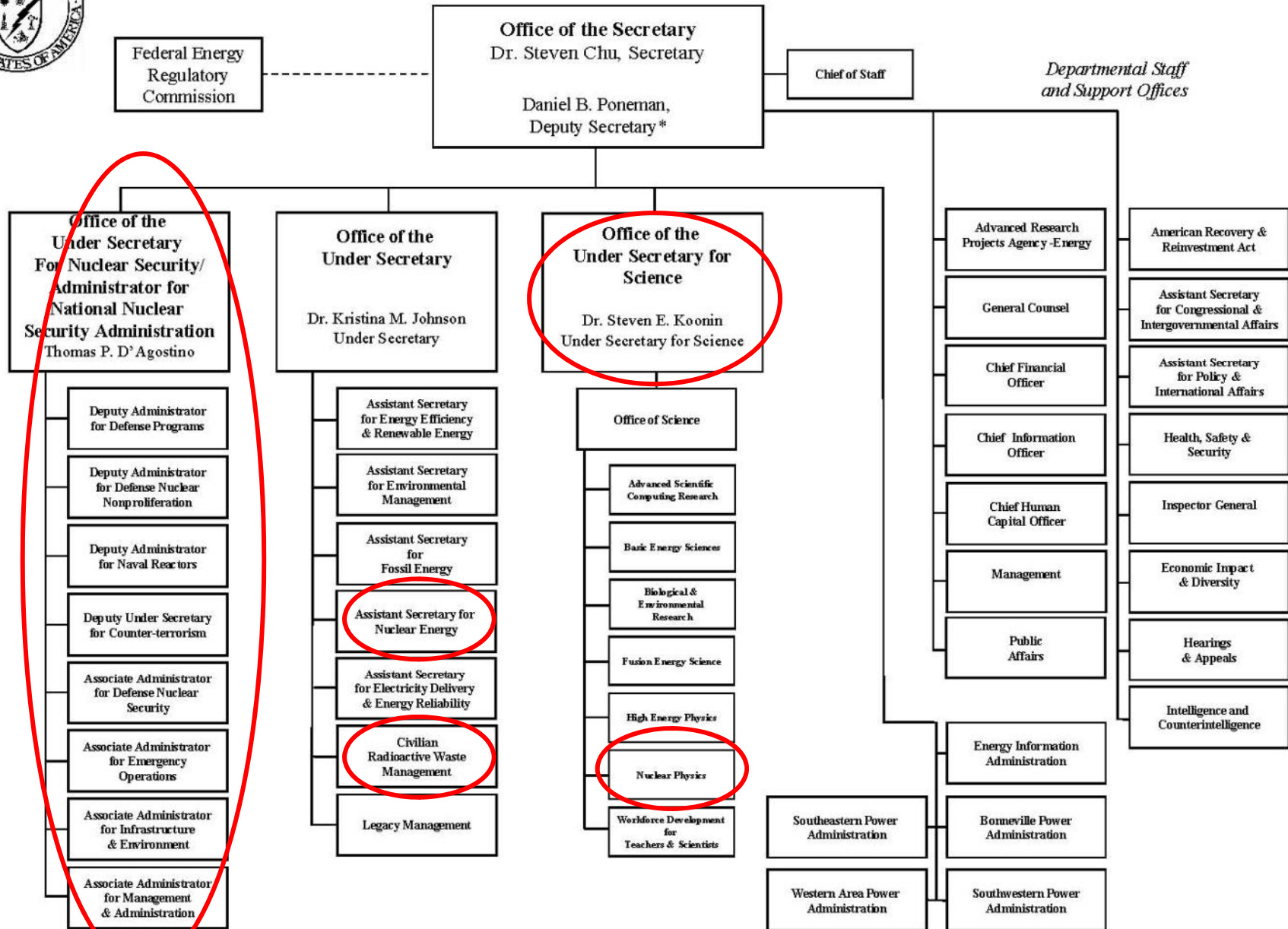
U.S. DEPARTMENT OF  
**ENERGY**

# **Nuclear Science Advisory Committee**

***Steven E. Koonin***  
*Under Secretary for Science*  
*US Department of Energy*  
*July 30, 2010*  
*NSAC*



# DEPARTMENT OF ENERGY



\* The Deputy Secretary also

**Nuclear Science is an essential cross-cutting element in the Department.**

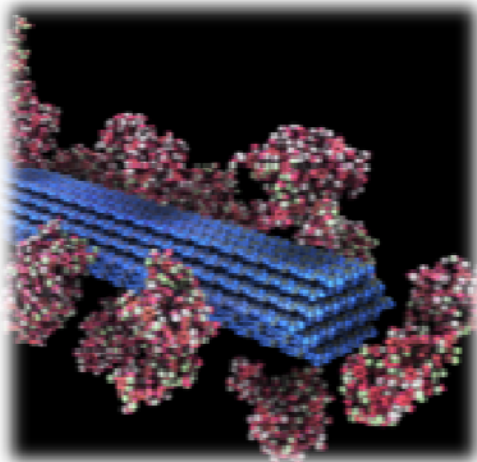
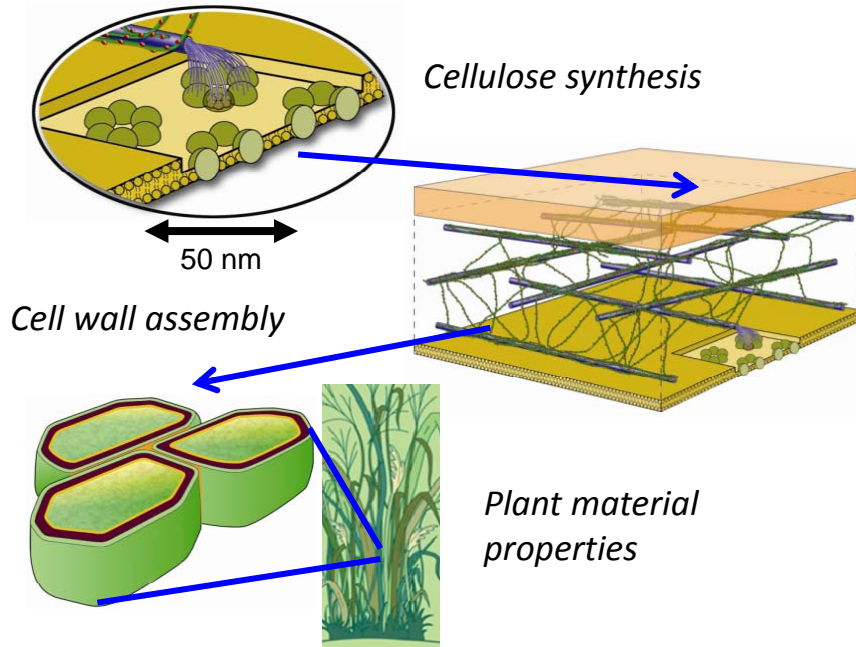
# DOE missions



DOE Secretary, Dr. Steven Chu

- ❑ Sustain **basic research**, discovery and mission driven
- ❑ Catalyze a transformation of the national/global **energy system**
- ❑ Enhance **nuclear security**
- ❑ Contribute to **US competitiveness** and jobs

# Basic Research



- ❑ How do we determine US position in various scientific fields?
- ❑ How can we balance resources in basic research between fields close to vs distant from applications?
- ❑ How do agencies talk to the public, Congress?
- ❑ How can we improve climate science?

