



U.S. Department of Energy Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy
is clean, abundant, reliable, and affordable

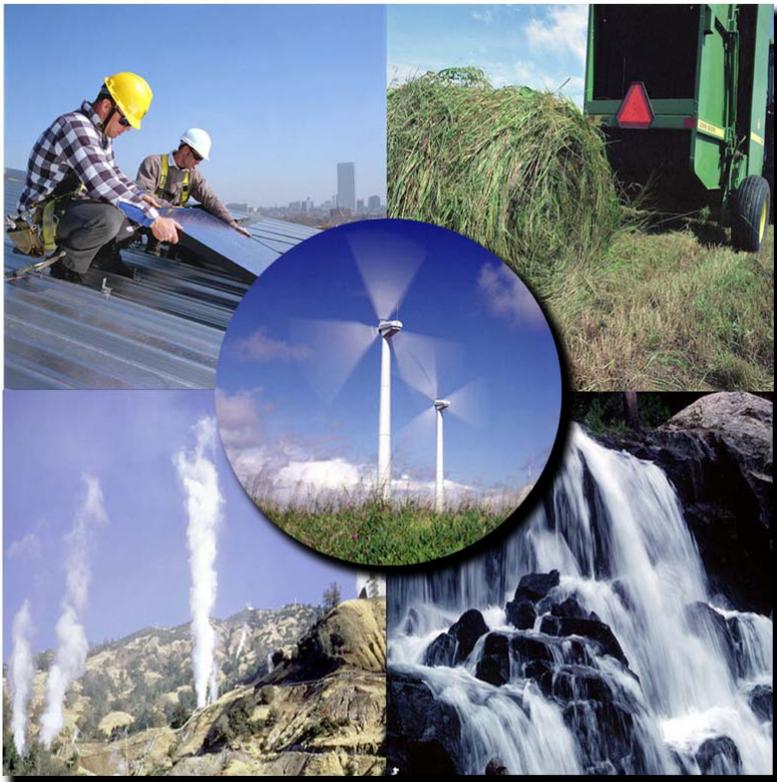
Federal Energy Management Program

Renewable Energy at the U.S. Department of Energy

Matt Gray, Federal Energy
Management Program

OFEE West Symposium

June 17, 2008



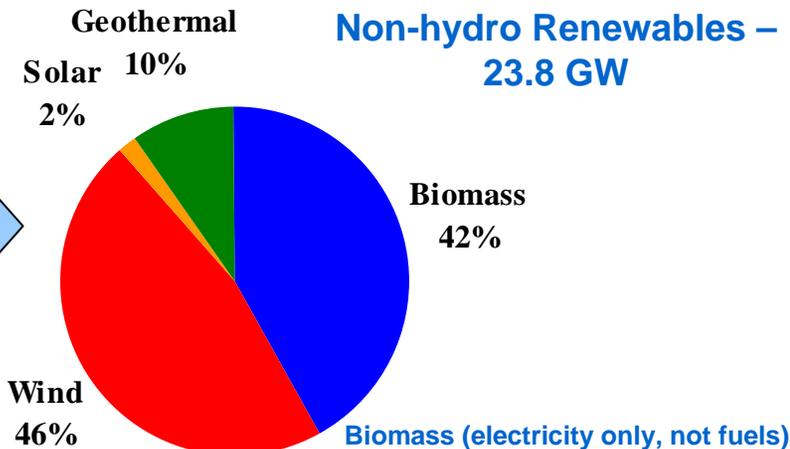
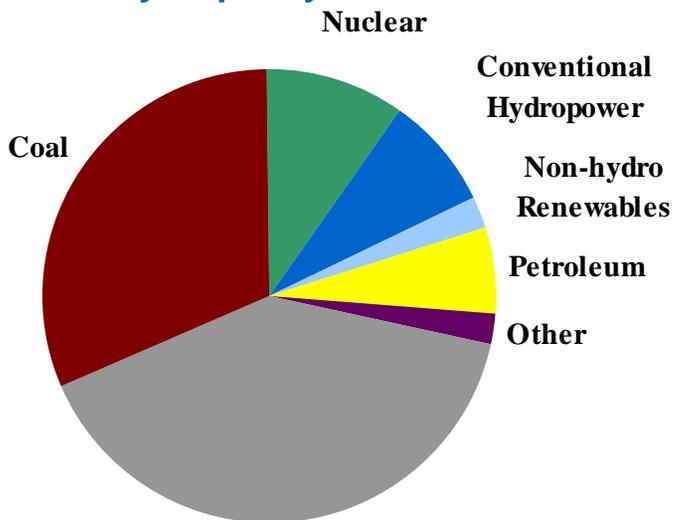


- Renewable Energy in the US
- Renewable Energy and the Federal Government
- DOE Secretary Bodman's Goal (TEAM Initiative)
- DOE HQ Process for Implementing On-Site Renewables
 - Screening for renewable opportunity
 - Prioritize, site visits and reports
 - Internal dialogue and process improvement
- Conclusion

