



Climate Change: Where Research Meets Policy in the United States



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Current Status of U.S. Climate Action

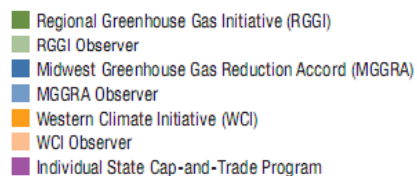
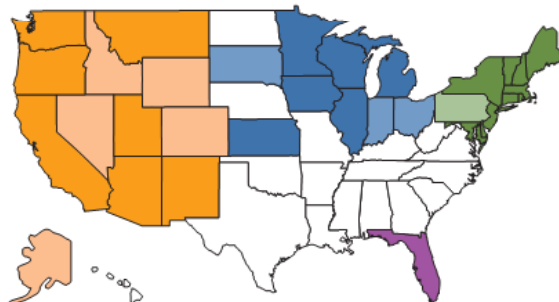
- Challenges in national legislation.
 - Passage of the **American Clean Energy Security Act (ACESA)** by U.S. House of Representatives in 2009.
 - Legislation stalls in U.S. Senate.
- Current presidential administration support for climate action.
 - Executive order mandating GHG reductions throughout the federal government
 - Climate action through federal government agencies (US EPA, Dept. of Transportation etc.)
 - **Energy Independence and Security Act (EISA)** of 2007 sets a minimum fuel efficiency standard and a target of increasing renewable fuel use by 400% by 2022.
 - **American Recovery and Reinvestment Act (ARRA)** of 2009 devotes \$90 billion to clean energy programs.



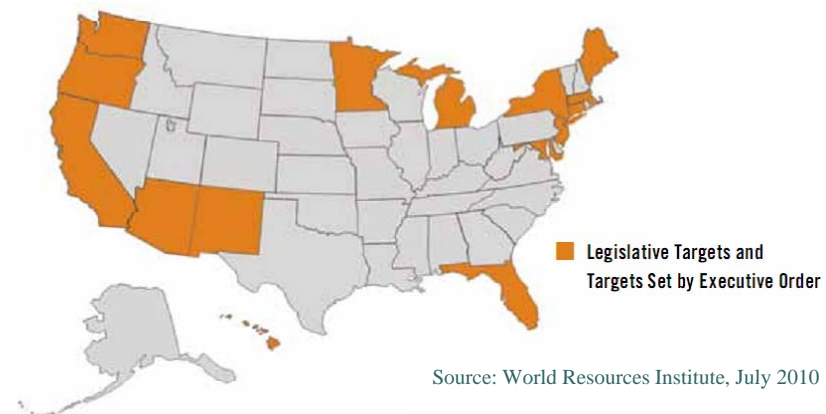
Current Status of U.S. Climate Action

Progress on the Regional Level.

- Regional Greenhouse Gas Initiative (RGGI), U.S. Northeast
- Western Climate Initiative (WCI) and Midwestern Greenhouse Gas Reduction Accord (MGGRA)
- Individual State Reduction Targets
 - 30 states have a renewable energy standard (RES).



Source: Pew Center on Global Climate Change.



