

Realizing a Clean Energy-Based Economy: A Path Forward

Presentation to the President's Council of Advisors
on Science and Technology

Kristina M. Johnson
Under Secretary of Energy
7 January 2010



Who we are...

Fossil Energy
James Markowsky



Office of the Under Secretary of Energy



Under Secretary
Kristina M. Johnson



Environmental Management
Ines Triay

Electricity Delivery and Energy Reliability
Patricia Hoffman
(Nominated)



Civilian Radioactive Waste Management
Chris Kouts
(Retired 1/10)

Nuclear Energy
Warren Miller



Energy Efficiency and Renewable Energy
Cathy Zoi



Legacy Management
David Geiser

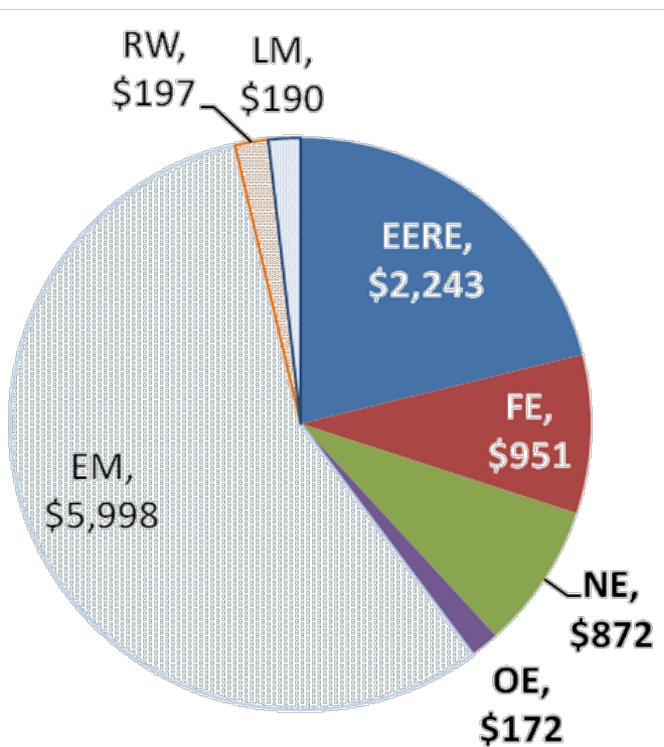


President's Goals and Secretary's Strategic Objectives:

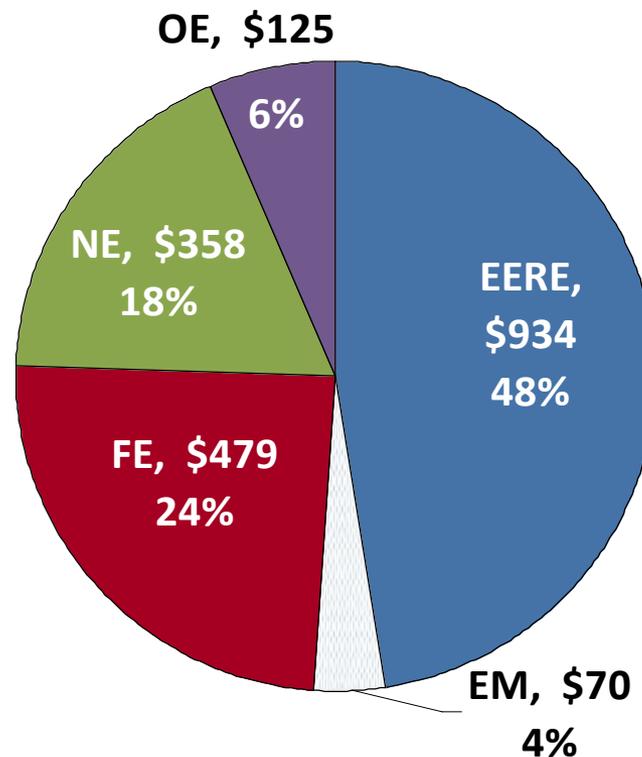
- *Reduce carbon emissions by 83% of 2005 levels by 2050*
- *Increase our energy security*
- *Build a sustainable clean energy economy*
- *Restore U.S. leadership in science, discovery and innovation*
- *Reduce nuclear dangers and environmental risks*



Energy and Environment Offices FY10 Budget (\$M)