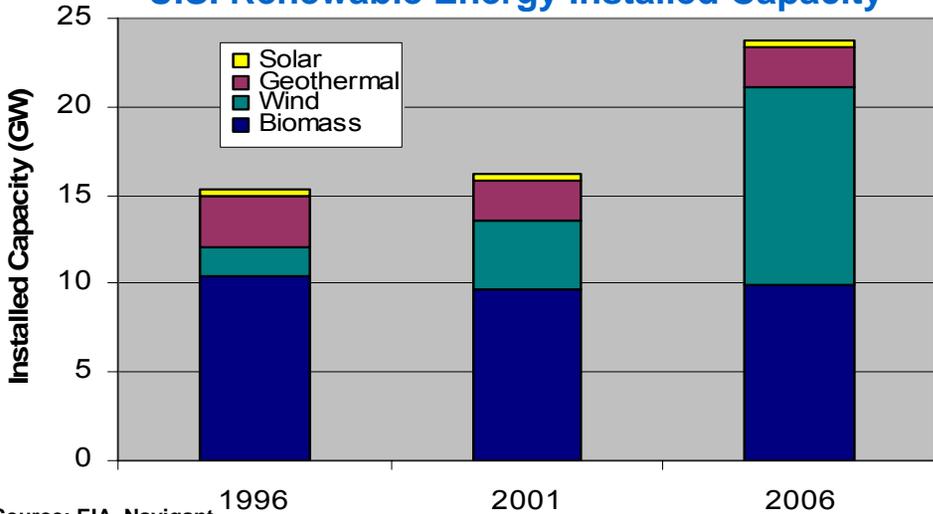


Electricity Capacity and Renewable Development Rates

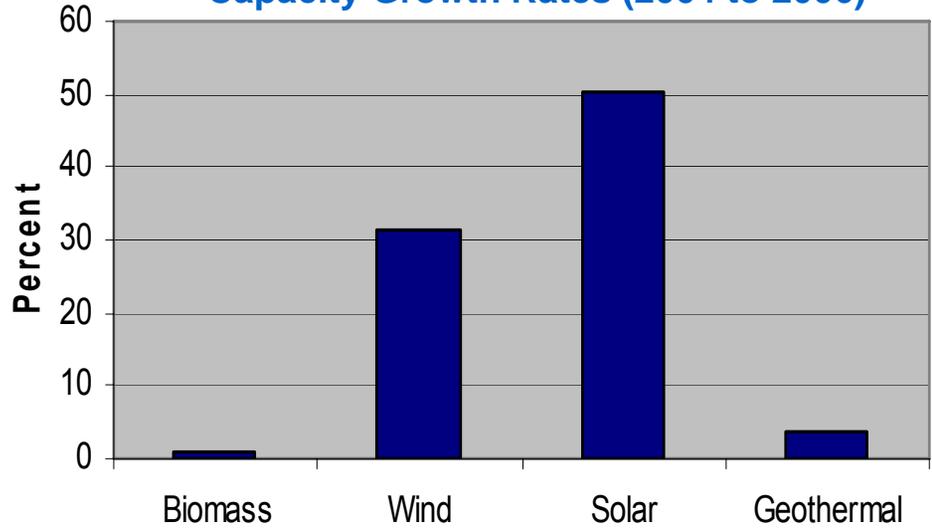
U.S. Electricity Capacity – 988 GW



U.S. Renewable Energy Installed Capacity



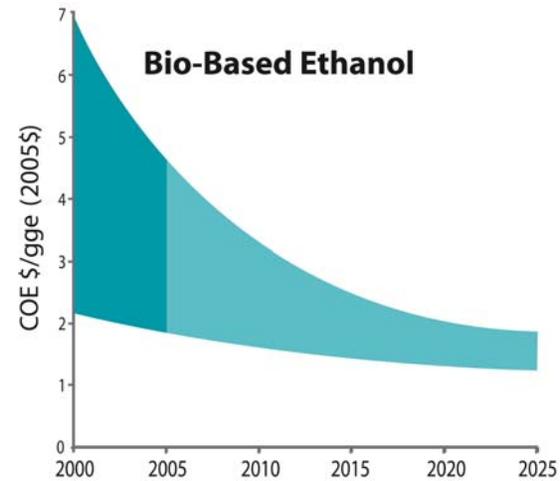
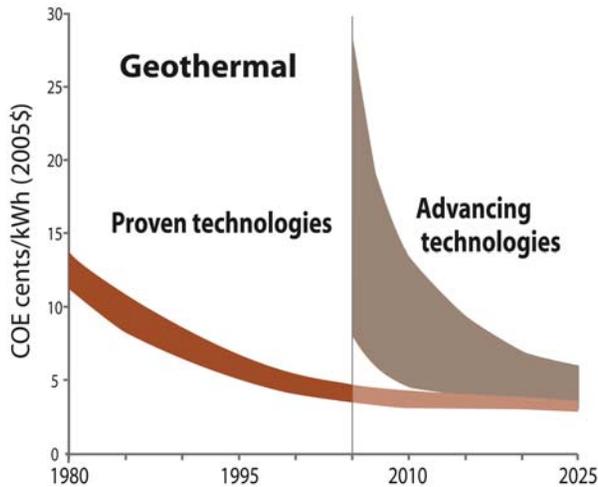
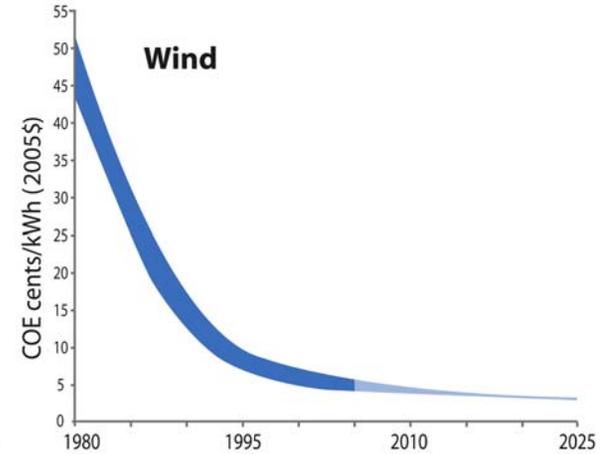
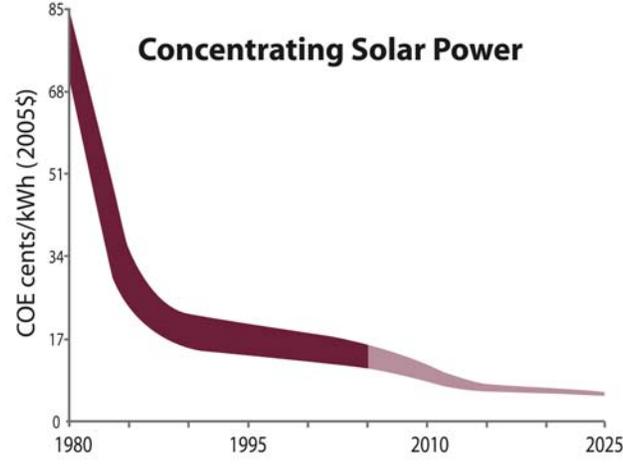
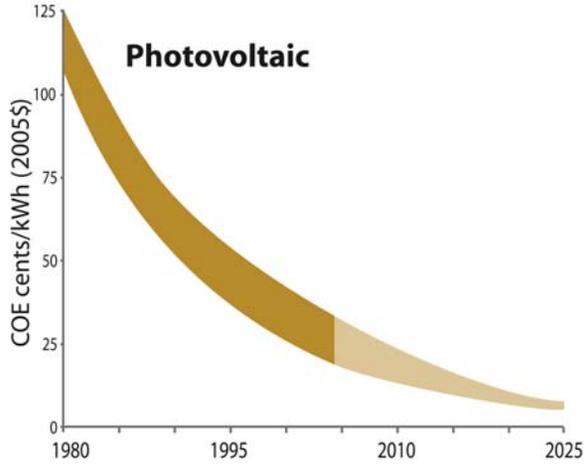
Average Annual U.S. Renewable Energy Capacity Growth Rates (2004 to 2006)