# Accelerating Energy Transformation

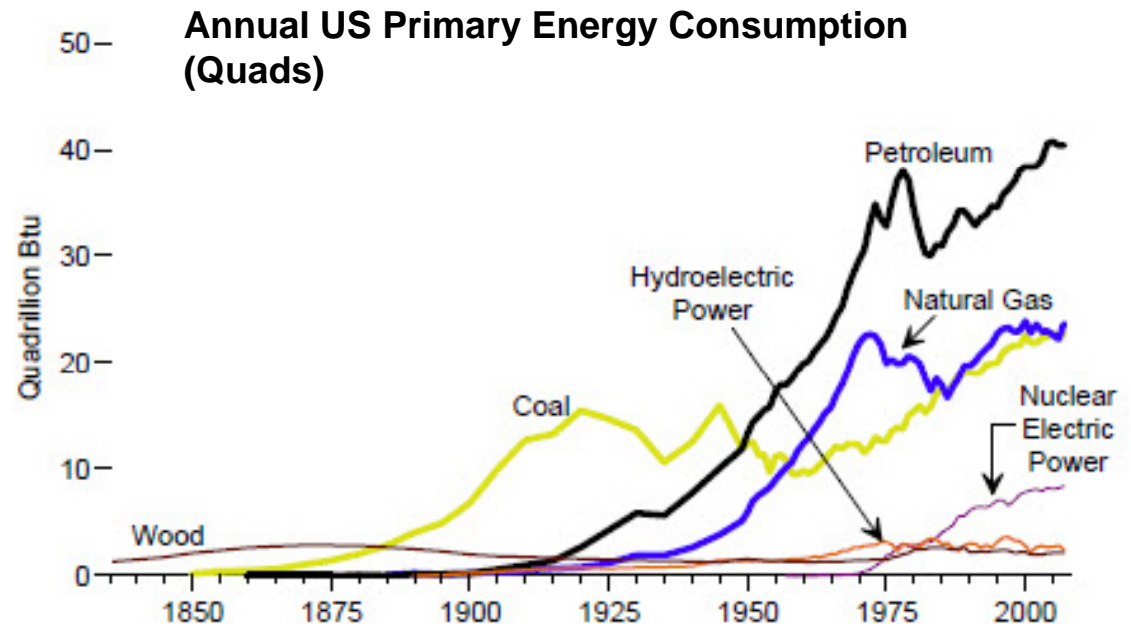
**Energy security:**

**3.5 M bbl/day reduction in crude use**

**Greenhouse gas emissions:**

**17% reduction by 2020,**

**83% by 2050**



[http://www.eia.doe.gov/aer/ep/ep\\_frame.html](http://www.eia.doe.gov/aer/ep/ep_frame.html)

- ❑ Changing the historically decadal timescale?
- ❑ S&T engaging society and industry? The best research structures?
- ❑ Coupling basic and applied research?
- ❑ Formulating/Communicating sensible policy?

# Nuclear Security



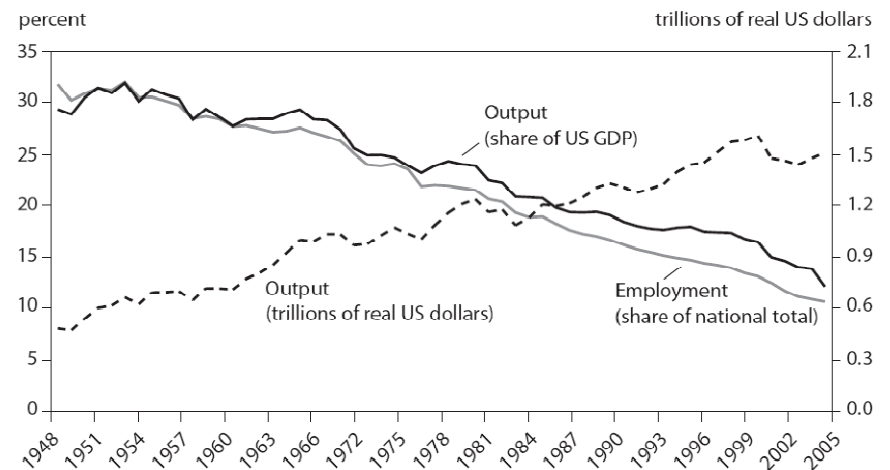
- ❑ Maintain technical base?
- ❑ Keep staff engaged?
- ❑ Energy prospects for the National Ignition Facility?
- ❑ Exploit simulation capabilities



# US Competitiveness

- ❑ How do we get to a deep understanding of the issues?
- ❑ How do we get public dialog/understanding?
- ❑ What is the US strategy?
- ❑ How do we execute?
- ❑ What role do scientists and S&T play?