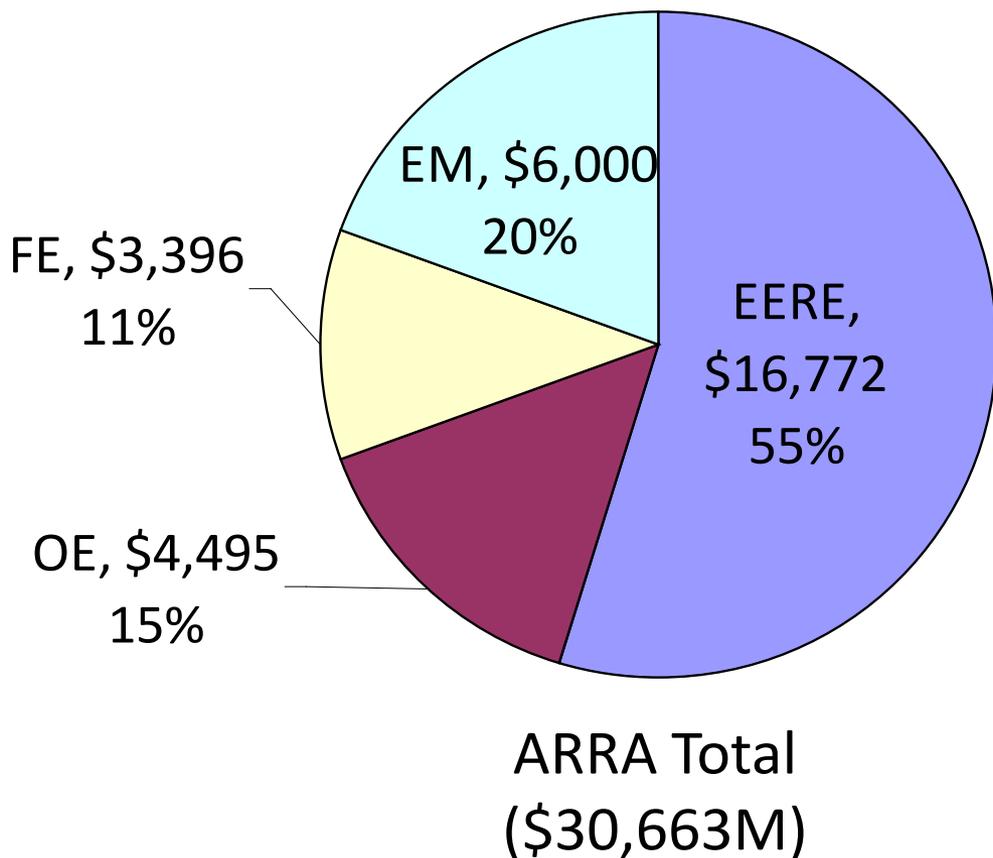
FY2010 Enacted
(\$10,621M)



FY2010 R&D Budget
(\$1,966M)