Source: World Resources Institute, July 2010



Current Status of U.S. Climate Action: The Clean Air Act

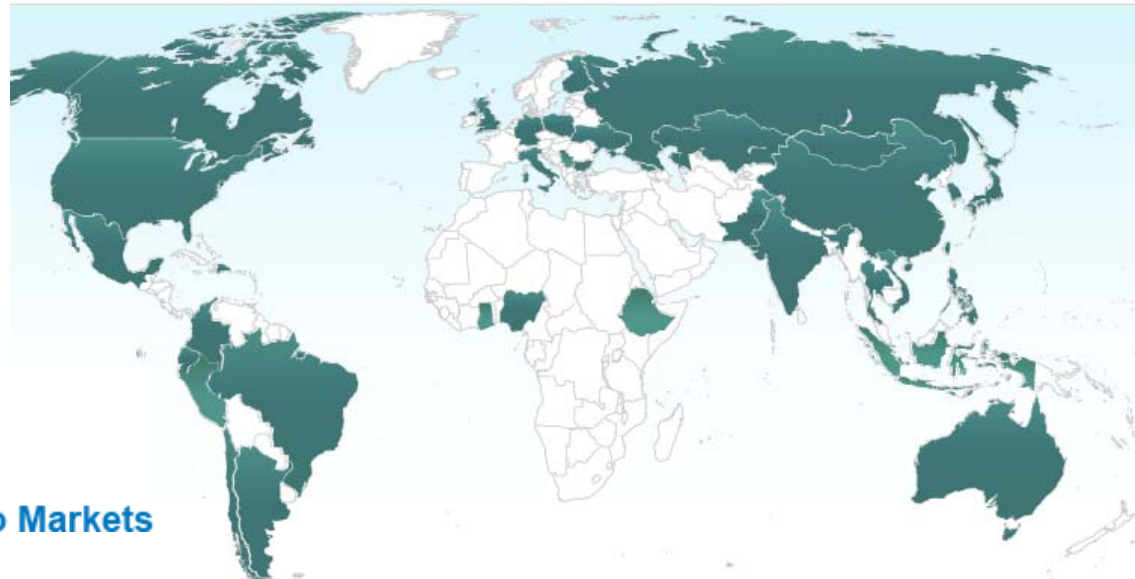
- **The Clean Air Act (CAA)** of 1970 requires the U.S. Environmental Protection Agency to review emissions of pollution, establishing and enforcing limits on those determined to harm public health and welfare.
- 2007 U.S. Supreme Court decision that greenhouse gases are covered by the CAA.
- December 2009 U.S. EPA “**Endangerment Finding**” for GHGs, setting in motion a regulatory process.
- U.S. EPA release of regulatory “rules”.
 - Mandatory Reporting Rule
 - **Light Duty Vehicle Rule****
 - Triggering Rule
 - Tailoring Rule

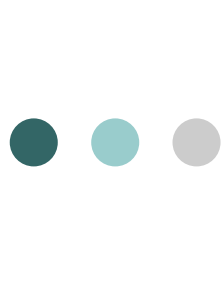




U.S. International Climate Action

- Latest: **Low Emissions Development Strategies (LEDS)** support to developing countries.
 - Greenhouse gas inventories
 - Economic modeling
 - Forestry and land use modeling
- EPA: **Methane to Markets** www.methanetomarkets.org





Science and Policy

- U.S. Government heavily invested in advancing research on all aspects of climate change.



- **United States Global Change Research Program**, with a budget of \$2 billion, brings together expertise from 13 government agencies: www.globalchange.gov



- **U.S. Department of Energy** research laboratories (13) bring together top researchers to confront climate change and clean technology issues: <http://www.energy.gov/organization/labs-techcenters.htm>

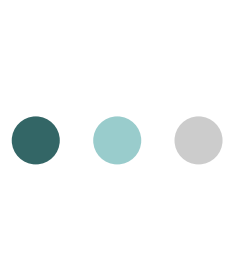




A Focus on Economic Analysis

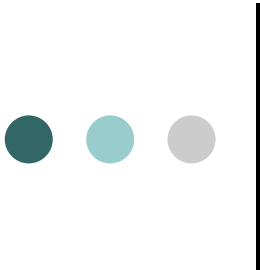
- Why is it important?
 - Global economic recession
 - The national conversation has shifted from the science to the cost
 - Policy design
 - Feasible technologies
 - Business as Usual projections