Trends in US Manufacturing

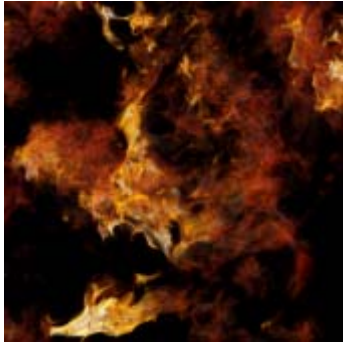


Sources: US Department of Commerce, Bureau of Economic Analysis, Industry Economic Accounts,

**“The United States led the world’s economies in the 20th century because we led the world in innovation. Today, the competition is keener; the challenge is tougher; and that is why innovation is more important than ever. It is the key to good, new jobs for the 21st century.” --President Barack Obama, August 5, 2009**

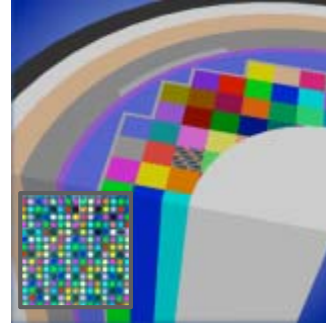


# Simulations expand scientific and technical understanding



## Turbulence

Understanding the statistical geometry of turbulent dispersion of pollutants in the environment.

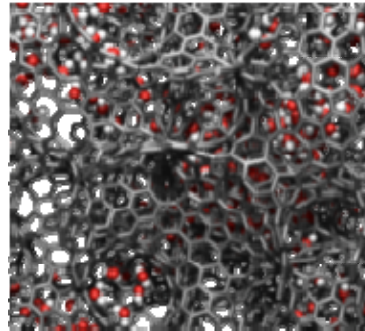


## Nuclear Energy

High-fidelity predictive simulation tools for the design of next-generation nuclear reactors to safely increase operating margins.

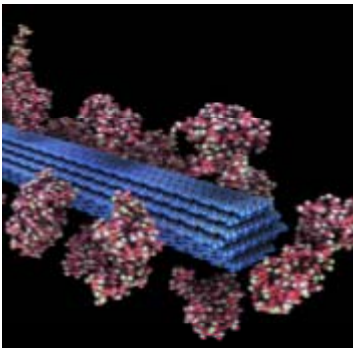
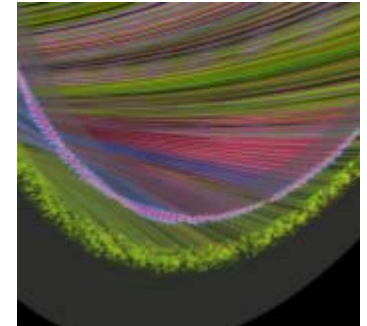
## Energy Storage

Understanding the storage and flow of energy in next-generation nanostructured carbon tube supercapacitors



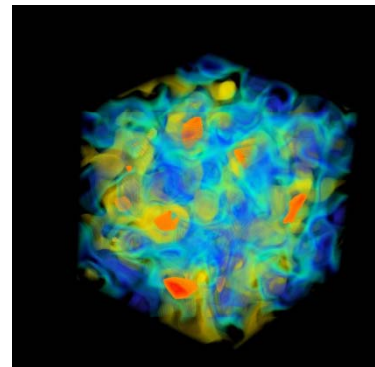
## Fusion Energy

Substantial progress in the understanding of anomalous electron energy loss in the National Spherical Torus Experiment (NSTX).



## Biofuels

A comprehensive simulation model of lignocellulosic biomass to understand the bottleneck to sustainable and economical ethanol production.



## QCD

Studying the theory of quarks and gluons formulated on a space-time lattice.