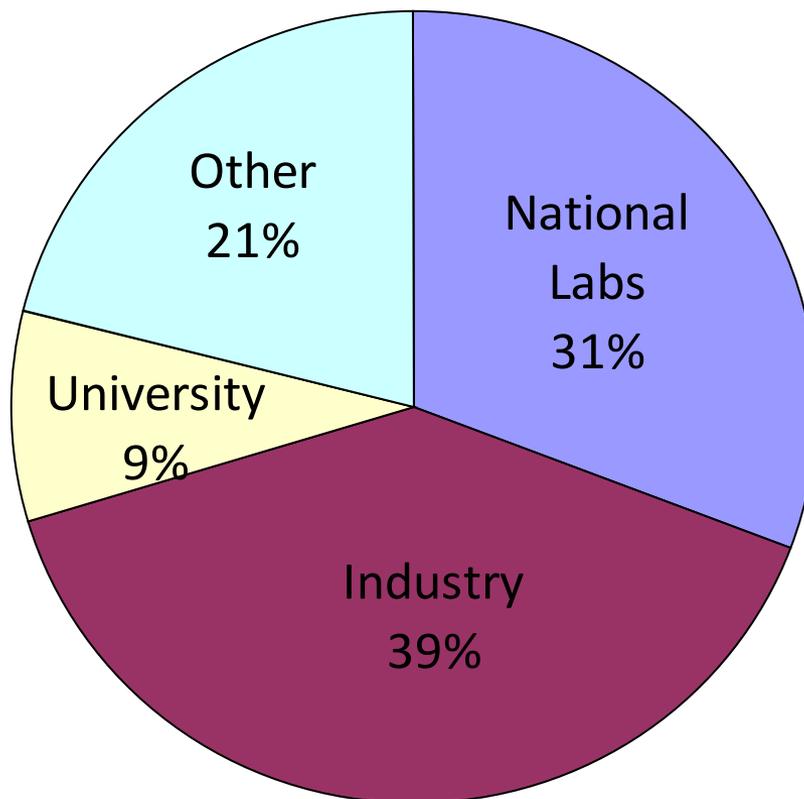


Energy and Environment Offices ARRA Budget(\$M)





FY09 Recipient Breakdown for the Applied Energy Offices (Approx \$4.2 Billion)





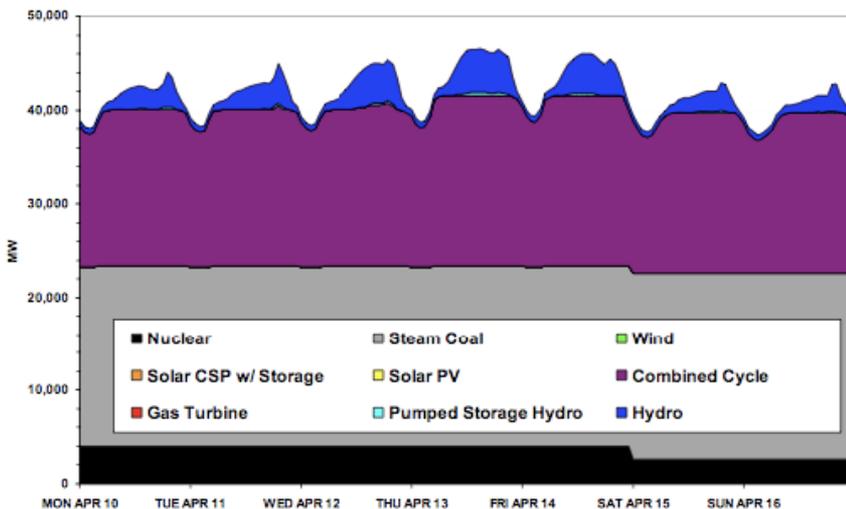
Question 1:

Do we have the right balance across the portfolio and within each program?

