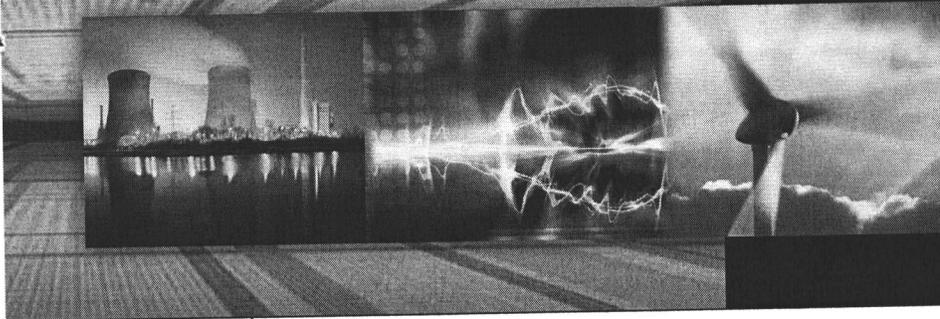


Legislative Energy Horizon Institute

April 7 - 8, 2010
Washington, D.C.



INSTITUTE PARTNERS:

Pacific NorthWest Economic Region
University of Idaho
U.S. Department of Energy
National Conference of State Legislatures

AGENDA WASHINGTON, DC

Wednesday, April 7, 2010

7:00-7:15a.m. ✓	Meet in Lobby of Marriott Wardman Park for Transportation to American Gas Association <i>(all events @AGA Facility – 400 N. Capitol St. NW- unless noted otherwise)</i> <i>Please look for Legislative Energy Horizon Institute sign</i>
7:30-8:00a.m. ✓	Continental Breakfast Welcome from AGA, Laura Sheehan, Senior Vice President
8:00-9:15a.m. ✓	FERC <i>Hon. Philip Moeller and Staff</i> Introduction and welcome by Commissioner Moeller, FERC 101, Resources for States. How is FERC working with States? (AGA)
9:30-10:45a.m. ✓	NERC <i>David R. Nevius, Senior Vice President of the North American Electric Reliability Corporation</i> Who is NERC? When utilities complain about NERC policies who should legislators call to get more information? (AGA)
11:00-12:00 ✓	TBD Nuclear Energy Today and Tomorrow. <i>Michael McGarey, NEI</i> What is status of Nuclear energy today n North America and World? What new technologies are on the horizon? What about waste? (AGA)
12:00-1:15 ✓	Institute Network Lunch (AGA)
1:30-2:30p.m. ✓	The Future of State Utility Regulation <i>Miles Keogh, Director of Grants & Research, National Association of Regulatory Utility Commissioners (NARUC) (AGA)</i>
2:45-4:30p.m. ✓	Department of Energy (AGA)
4:45-5:45p.m.	Smart Energy Canadian US Demonstration <i>John Schnagl, Director Transmission Adequacy (AGA)</i>
6:00 p.m.	Sponsor Dinner at Art and Soul <i>The Liaison Capitol Hill</i> <i>415 New Jersey Ave, NW</i> <i>Washington, DC 20001</i>