Source: EIA, Navigant



Renewable Energy Cost Trends



**Levelized cost of energy in constant 2005\$
(Ethanol is fuel)**

Source:
NREL Energy
Analysis Office



- Energy Policy Act of 2005 (EPACT 2005) goals for percent of Federal electricity consumption from renewable energy:
 - 2007-09: **3%**
 - 2010-12: **5%**
 - 2013: **7.5%**
- Electric energy generated from **solar, wind, biomass***, **landfill gas, ocean** (including tidal, wave, current, and thermal), **geothermal, municipal solid waste, or incremental hydropower**
- Executive Order 13423 provision: 50% of statutorily required RE must be “New” (defined as 1/1/99), and encourage on-site
- Renewable guidance issued January 28, 2008

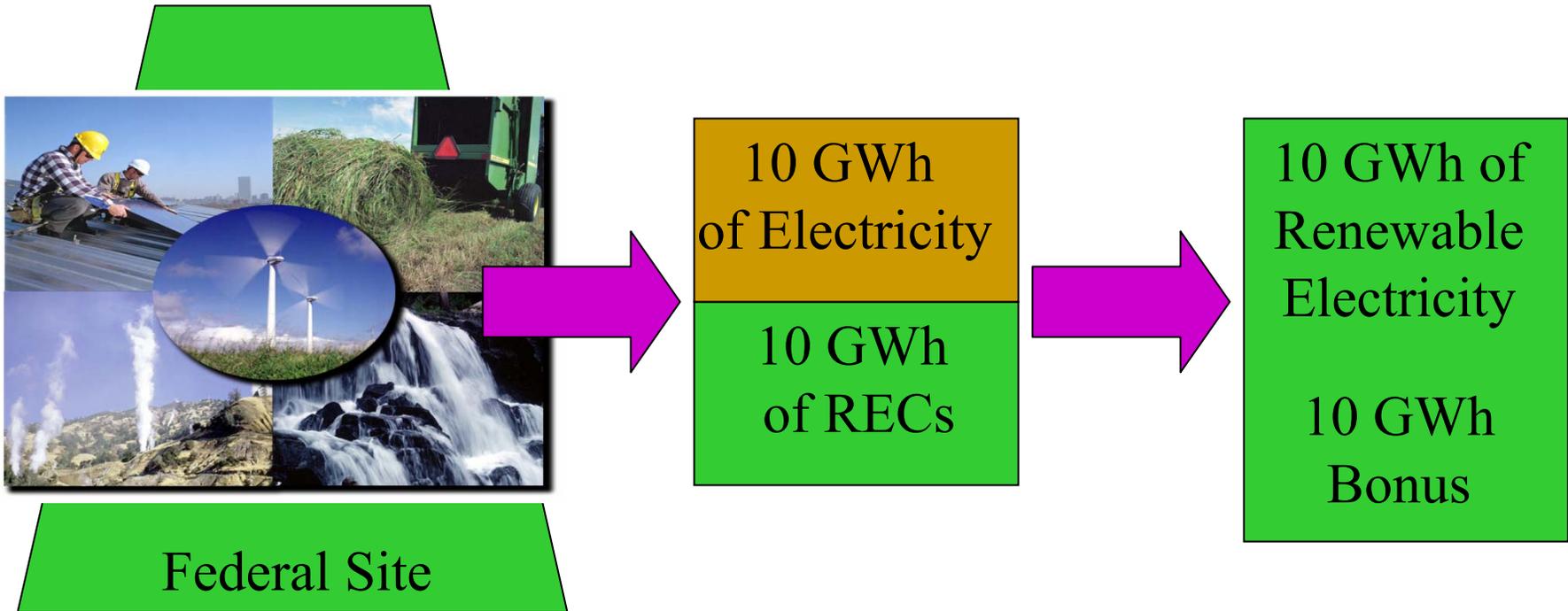
** There is a detailed biomass definition in the law*



- 2x Bonus limited to new electric energy renewable sources.
- Can include non-electric renewable for the EO 13423 Goal.
- Renewable energy contribution to EO 13423 energy goal phased out to 0 in 2012.
- Requires retention of Renewable Energy Credit (REC) attributes for on-site sources, but allows for REC trading (swapping).
 - RECs represent the environmental (non- energy) attributes of energy generated from renewable sources.
 - RECs can be sold separately from the electricity with which it is associated
 - RECS from qualified sources may be used to meet the RE goals