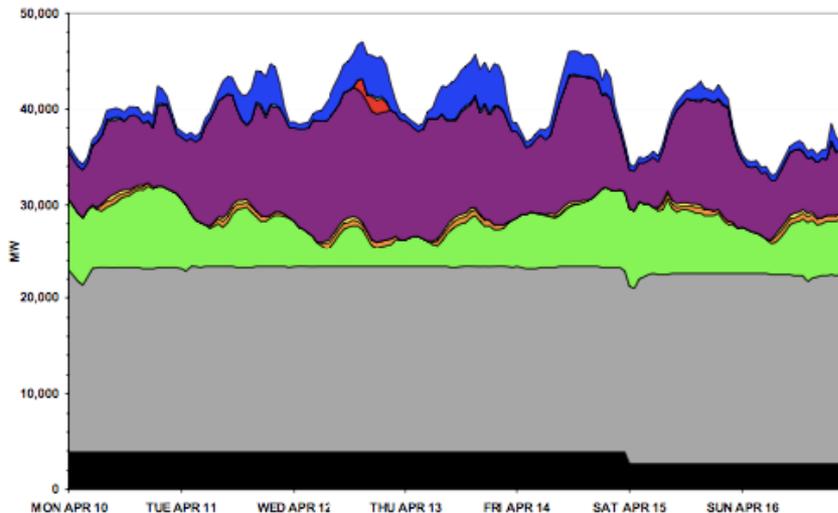


OE - Variable Generation Affects Grid Operations

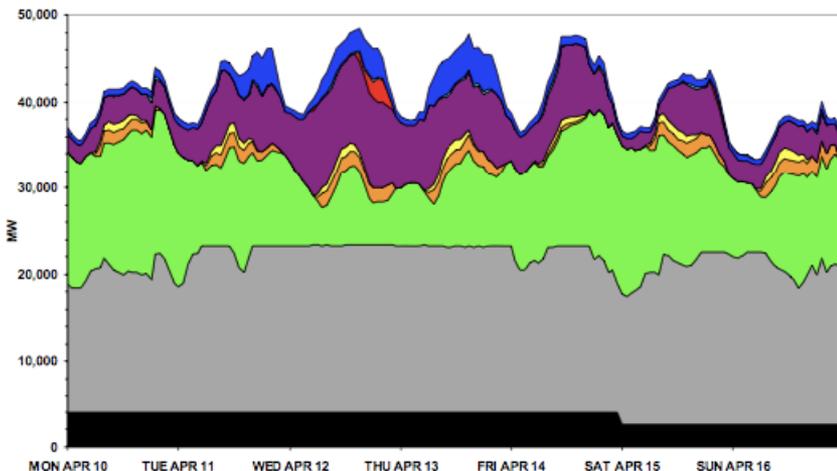
No wind



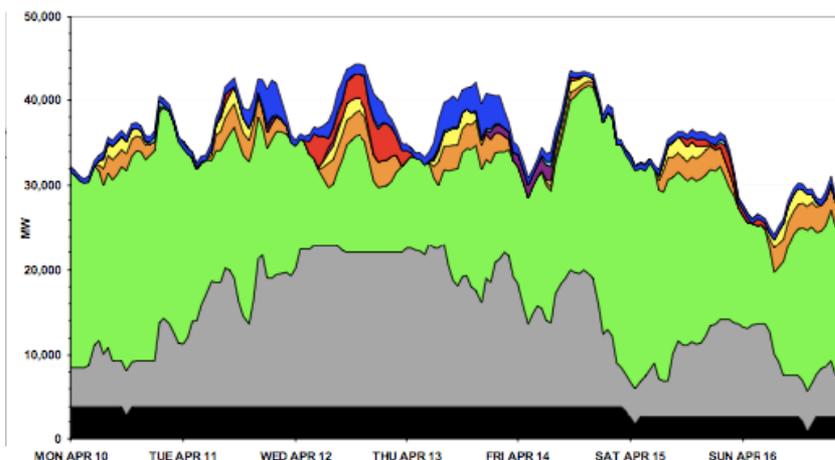
11% renewables



23% renewables



35% renewables





Linking Science and Technology



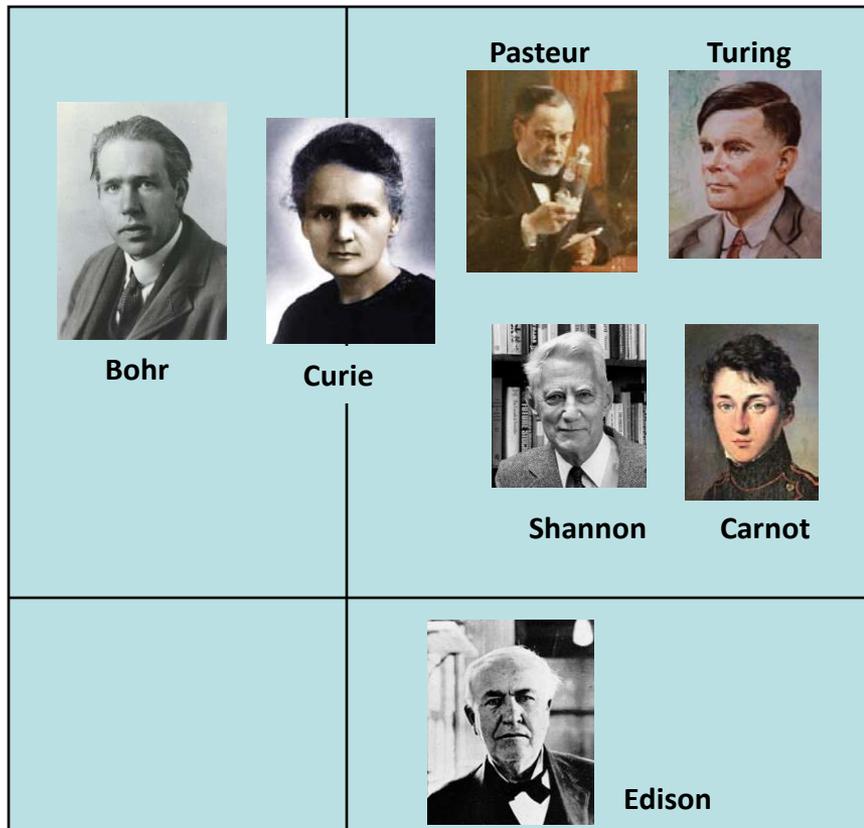
Vannevar Bush



1-D view

2-D view:

Fundamental:

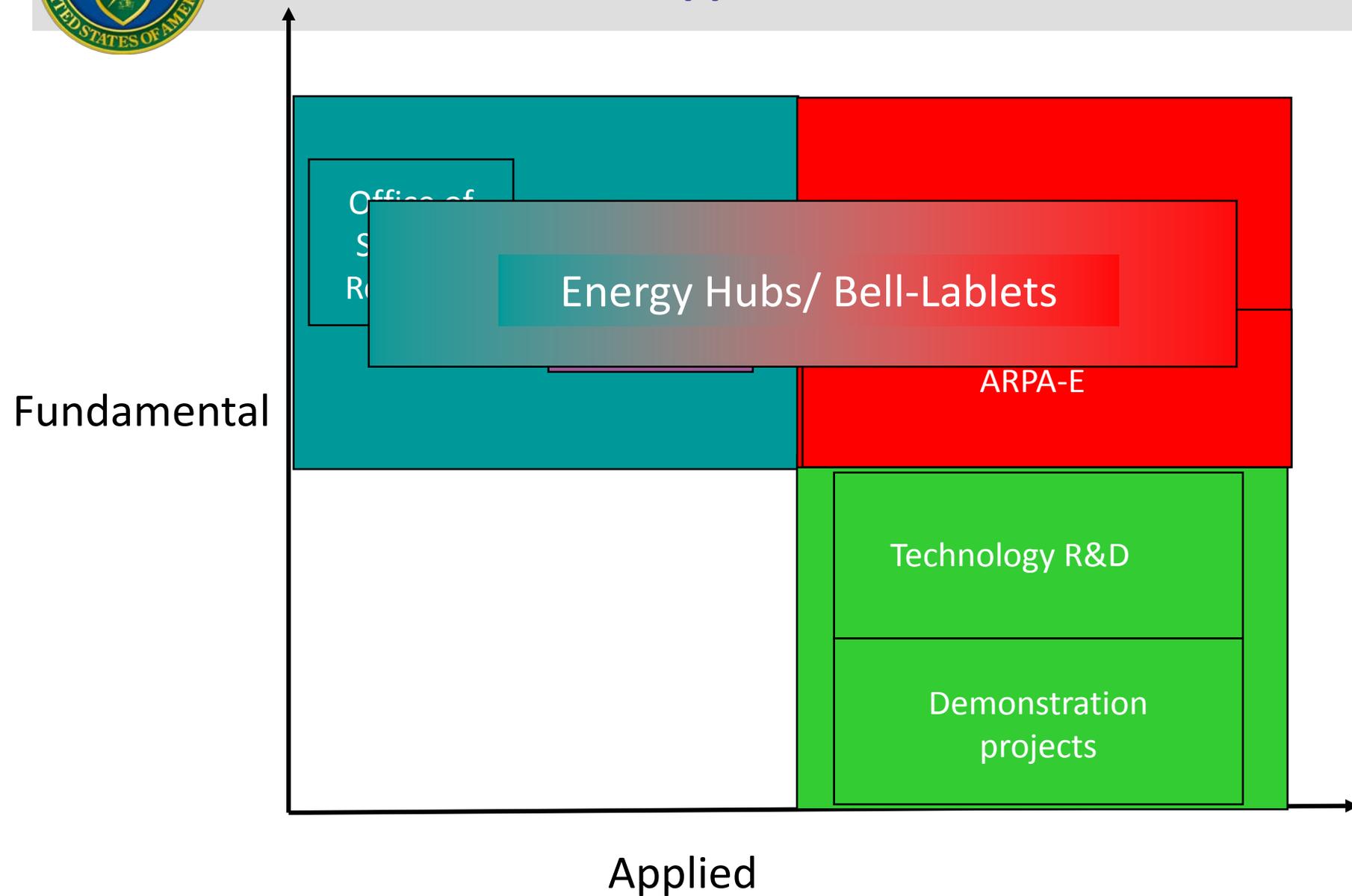


(Source: Adapted from *Pasteur's Quadrant* by Donald Stokes)

Applied:



Pasteur's Quadrant applied to the DOE





Question 2:

How do we attract the top talent to the applied programs?