Thursday, April 8, 2010

7:00-7:15a.m.	✓ Meet in Lobby of Marriott Wardman Park for Transportation to AGA <i>Please look for Legislative Energy Horizon Institute sign</i>
7:30-8:00a.m.	✓ Continental Breakfast (AGA)
8:00-10:00a.m.	✓ Climate Change-US EPA Federal carbon rules and the roles of the States. Resources for State Policy makers <i>Contact-Nikolaas Dietsch, State Climate and Energy Program</i> <i>U.S. EPA Office of Atmospheric Programs</i>
10:00 - 10:15	✓ Break <i>STACY ANGEL</i> <i>Energy Efficiency</i>
10:15 - 11:00	✓ Chicago Climate Exchange <i>Will Ferretti, Vice President</i>
11:00-12:00p.m.	✓ Climate Change- Congressional Perspective <i>Colin Hayes, Senior staff, Senate Energy Committee, Climate Change Subcommittee</i> <i>Greg Dotson, Office of Congressman Waxman</i>
12:15-1:30p.m.	✓ Lunch – Canadian Policy Overview on Climate Change <i>Marc LePage, Special Advisor, Climate Change and Energy, Canadian Embassy</i> ✓ <i>BC Minister Naomi Yamamoto, Minister of Intergovernmental Relations, BC – BC's carbon Tax</i>
1:30-3:00p.m.	✓ Department of Energy Office of Electricity Delivery and Energy Reliability <i>Alice Lippert, Senior Technical Advisor</i>
3:00-3:15p.m.	Comments from Sponsors
3:15-4:00p.m.	<i>Travel to Wardman Park Marriot Hotel, change into business attire for reception and dinner.</i>
4:00 pm	US Department of Energy Secretary Stephen Chu – will speak to the Energy Institute and the National Conference of State Legislatures
5:15pm	Depart for Canadian Embassy Reception and Graduation Ceremony (5:30 – 8:00pm)
6:00 – 8:00p.m.	Canadian Embassy Graduation Ceremony – Reception and Banquet <i>Ambassador Gary Doer, confirmed, Secretary Chu requested to hand out diplomas to Graduates</i> <i>Business Attire</i> <i>Photo Identification Required</i>

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability Standards and NERC's Role as the Electric Reliability Organization

David R. Nevius, Senior Vice President, NERC

Legislative Energy Horizon Institute

April 7, 2010

the reliability
bulk power

History of Reliability ...

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The electricity industry in North America has undergone significant changes in the last decade in terms of its regulation, the introduction of competition in wholesale markets, several major blackouts, and finally the establishment of mandatory, enforceable reliability standards.

About NERC: History

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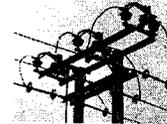
- 1968 NERC formed following 1965 Northeast Blackout
- 1978 NERC expanded to address National Energy Act
- 1987 National Electric Security Committee formed
- 1992 Compliance with standards expected, but no enforcement authority
- 1996 FERC open access rules
- 1997 "Blue Ribbon" Panel recommendations on reliability
- 1999 9 independent directors added to NERC board
- 2000 Legislation to provide for ERO introduced in Congress
- 2003 August 14 Blackout
- 2005 Energy Policy Act signed into law
- 2006 NERC certified as ERO
- 2007 NERC Standards become enforceable in U.S.

About NERC: Mission

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

To ensure the reliability of the North American
bulk power system

- Develop & enforce reliability standards
- Assess current and future reliability
- Analyze system events & recommend improved practices
- Encourage active participation by all stakeholders



About NERC: Vitals

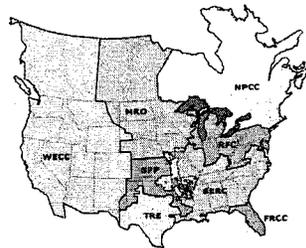
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- Independent non-profit corporation headquartered in Princeton, NJ
- Second office in Washington, DC
- NERC has over 100 employees
 - Engineers, auditors, system operators, analysts, trainers, accountants, policy specialists, lawyers, and administrative assistants

About NERC: Regional Entities

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- Delegated functions
 - Compliance
 - Regional standards
 - Organization registration
 - Reliability assessment
- Regional consistency is key
 - Transparency
 - Predictability
 - Uniform outcomes



Program Areas

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- Standards Development
- Organization Registration
- Compliance Monitoring and Enforcement
- Event Analysis and Information Exchange
- Reliability Assessment
- Performance Analysis and Metrics
- Critical Infrastructure Protection
- Situational Awareness
- Training, Education, and Personnel Certification

Regulation of Electricity

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- FERC
 - Rates for wholesale sales and transmission in interstate commerce
 - Private utilities, power marketers, power pools, power exchanges, ISOs
 - FPA, PURPA, EPCRA 1992, EPCRA 2005
- States
 - Adequate, safe, reliable service
 - Rates for retail power sales, T&D rates
 - Facility certification and siting

Evolution of Electricity Competition

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- 1978 – PURPA introduced competition
- 1991 – DOE National Energy Strategy
 - Allow independent power producers
 - Encourage open access to transmission
- 1992 – EPCRA
 - NERC action plan for the future
- 1996 – FERC Orders on Open Access
 - Put NERC on a course to become a self-regulatory reliability organization