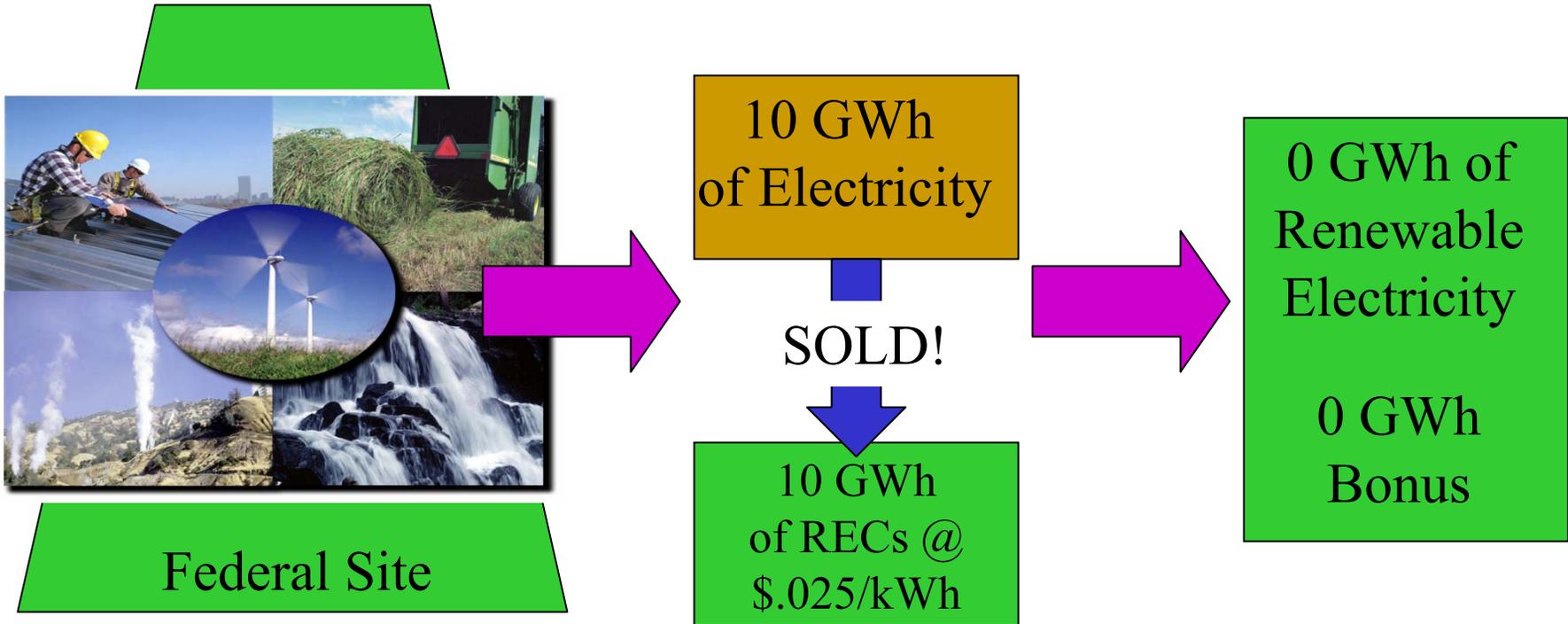
Case 1: Site Retains RECs from On-Site Project



At \$.05/kWh site spends \$50M, for 10 GWh of electricity and 10 GWh bonus, total of 20 GWh of credit toward renewable energy goal



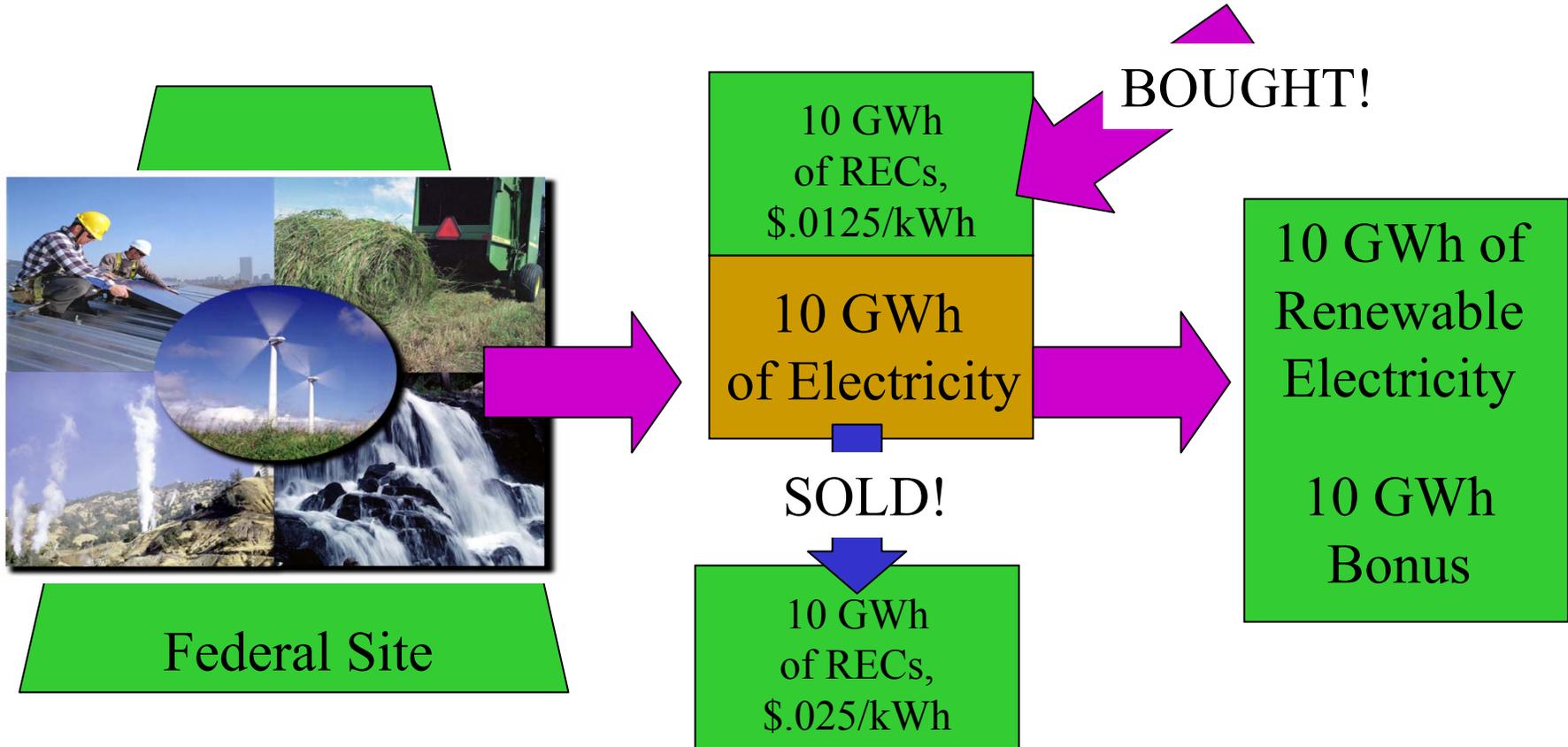
Case 2: RECs from On-Site Project Sold Outside Government