U.S. Environmental Protection Agency: Applied Economics Research

- Development and application of computable general equilibrium models:
 - **Applied Dynamic Analysis of the Global Economy (ADAGE)**,
Research Triangle Institute, North Carolina
 - **Inter-temporal General Equilibrium Model (IGEM)**,
Dale Jorgenson Associates, Cambridge, MA
 - **Second Generation Model (SGM)**,
Joint Global Change Research Institute (JGCRI), University of Maryland and the U.S. Department of Energy
- Collaboration on development and implementation on detailed “bottom-up” and other models:
 - Power Sector: **Integrated Planning Model (IPM)**, ICF International, Virginia
 - Distributional: **Resources for the Future (RFF)**, Washington, D.C.
 - Forestry and Land Use: **Forestry and Agricultural Sector Optimization Model (FASOM)**,
U.S. Forest Service
 - Renewable Energy: **National Renewable Energy Laboratory (NREL)**, Colorado
 - Atmospheric Concentration: **Model for the Assessment of Greenhouse Gas-Induced Climate Change (MAGICC)**,
National Center for Atmospheric Research, Colorado
 - Integrated Assessment Modeling: **Integrated Global System Modeling Framework (IGSM)**,
MIT, Cambridge, MA



Questions Emerging from Economic Analysis

- Offsets – availability impacts costs
 - Global supply
 - Quantity to allow
- Technologies – availability impacts costs
 - Deployment of Carbon Sequestration and Storage Technology
 - Expansion of Nuclear Technology
- Presentation of Welfare Impacts
 - GDP, Consumption, “Full Consumption”
 - Discounting
 - Distributional Analysis and Job Losses





Economic Analysis: And What About The Benefits?

- Avoided climate change is an economic benefit.
- The science of measuring this benefit is well behind that of policy cost analysis.
- Investment in research on the “social cost of carbon”.
- Recasting the conversation on climate change as a simpler pollution problem
 - Polluter emits GHGs without constraint.
 - Surrounding society suffers from the pollution.
 - Regulator intervenes to so that polluter pays cost of this damage.



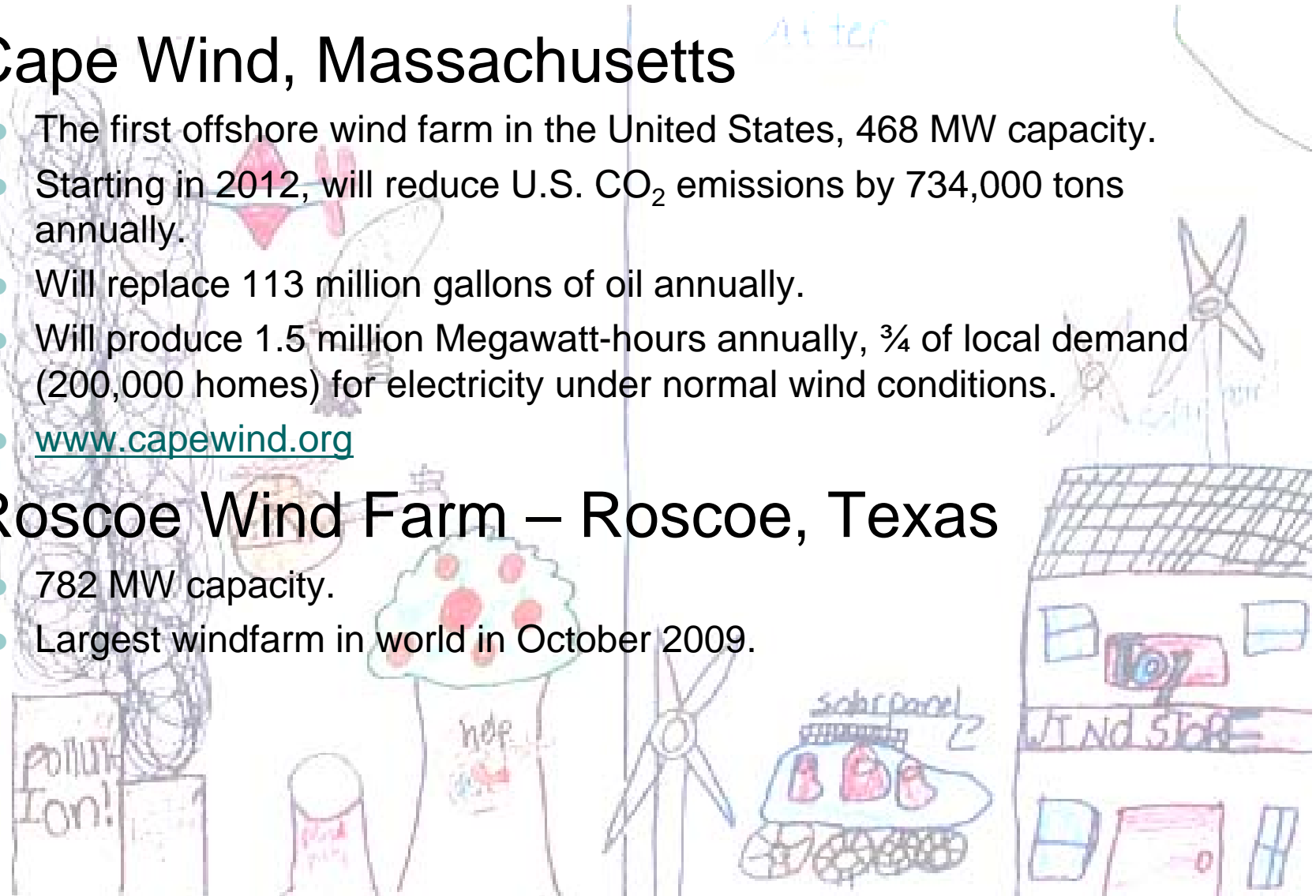
Current LCS Projects in the United States