Need for Reliability Legislation

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- 3 decades of successful voluntary reliability standards
- Transition to competition and functional unbundling raised reliability concerns
- 1997 – Electric Reliability Panel and DOE Electric System Reliability Task Force agree that legislation needed to create self-regulatory reliability organization

EPAct 2005 Section 215

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- 1999 – NERC and broad coalition of industry, state, and consumer organizations propose language
- 2000 – Introduced in Senate by Slade Gorton
- Eventually included in EPAct 2005
 - Authorized creation of ERO
 - FERC oversight in U.S.
 - Mandatory compliance with ERO standards

Fully Functioning ERO

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- Develop strong reliability standards
- Strictly enforce compliance
- Promote culture of excellence in reliable planning and operations
- Promote continuous improvement through analysis of events and information sharing
- Implement training, education, and certification of personnel
- Perform real-time situation awareness role

Audited Self Regulation

- **Regulation**
 - Mandatory compliance with standards
 - Penalties for standards violations
- **Self – Industry Stakeholders ...**
 - Develop standards
 - Elect independent board
 - Approve changes to bylaws
- **Audited**
 - Independent review of actions, first by board and then by FERC

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Self-Regulation

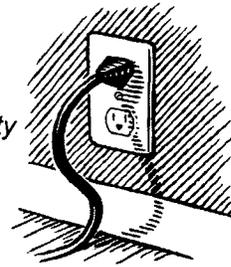
- Self-Regulation will work ONLY if industry participants live up to their obligations:
 - Set strong, comprehensive standards
 - Establish and follow best practices for meeting and exceeding standards requirements
 - Correct violations promptly
 - Strive for continued improvement and excellence in Bulk Power System Reliability

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Who Must Comply?

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- **Energy Policy Act:**
 - *All users, owners, and operators of the bulk power system shall comply with reliability standards*
- **FERC Rule:**
 - *All entities subject to the Commission's reliability jurisdiction... (users, owners, and operators of the bulk power system) shall comply with applicable Reliability Standards ...*
- **NERC Compliance Registry**
 - *Statement of Compliance Registry Criteria*
- **Provincial Canadian Regulations**



About Reliability Standards

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- **Focus on bulk power system reliability**
 - No market practices
 - Minimum distribution system requirements
- **Results-oriented**
 - Avoid prescribing practices – allow entities to determine their own “best way” to meet a standard given their individual circumstances
 - Encourage innovation in compliance
 - Specific & measurable requirements
- **Starting point for industry implementation**

Key Roles in Standards Process

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Board of Trustees



Regulators



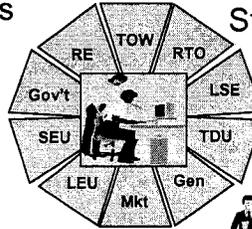
Stakeholders



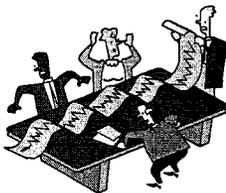
Standards
Committee



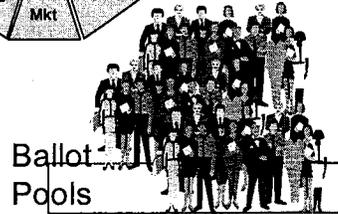
Standards
Staff



Ballot
Body



Drafting
Teams



Ballot
Pools

What is a Results-Based Standard?