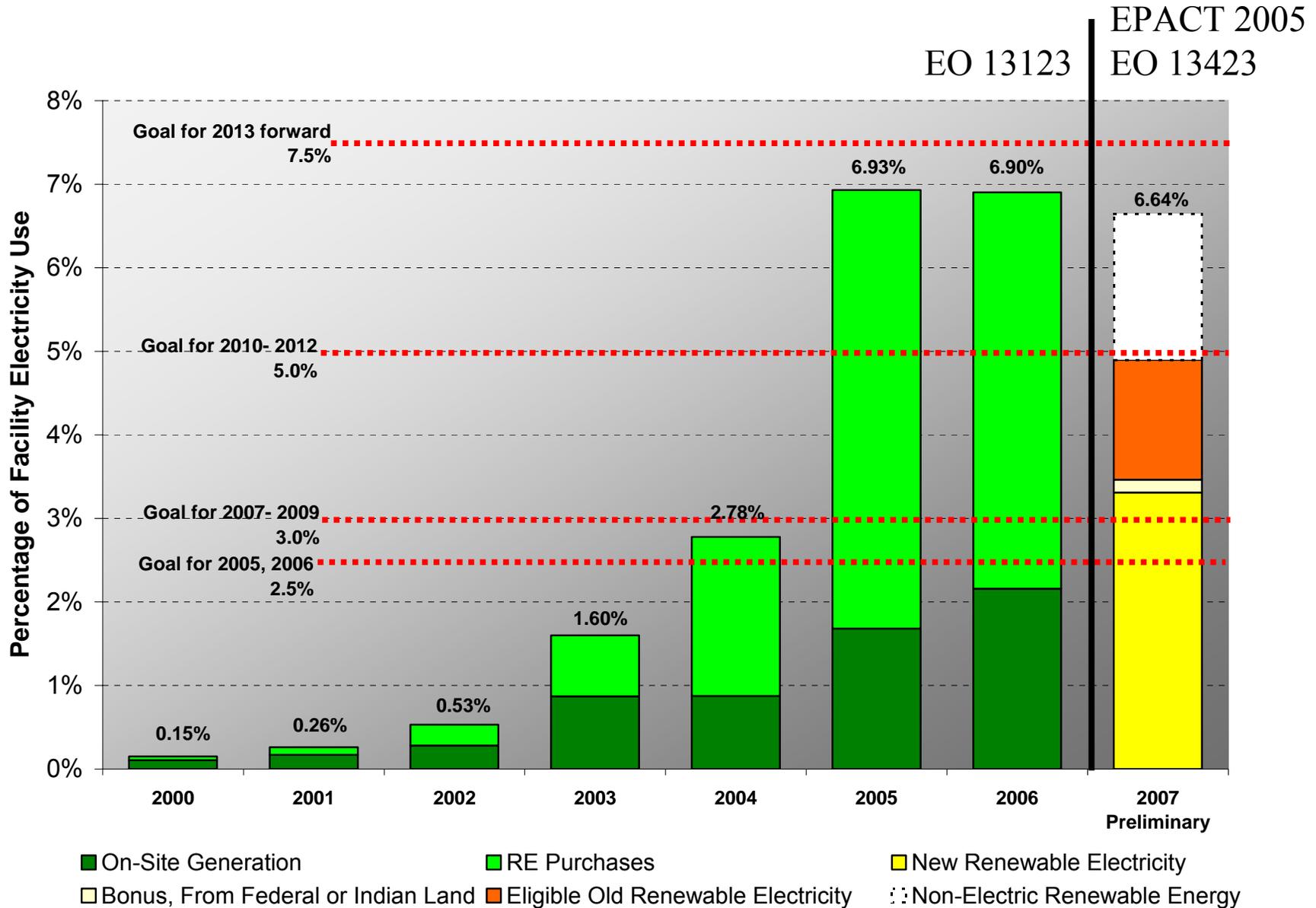
At \$.05/kWh site spends \$50M. RECs sold for \$.025/kWh to reduce costs by \$25M. 0 GWh of credit toward renewable energy goal because without RECs the electricity is just electricity.