Re-Energise and Outreach

Post-Grad

- Energy Postdoctoral Fellowships
- Graduate Research Fellowships
- Masters in Energy Systems Mgt

K-16

- Undergrad Assistantships
- Technical Education
- K-12 Education and Outreach



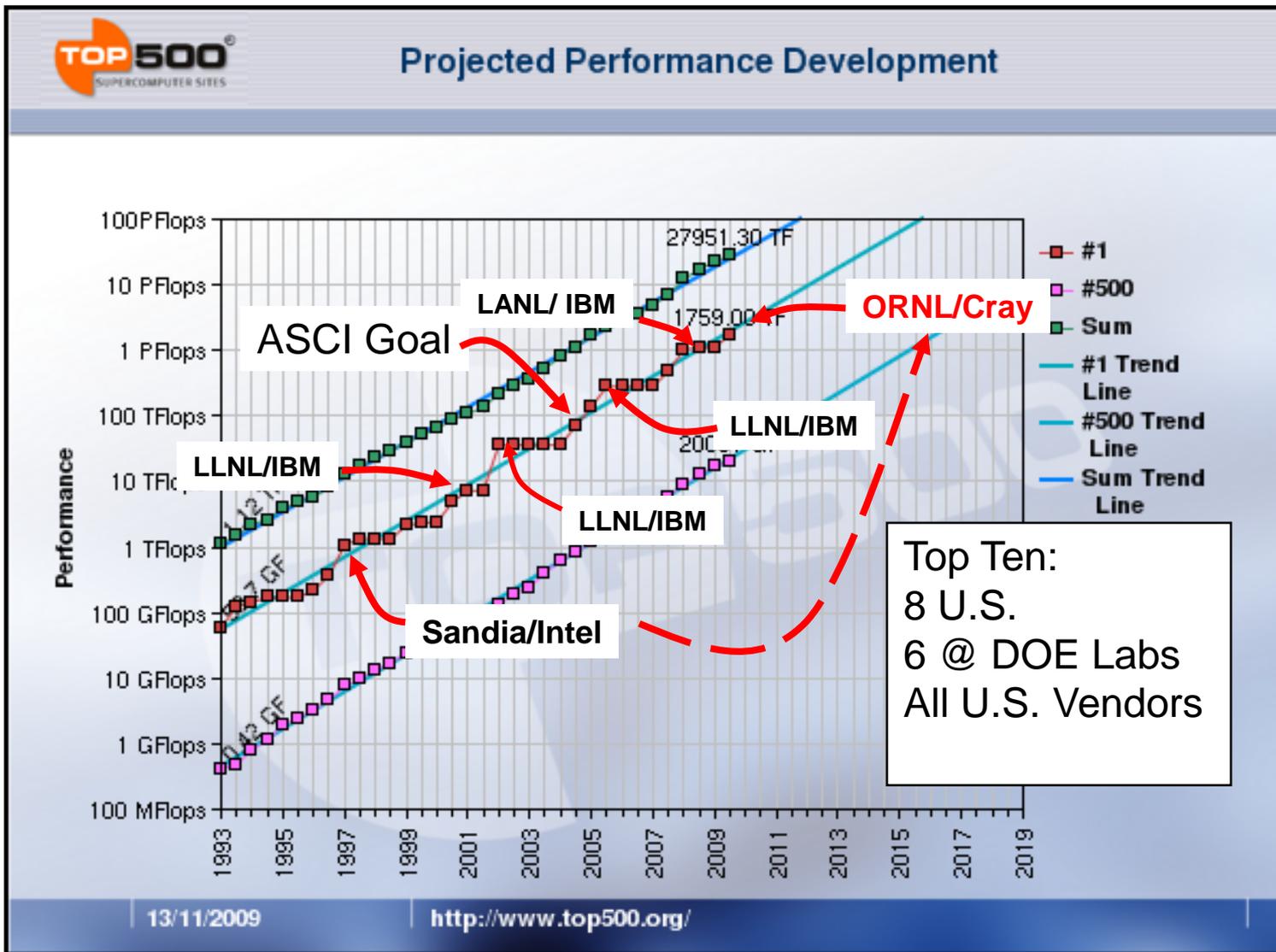
Question 3:

Given the heightened urgency of developing clean energy technology, should DOE:

- a) Do something DIFFERENT, or*
- b) Do the same thing but BETTER, or*
- c) Do MORE?*