○ Cape Wind, Massachusetts

- The first offshore wind farm in the United States, 468 MW capacity.
- Starting in 2012, will reduce U.S. CO₂ emissions by 734,000 tons annually.
- Will replace 113 million gallons of oil annually.
- Will produce 1.5 million Megawatt-hours annually, $\frac{3}{4}$ of local demand (200,000 homes) for electricity under normal wind conditions.
- www.capewind.org

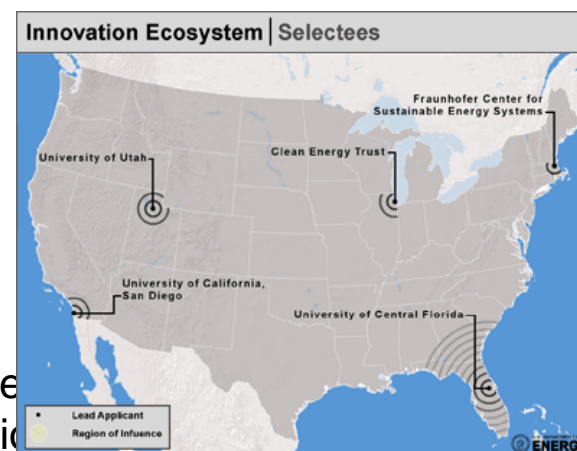
○ Roscoe Wind Farm – Roscoe, Texas

- 782 MW capacity.
- Largest windfarm in world in October 2009.