Case 3: RECs from On-Site Project “Swapped” to Reduce Costs

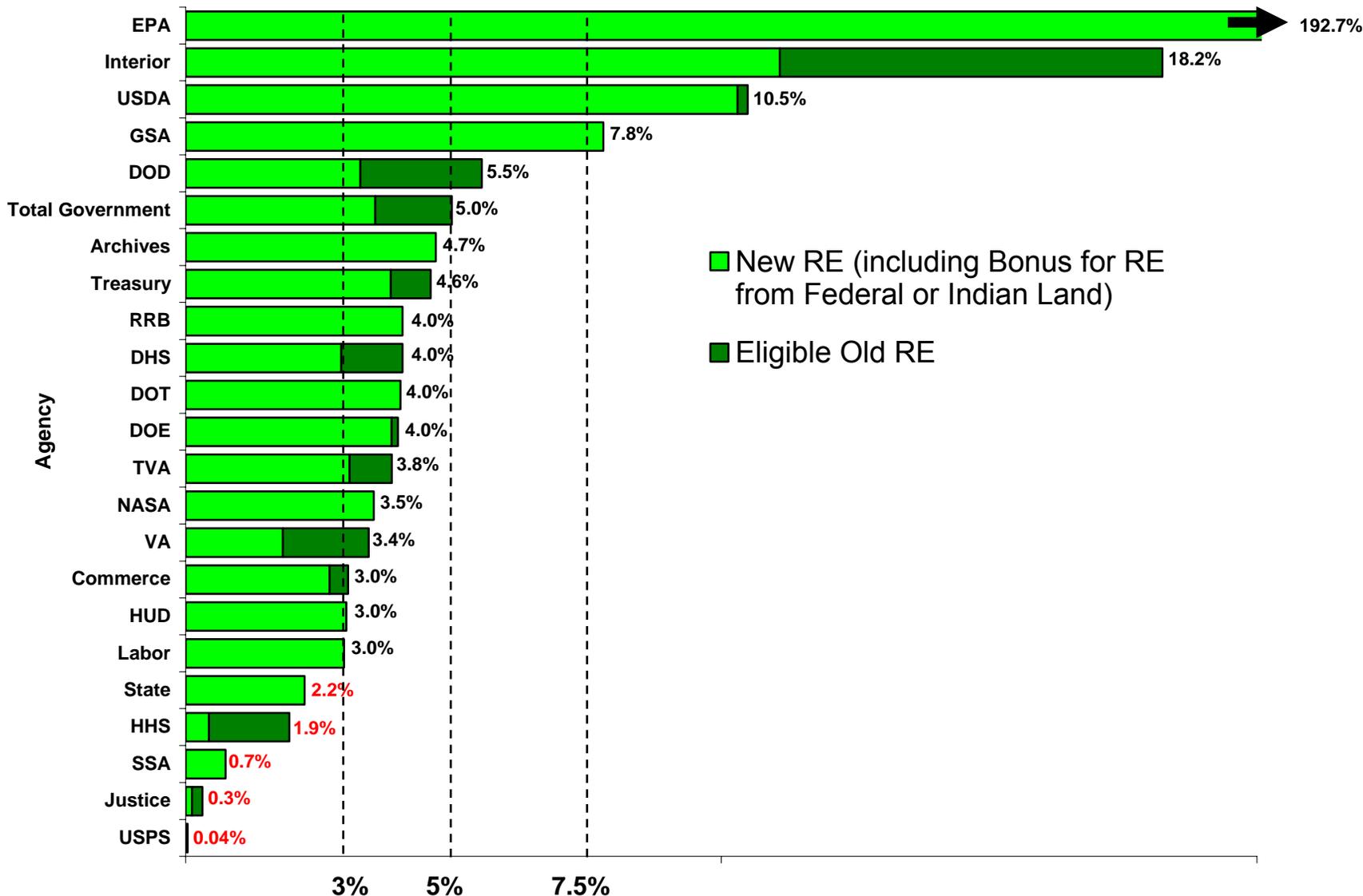


At \$.05/kWh site spends \$50M. RECs sold for \$.025/kWh to reduce costs by \$25M. RECs from new (installed after January 1, 1999) renewable energy sources purchased at \$.0125/kWh for \$12.5 M. Net cost to site = \$37.5M 20 GWh of credit toward goal.





Renewable Usage by Agency



PRELIMINARY DATA

Renewable Electric Energy as a % of Electricity Use



“My specific requirements for the TEAM Initiative are as follows... Maximize installation of secure, on-site renewable energy projects at all DOE sites”
Secretary Samuel W. Bodman, August 6, 2007 at GovEnergy 2007



- One of the TEAM goals related to RE includes:
 - **Maximize installation of on-site renewable energy projects at all DOE sites**
- WHY? Because the core mission and responsibility of the Department of Energy is to lead the nation in promoting and utilizing the best available energy management technologies and practices.
 - Federal government is the largest single energy user in the U.S. and DOE is the second largest energy consumer of all civilian federal agencies



DOE will strive to meet, exceed and/or lead in the Federal implementation of Executive Order 13423 and EPACT 2005

<i>EPACT 2005 and Executive Order 13423 Goals</i>	<i>Meet</i>	<i>Exceed</i>	<i>Lead</i>
1. Increased Energy Efficiency	✓	✓	✓
2. Renewable Energy Generation and Use	✓	✓	✓
3. Petroleum Reduction/Alternative Fuel Use (Fleets)	✓	✓	✓
4. Sustainable Building Standards	✓	✓	
5. Water Conservation	✓		
6. Sustainable Environmental Practices in Acquisitions	✓		
7. Reduction in Toxic and Hazardous Material Use/Solid Waste Diversion/Recycling	✓		
8. Electronics Stewardship	✓		



Goal: Executable renewable energy agreements in place by end of CY 2008 to meet or exceed 7.5% of electricity from on-site renewable energy (185,000 MWh with 2x bonus factor).