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- Who (applicability)
- Shall perform what action
- To achieve what reliability result or outcome, e.g.
 - bulk power system target performance/response
 - risk reduction
 - essential competency
- Under what conditions, if any

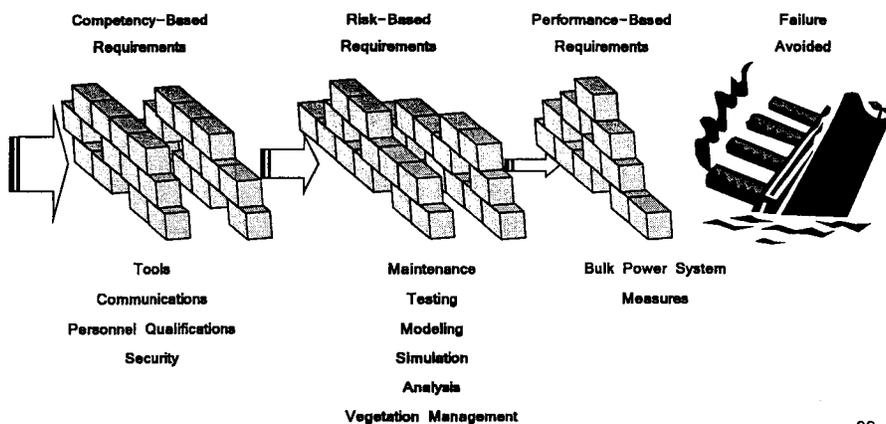
18

Preferred Types of Reliability Standards

- **Performance-based**
 - Defined target for bulk power system performance
 - Measures
 - Periodic reporting of system data/results
 - Event-triggered response data/analysis
 - System testing/simulation
- **Risk-based**
 - Necessary when consequences of failure or performance-based measures are too costly
 - Based on defined risk strategies and objectives
 - Measures
 - Bulk power system performance trends
 - Defined risk targets achieved
 - Performance records, logs, interviews, etc.
- **Competency-based**
 - Defined competencies necessary to ensure reliable performance
 - Measures
 - Observe/test functionality
 - Records, logs, interviews, etc.

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Defense in Depth Strategy *Building Barriers to Failure Prevention*



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Generic Example

- **Introduction**
 - Title, Number, Objective, Applicability, Effective Date
- **Requirements**
 - "Must do" elements
- **Measures**
- **Compliance**
- **Guides**
 - "Should do" or consider to achieve reliability performance desired
- **Administrative Procedures**
 - Reporting, recording, or communication protocols
- **Regional Differences**

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Specific Example – BAL-002-0 Contingency Reserves

- **Two Requirements**
 - Each Balancing Authority or Reserve Sharing Group shall activate sufficient Contingency Reserves to comply with the DCS for all Reportable Disturbances.
 - A Balancing Authority or Reserve Sharing Group shall restore its Contingency Reserves within 90 minutes following the end of the Disturbance Recovery Period.

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Specific Example – BAL-002-0 Contingency Reserves

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▪ Administration

- Each Reserve Sharing Group shall specify its Contingency Reserve policies.
- All Balancing Authorities and Reserve Sharing Groups shall annually review their probable contingencies, to include both loss of generation and loss of transmission, to determine their prospective most severe single contingencies.
- Each Balancing Authority or Reserve Sharing Group shall submit one completed copy of DCS Form, "NERC Control Performance Standard Survey – All Interconnections" to its Regional Survey Contact no later than the 10th day following the end of the calendar quarter (i.e. April 10th, July 10th, October 10th, January 10th).
- Each Balancing Authority shall calculate and transmit Operating Reserve data to its Reliability Coordinator as outlined in the procedures below.

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Specific Example – BAL-002-0 Contingency Reserves

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▪ Procedures

- Contingency Reserve may be supplied from generation, controllable load resources, demand side management, or coordinated adjustments to Interchange Schedules.
- A Balancing Authority may elect to fulfill its Contingency Reserve obligations by participating as a member of a Reserve Sharing Group. A Reserve Sharing Group has the same responsibilities and obligations as each Balancing Authority with respect to monitoring and meeting the requirements of Standard BAL-002.
- The Reserve Sharing Group Contingency Reserve policies shall as a minimum include:
 - The minimum reserve requirement for the group.
 - Its allocation among members.
 - The permissible mix of Operating Reserve – Spinning and Operating Reserve – Supplemental that may be included in Contingency Reserve.
 - The procedure for applying Contingency Reserve in practice.
 - The limitations, if any, upon the amount of interruptible load that may be included.
 - The same portion of resource capacity (e.g. reserves from jointly owned generation) shall not be counted more than once as Contingency Reserve by multiple Balancing Authorities.
 - The identified most severe single contingency.
 - Allocation of sanctions to its members.