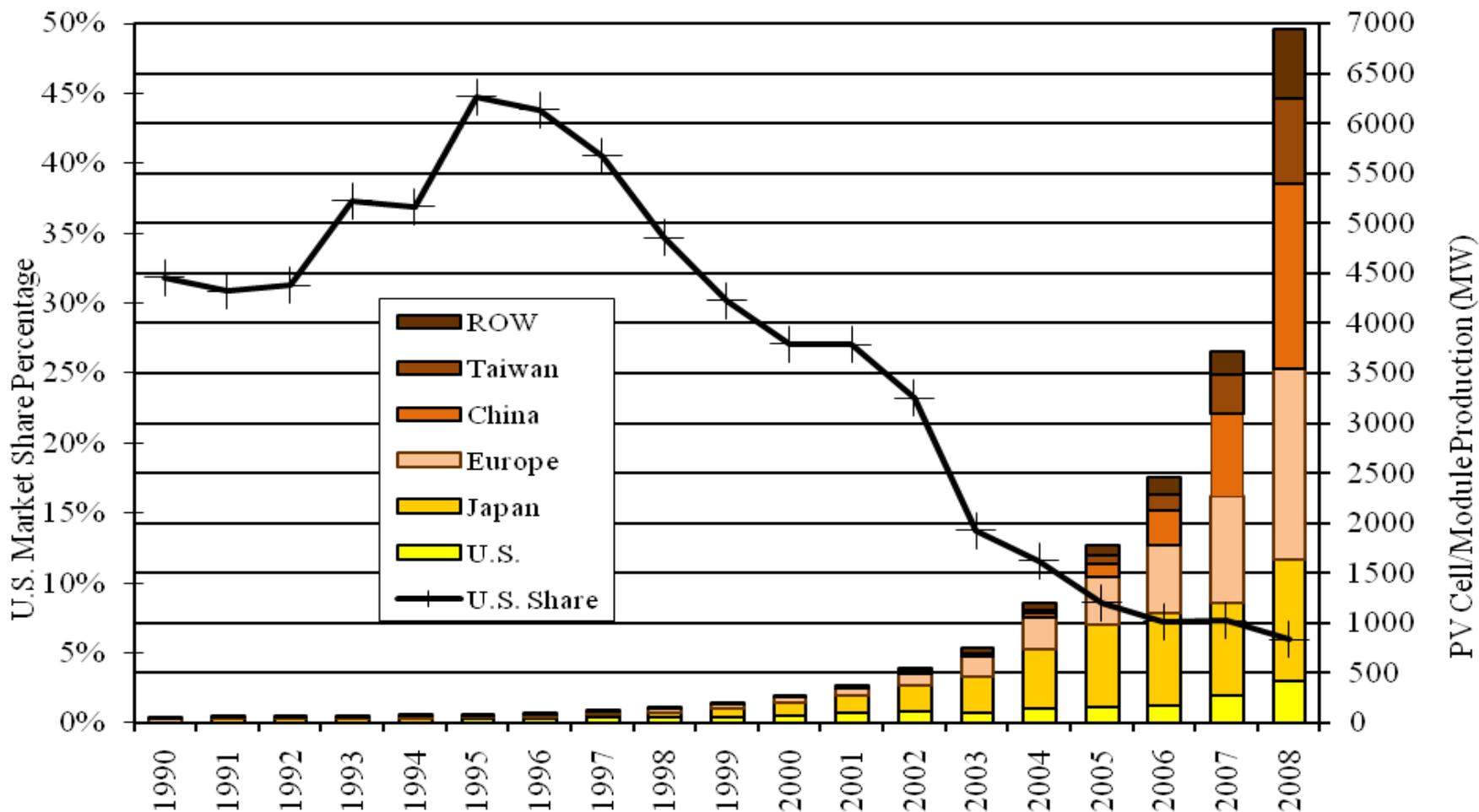


DOE Stockpile Stewardship (ASCI/ASC) → (SciDAC) has maintained US Global Computing Leadership