Vision: Minimize reliance on Renewable Energy Credit (REC) purchases and Maximize use of DOE land for new renewable energy projects (“utility scale” projects)

Primary Strategies:

- 1. Develop life-cycle cost effective on-site projects using private financing (ESPCs and Power Purchase Agreements)**
- 2. Maximize direct purchases which facilitate new renewable projects**
- 3. Incorporate renewable technologies into new construction where feasible**



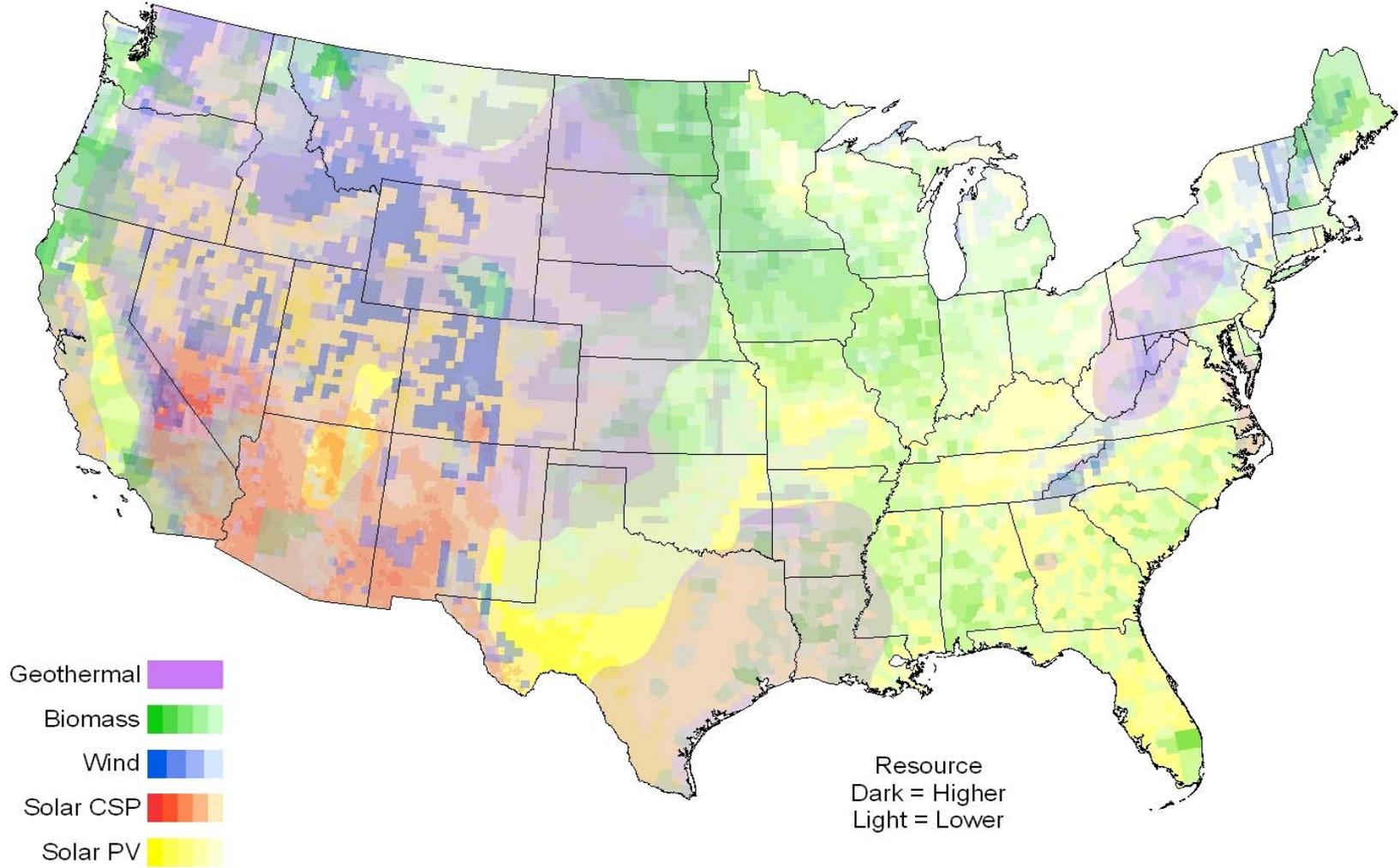
- Developed DOE HQ Team
 - Collaboration with DOE Program Secretarial Offices
 - EERE Program Office assistance with broad array of renewable technologies
 - Buy in on emphasizing private sector financing
- Understanding our universe: 60 DOE sites across the country
 - Initial Renewable Screening for all 60 sites
 - Prioritized high-potential sites; provided individual site screening report to most high priority sites.
 - Conducted 18 site visits and drafted detailed renewable energy site assessment reports
- Site-by-site identification of contracting paths, threshold issues, and obstacles
- Collaboration with ESPC team on renewable measures in ESPCs



- **Initial** renewable screening for 60 DOE sites conducted by National Renewable Energy Laboratory (NREL)
 - PV, wind and biomass
 - Simple payback only
 - Scenarios: no incentives applied, only state incentives applied, only Federal incentives applied, and both Federal and state incentives applied.
 - Renewable Energy Credit (REC) value not included
- Additional biomass screening by National Energy Technology Laboratory (NETL)
 - Landfills within 15 miles
 - Wastewater treatment plants within 15 miles
 - Wood waste sources within 50 miles