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Specific Example – BAL-002-0 Contingency Reserves

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- **Guides**

- Reserves should be distributed among multiple generators, particularly during Conservative Operations.

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About NERC: Mission

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- Analyze system events & recommend improved practices
- Encourage active participation by all stakeholders



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Questions?

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- **Dave Nevius, Senior Vice President**
- **(609) 524-7037 (w)**
- **(609) 915-3062 (c)**
- **dave.Nevius@nerc.net**
- **info@nerc.com**

Nuclear Energy's Indispensable Role in Global Climate Change Strategy

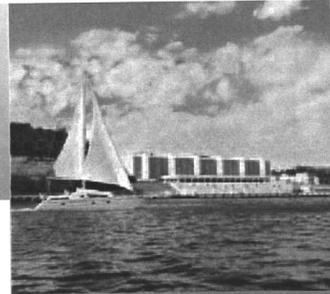
The world's developed nations have an ethical obligation to accelerate the deployment of low-carbon technologies, including renewable energy options and nuclear energy, on a global scale. Aggressive mitigation actions will help reduce the impacts of climate change on the most vulnerable countries, such as low lying countries like Bangladesh and the Netherlands, small island developing states, and the world's least developed countries.

The Intergovernmental Panel on Climate Change (IPCC) highlighted nuclear energy as a "key mitigation technology" in its Fourth Assessment Report. The nuclear energy industry supports an effective international agreement that recognizes nuclear energy's role in climate change mitigation.

Nuclear energy is the largest scalable and most efficient source of emission-free electricity. Globally, nuclear energy provides 15 percent of the world's electricity each year while preventing 2.6 billion metric tons of carbon dioxide. Independent analysis of climate change mitigation strategies internationally show that a substantial expansion of nuclear energy is needed to meet climate change goals in a manner that reduces the cost of energy to consumers. These benefits are being expanded with more than 50 new reactors under construction.

International partnerships, along with financial assistance for technology transfer, should be established to promote the development of new nuclear energy plants in accordance with the United Nations Framework Convention on Climate Change. Countries pursuing commercial nuclear energy programs should receive international recognition within the UNFCCC process for their emission reduction efforts.

Increased access to energy is essential to poverty reduction efforts world-wide. People with greater access to electricity enjoy a healthier standard of living. Nuclear energy generates emission-free power for hundreds of millions of people around the world and is used to provide clean water in nations with scarce freshwater supply.



Fast Facts

- 436 nuclear reactors produce 15% of world electricity.
- Nuclear energy generates 45% of global carbon-free electricity.
- Climate change mitigation requires a strong role for nuclear energy among low-carbon energy options.
- 53 new reactors are being built worldwide; 430 are proposed to be built.

“In the opinion of these countries, nuclear energy can play an essential role, as it meets the dual challenge of reducing greenhouse gas emissions and lowering fossil-fuel consumption. ... We note that, in the opinion of a growing number of countries, the use of nuclear power can diversify the energy mix, contribute to energy security while reducing greenhouse gas emissions.”

—G8 Leaders, Aug. 7, 2009



Analyses of Nuclear Energy's Effective Role In Reducing Greenhouse Gases

Studies on the United States:

Source	Study or Analysis of Proposed Legislation (Year Released)	Number of new reactors ¹	Gigawatts	Timeframe
Energy Information Administration	Updated Annual Energy Outlook 2009 ²	8	11	2030
	Representatives Waxman/Markey, H.R. 2454 (2009)	69	96	2030
	Senators Lieberman/Warner, S. 2191 (2008)	191	268	2030
Environmental Protection Agency	Representatives Waxman/Markey, H.R. 2454 (2009)	187	262	2050
	Senators Lieberman/Warner, S. 2191 (2008)	179	250	2050
National Academy of Sciences	America's Energy Future: Technology and Transformation (2009) ³	77	108	2035
Electric Power Research Institute	Prism/Merge Analyses: 2009 Update	46	64	2030
McKinsey & Company	U.S. Greenhouse Gas Abatement Mapping Initiative - Mid-Range Case (2007)	18	25	2030