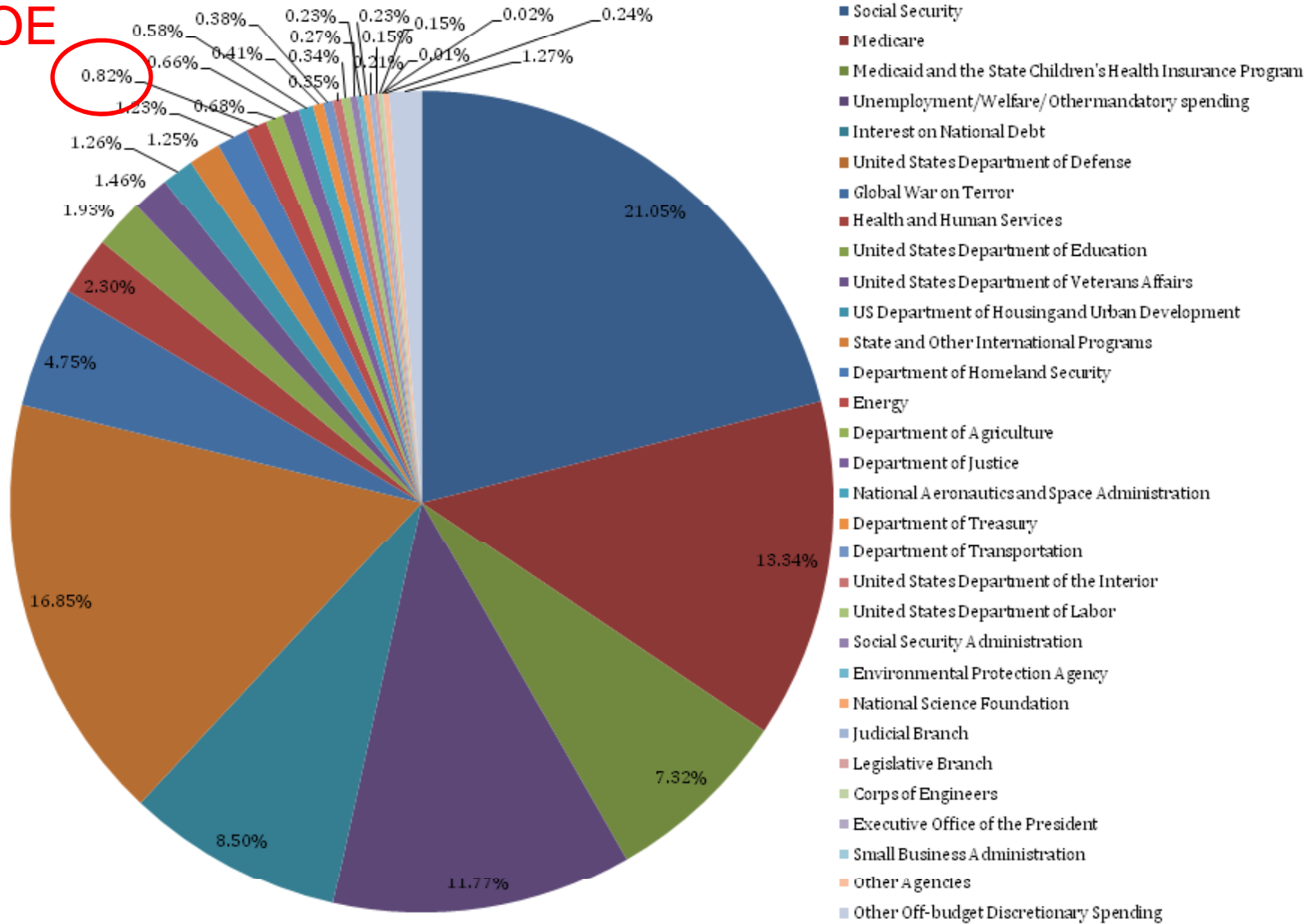
*SciDAC provides opportunities to leverage science and computing across the DOE*