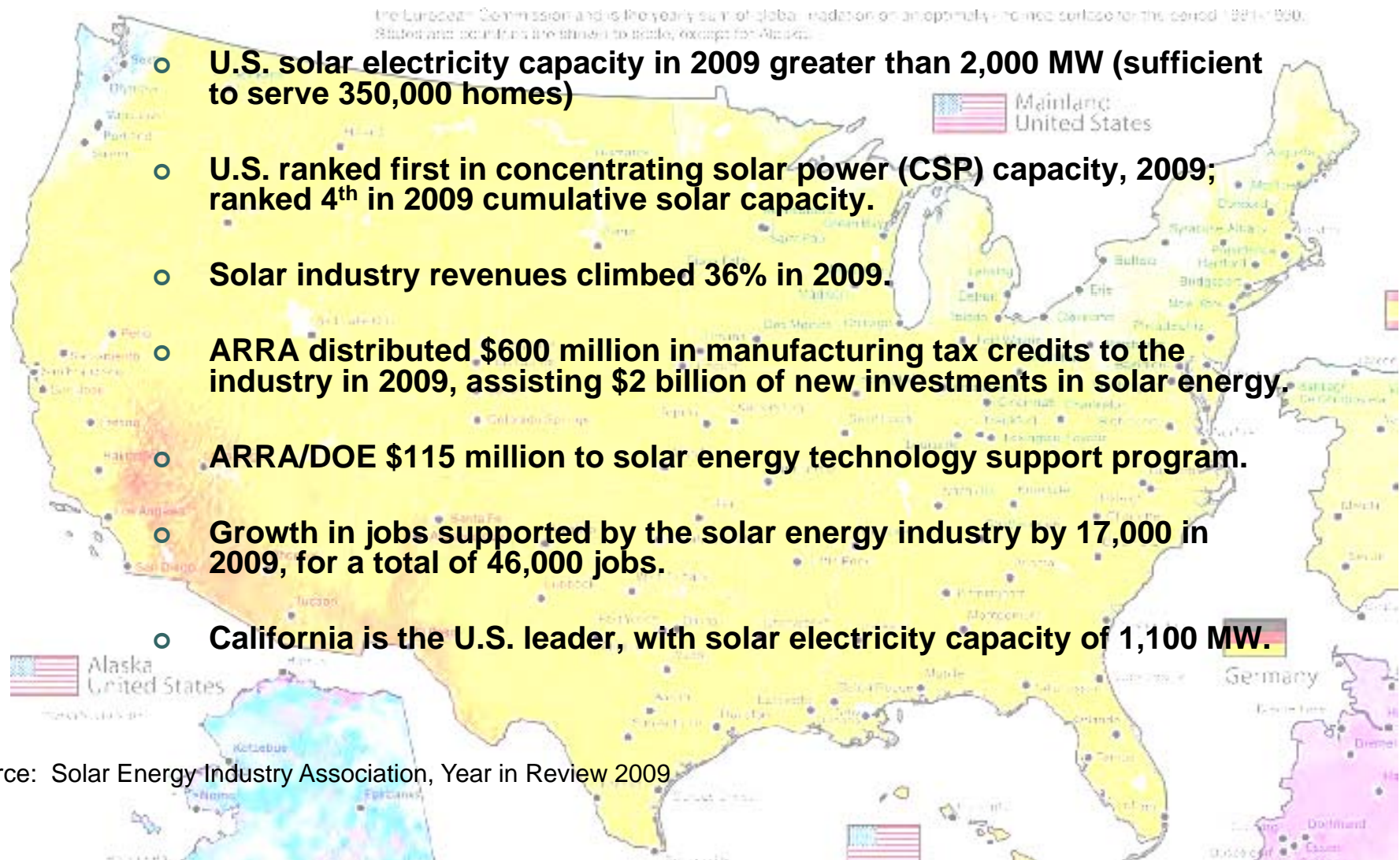
Current LCS Projects in the United States

- Department of Energy Innovation Ecosystem project (September 2010)
 - \$9 million, over 3 years, to support collaboration between universities and the private sector.
 - Bringing clean technologies from the university laboratory into the marketplace.
- Department of Energy Clean Energy Technology Commercialization (September 2010)
 - \$57 million to support 33 small clean technology businesses
 - To develop manufacturing processes to speed up production of new, proven clean technologies.
- Green Buildings
 - 1/3 of new construction in the United States.
 - Leadership in Energy and Environmental Design (LEED) certification.
 - 70% of U.S. electricity use from building operations, 39% of CO₂ emissions.
 - In 2008, LEED-certified buildings used 24% less electricity than the current stock of buildings.





Current LCS Projects in the United States: Solar Energy



Source: Solar Energy Industry Association, Year in Review 2009