Studies on the World:

Source	Study	Number of new reactors ¹	Gigawatts	Timeframe
International Atomic Energy Agency	Energy, Electricity and Nuclear Power Estimates for the Period up to 2030	99-311	139-435	2030
OECD International Energy Agency	World Energy Outlook 2009 - 450 Policy Scenario	235	330	2030
	Energy Technology Perspectives - ACT Map scenario ³	414	579	2050
	Energy Technology Perspectives - BLUE Map scenario ³	642	899	2050
OECD Nuclear Energy Agency	Nuclear Energy Outlook 2008 - Low and High Scenarios ³	149-734	208-1,028	2050
McKinsey & Company	Global Greenhouse Gas Abatement Cost Curve, Version 2 ³	199	279	2030

All countries can access peaceful nuclear energy... We must harness the power of nuclear energy on behalf of our efforts to combat climate change, and to advance peace for all people."

—President Barack Obama, United States, April 2009

So however we look at it, we will not secure the supply of sustainable energy on which the future of the planet depends without a role for civil nuclear power."

—Prime Minister Gordon Brown, United Kingdom, March 17, 2009.

"In the years ahead, China will further integrate our actions on climate change into our economic and social development tasks... we will vigorously develop renewable energy and nuclear energy. We will endeavor to increase the share of non-fossil fuels in primary energy consumption to around 15 percent by 2020."

—President Hu Jintao
People's Republic of China
Sept. 22, 2009

"Our nuclear industry is poised for a major expansion and there will be huge opportunities for the global nuclear industry. This will sharply reduce our dependence on fossil fuels and will be a major contribution to global efforts to combat climate change."

—Prime Minister Manmohan Singh
India
Sept. 30, 2009

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¹In these tables and throughout this document, unless stated otherwise, each new reactor is 1,400-MW.

²Based on business as usual – no climate policy

³Numbers calculated based on a 90% capacity factor.



Economic Benefits

- Production costs at nuclear power plants in 2008 averaged 1.87 cents per kilowatt-hour, cheaper than coal (2.75 cents) and natural gas-fueled (8.09 cents) plants
- Each nuclear power plant provides about \$430 million annually to state and local economies
- Approximately \$40 million is spent annually in labor income
- 15,000 new, high-paying jobs have been added to the industry over the last three years
- 16 license applications are being reviewed by the U.S. Nuclear Regulatory Commission for 25 new reactors
- Up to 21,000 high-paying jobs will be created if all planned nuclear reactors come on line
- 1,400 to 1,800 construction jobs will be created to build each new reactor
- 400 to 700 permanent jobs will be created to operate each new reactor
- An additional 700 indirect jobs are expected to be created at each project
- Nearly \$100 million in local, state and federal taxes will be generated by each project
- A new nuclear energy facility creates 500 jobs per 1,000 MW of electric generating capacity, compared to 220 jobs for a coal plant, 90 for a wind farm and 60 for a natural gas plant

Environmental Benefits

- Nuclear energy produces 72% of all U.S. emission-free electricity
- In 2008, nuclear power plants prevented nearly 700 million metric tons of carbon dioxide emissions, almost equal to the amount of carbon dioxide emissions from all U.S. passenger cars
- A nuclear energy facility's life-cycle carbon emissions are among the lowest of any electricity generation source at 17 tons of CO2 equivalent per gigawatt-hour, comparable to geothermal (15 tons) and wind (14 tons)

Public Opinion

- 70% of American adults favor using nuclear energy
- 84% say nuclear energy is important to the United States' energy future
- 62% say the industry should "definitely build new nuclear plants"
- 90% of nuclear power plant neighbors hold a favorable impression of the local facility; 76% would find it acceptable to add a new reactor at the nearby site

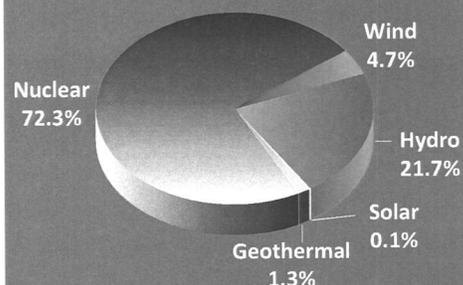
Nuclear Power Plants Provide More Jobs Than Other Sources of Electricity