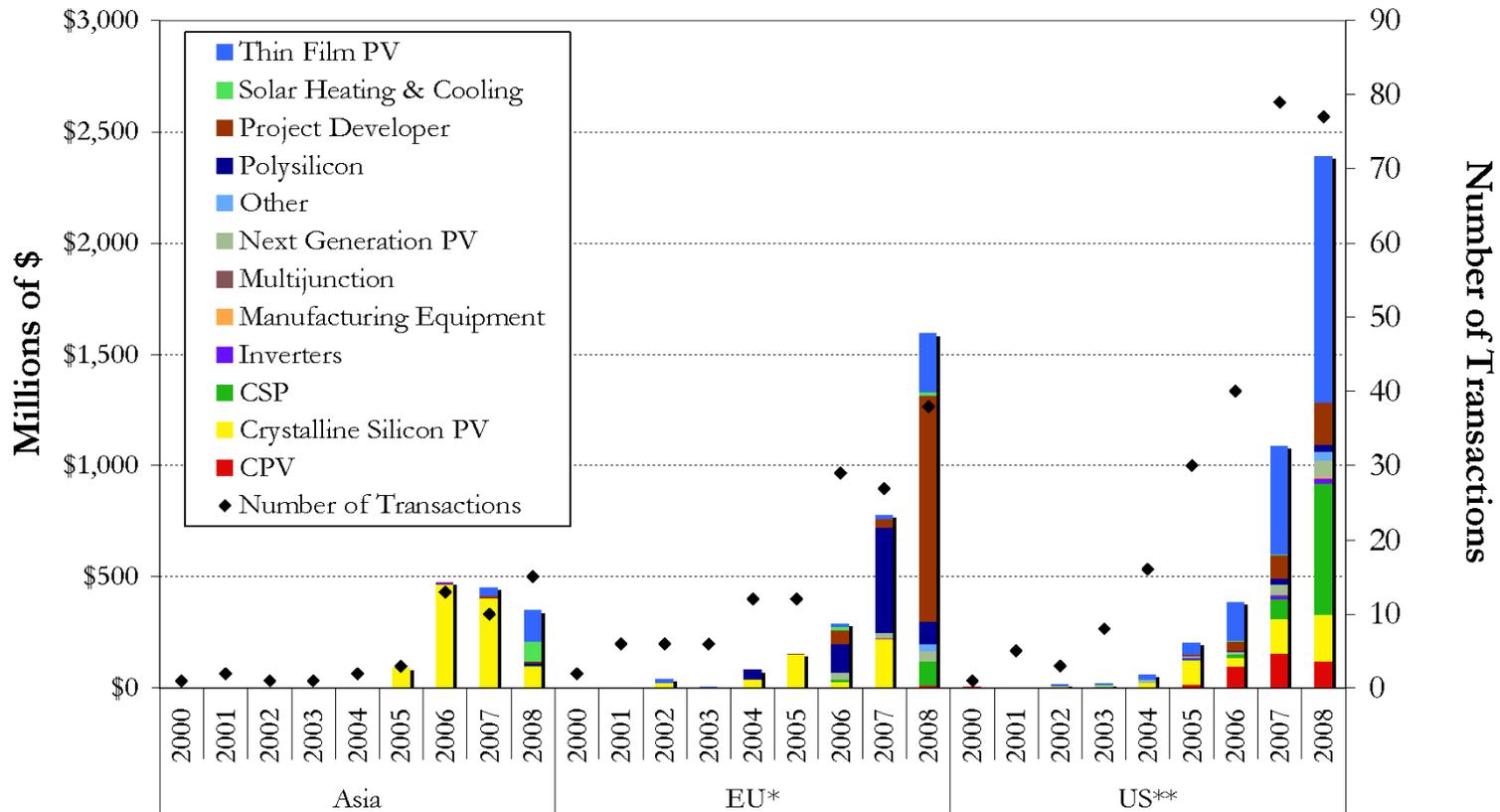
PV Production and U.S. Market Share





The U.S. is Rich in PV Technology Innovation

VC & PE Solar Investments by Region and Technology



The US is the most diversified in solar technologies receiving VC and PE financing, with substantial investment in thin film PV, as well as CPV and CSP

- In Europe, most of the funding has been to polysilicon and c-Si PV companies
- In Asia, almost all investment has gone to c-Si PV



Challenges and Opportunities

- *Do we have the right balance across the portfolio and within each program?*
- *How do we attract the top talent to the applied programs?*
- *Given the heightened urgency of developing clean energy technology, should DOE:*
 - a) *Do something DIFFERENT, or*
 - b) *Do the same thing but BETTER, or*
 - c) *Do MORE?*