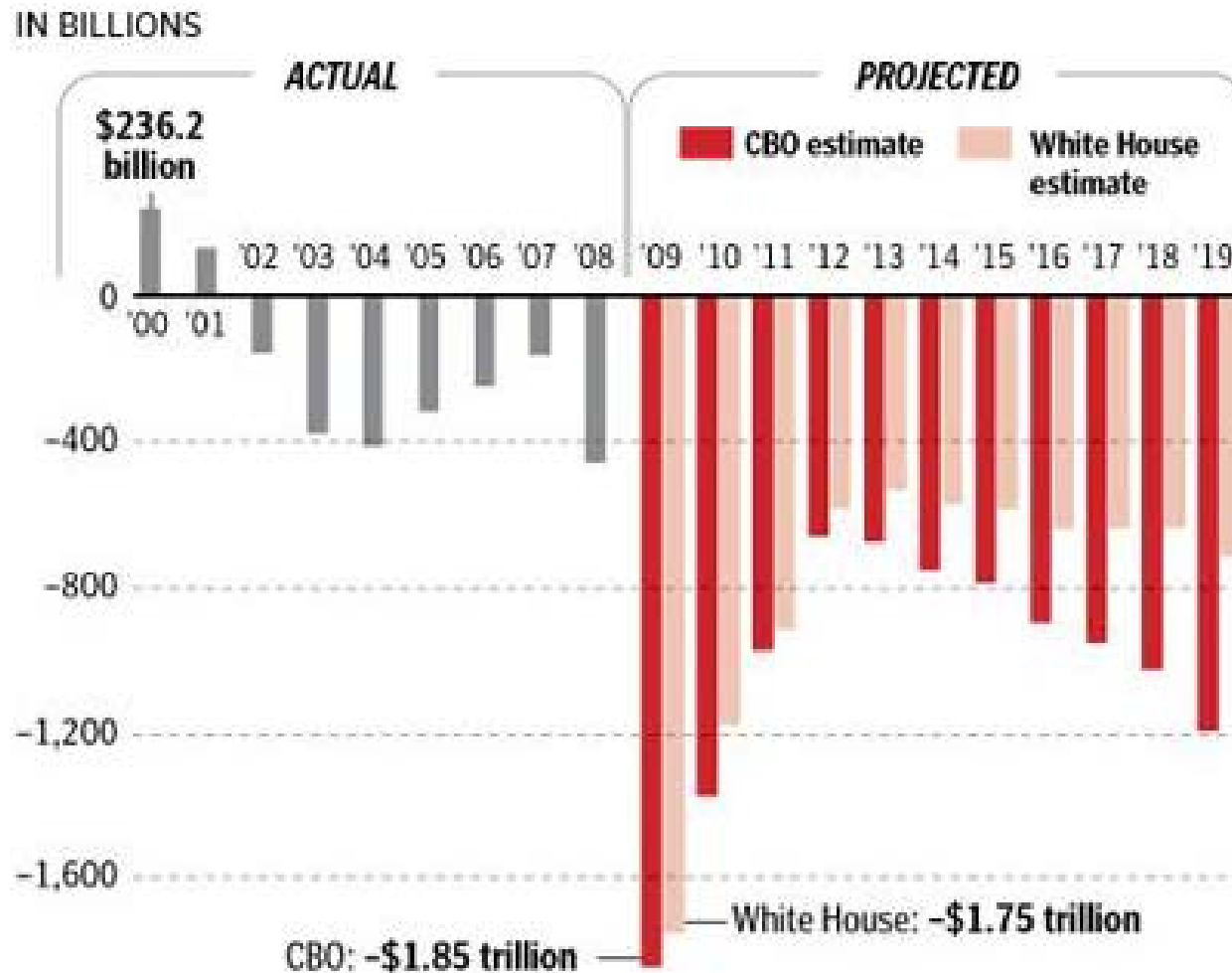


# FY09 Federal Spending

DOE



# Federal deficit projections



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# Nuclear Science Advisory Committee

- Thank you for your hard work and continued dedication to advising the government.
- I plan to continue calling on your expertise as we move toward an overall strategic plan.

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# Questions/Comments?

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