Jobs per 1,000 MW of generating capacity

Nuclear	500
Coal	220
Natural Gas	60
Wind	90

Source: Ventyx and U.S. Department of Energy (numbers are averages)

Electricity Sources That Do Not Emit Greenhouse Gases During Operation



Source: Energy Information Administration Updated: 4/09

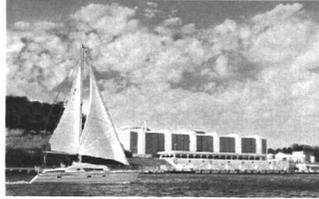


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Nuclear Energy Quick Facts

Nuclear Energy Institute



Reliable Electricity

- 104 nuclear power plants provide 20% of all U.S. electricity
- Nuclear energy generated 806.2 billion kilowatt-hours of electricity in 2008—the second-highest total ever and enough to power one of five U.S. homes and businesses
- Improved efficiency and technologies at U.S. nuclear power plants since 1990 have led to an increase in electricity production equivalent to 29 new reactors
- Since 2000, the industry has added 3,730 megawatts of capacity through plant improvements—enough to power 2.8 million homes
- The United States generates more nuclear energy than any other nation—more than France and Japan (the second- and third-largest programs, respectively) combined
- Nuclear power plants are reliable, generating electricity 24/7 at a 91.5% capacity factor. This is more efficient than coal plants at a 70.8% capacity factor, combined cycle natural gas plants at 41.7% and wind at 31.1%

Used Nuclear Fuel

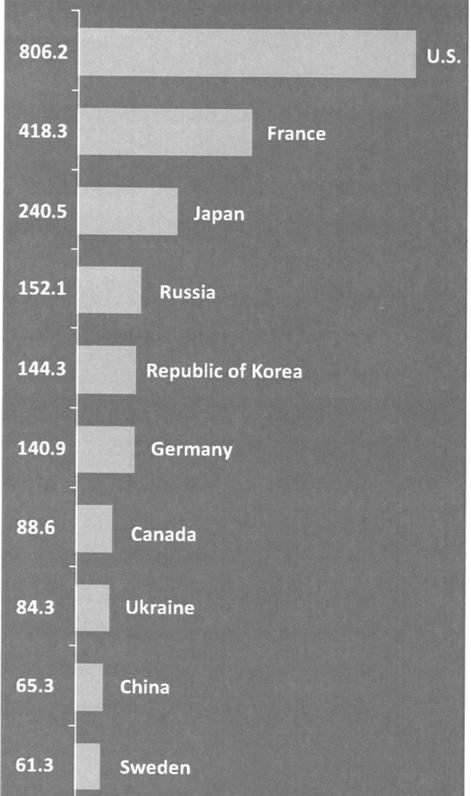
- The volume of used nuclear fuel rods created over 50 years (60,000 metric tons) would only cover one football field seven yards deep
- Used fuel rods are stored safely in steel-lined concrete vaults or in concrete and steel containers at each plant site
- Used nuclear fuel is solid material, safely contained and safely transported
- Since U.S. nuclear power plants began operating, more than 3,000 shipments across 1.7 million miles have been conducted safely, without any harm to the public or the environment
- Shipments they cannot break open in a severe accident because of safety precautions and regulatory oversight every step of the way

Safety

- The independent Nuclear Regulatory Commission inspects and monitors each nuclear power plant daily
- Every nuclear power plant has multiple back-up safety systems, including an automatic safe shutdown mechanism
- If a nuclear power plant is not operating safely, the regulator will shut it down until safety practices improve
- Nuclear power plants are safe places to work, with one of the lowest industrial accident rates at 0.13 accident per 200,000 worker hours

Top 10 Nuclear Energy Countries

Billion kilowatt Hour



Source: International Atomic Energy Agency, U.S. is from Energy Information Administration Updated: 4/09

Nuclear Energy Update

Legislative Energy Horizon Institute

Washington, D.C.