U.S. Renewable Resources

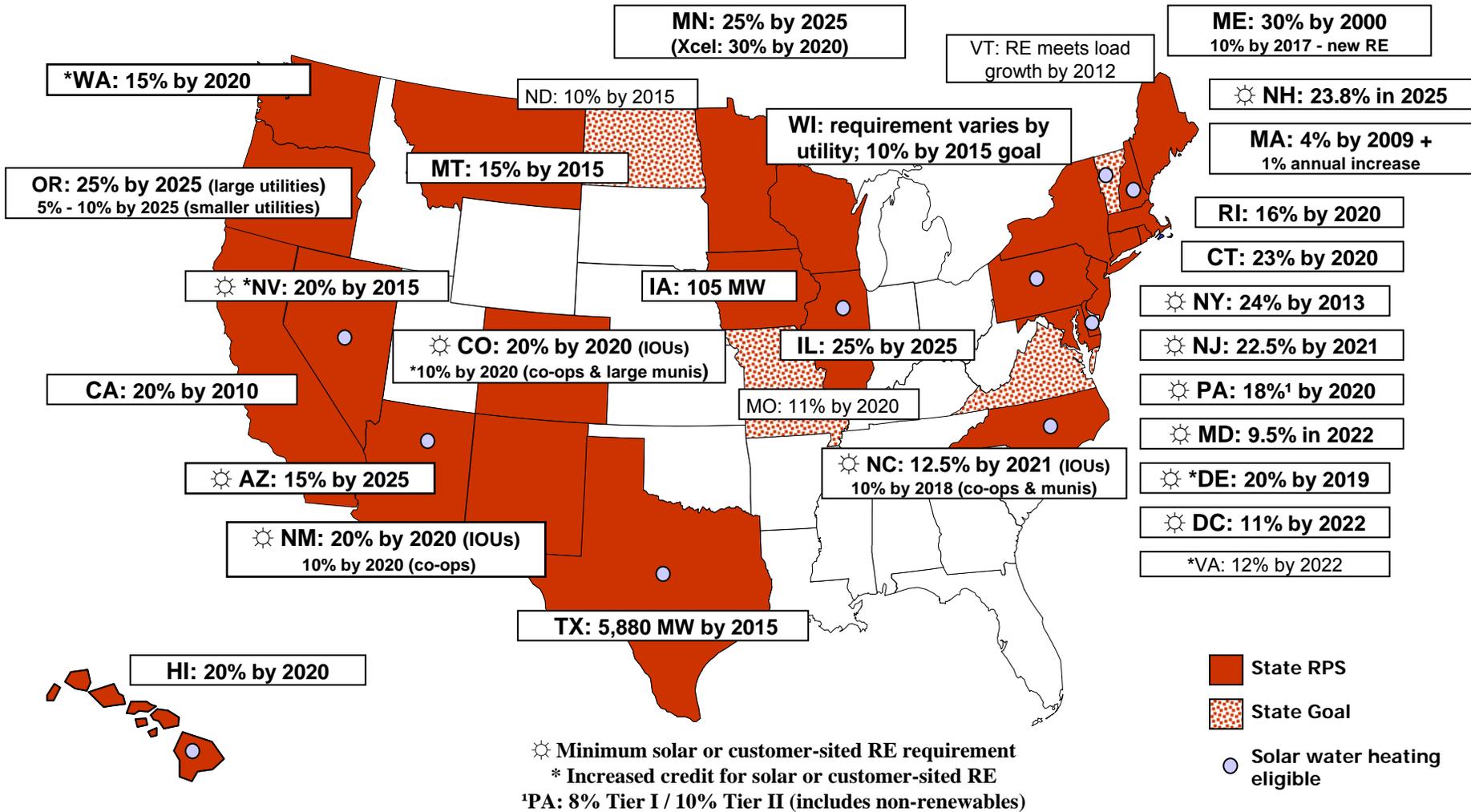




Renewable Portfolio Standards (RPS)

DSIRE: www.dsireusa.org

March 2008





Example of Renewable Energy Screening Results

DOE Site	Location	2005 or 2006 Electricity Usage (kWh/yr)	2005 or 2006 Rate (\$/kWh)	DG PV Payback Under 15 Yrs*	DG Small Wind Payback Under 15 Yrs*	DG Biomass Payback Under 15 Yrs*
Princeton Plasma Physics Laboratory	Princeton, NJ	28,342,410	\$0.08**	✓✓		✓✓
Pacific Northwest National Laboratory	Richland, WA	59,837,870	\$0.06		✓	✓✓
Pantex	Panhandle, TX	71,569,530	\$0.06			✓
Argonne	Argonne, IL	260,904,370	\$0.05		✓✓	✓
Fermi National Accelerator	Batavia, IL	408,137,000	\$0.05		✓✓	
Oak Ridge National Laboratory	Oak Ridge, TN	283,154,920	\$0.05			
Brookhaven National Laboratory	Upton, NY	241,454,400	\$0.07	✓✓	✓✓	✓✓

* Sites with ✓✓ have payback periods less than 10 years, based on preliminary screening. Sites with ✓ have payback periods greater than 10 years and less than 15 years.

** Princeton's rate is from 2007.



- Federal Government is meeting renewable goals, but need on-site projects for greater leadership
- Top-level support is crucial for comprehensive renewable programs
- DOE process for implementing on-site projects
- Need for continual process improvement
- Many projects in process, but not appropriate for public announcement
 - Look for updates at GovEnergy
 - Phoenix August 3-6
 - <http://www.govenergy.com/>



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INFORMATION

- FEMP Web Site – Renewables, Guidance
 - http://www1.eere.energy.gov/femp/renewable_energy/
 - http://www1.eere.energy.gov/femp/pdfs/epact05_fedrenewenergyguid.pdf
- FEMP Focus newsletter
 - <http://www1.eere.energy.gov/femp/newsevents/fempfocus.cfm>
- State Efficiency/Renewable Funds/Incentives
 - <http://www.dsireusa.org/>