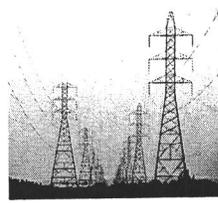
April 7, 2010

Mike McGarey

Nuclear Energy Institute

Today's Presentation

- **State of the Industry**
- **Impact of Climate Change Debate**
- **Building New Nuclear Plants = JOBS!**
- **Used Nuclear Fuel Management**
- **New Reactor Technology**



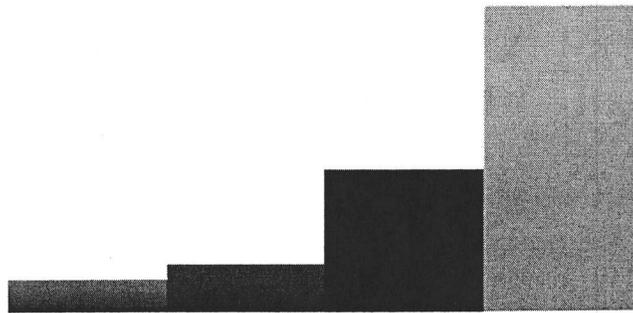


U.S. Capacity Factors by Fuel Type 2008

Source: Ventyx Velocity Suite / Energy Information Administration
Updated: 4/09

Nuclear Energy is the Lowest Cost Producer of Electricity Among Major Energy Sources

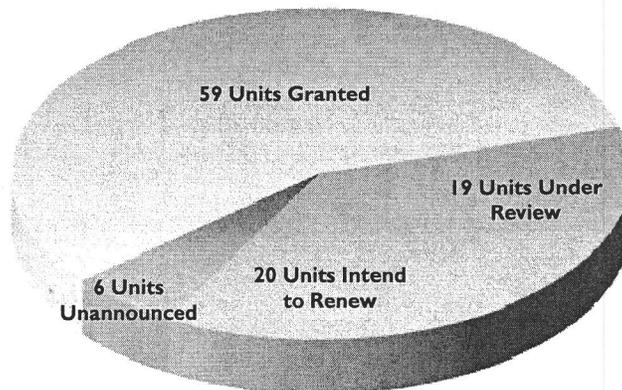
U.S. Electricity Production Costs for 2008, Cents/kWh



Production Costs = Operations and Maintenance Costs + Fuel Costs

Source: Ventyx Velocity Suite
Updated: 5/09

Applications for License Renewal



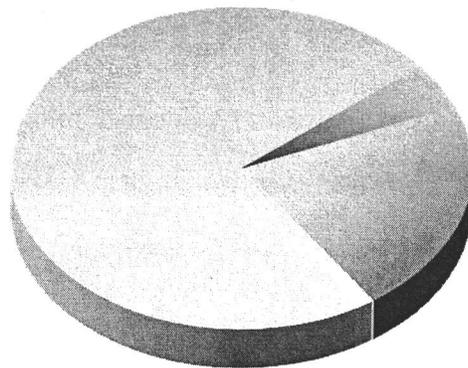
Source: Nuclear Regulatory Commission
Updated: 2/10

National Climate Debate

- **U.S. House passed HR 2454 – “Waxman-Markey Bill” – by 219-212 on June 26**
 - 83 percent carbon reductions by 2050
 - New Nuclear capacity removed from baseline for calculating compliance obligation
- **Senate “Kerry-Boxer Bill” – S. 1733**
- **U.S. EPA going forward with regulation of Carbon**

U.S. Electricity Sources Which Do Not Emit Greenhouse Gases During Operation

2008



Source: Energy Information Administration
Updated: 4/09

New Nuclear Power Plants Necessary To Meet Waxman-Markey CO₂ Goals – EPA Analysis

Analysis of H.R. 2454, American Clean Energy and Security Act of 2009, Environmental Protection Agency

New Power Plant Capacity Necessary To Meet Waxman-Markey CO₂ Goals – EIA Analysis

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* 96 Gigawatts of nuclear plants equals 69 new nuclear plants (based on average new plant size of 1.4 GW)

Energy Information Administration, "Energy Market and Economic Impacts of H.R. 2454, the American Clean Energy and Security Act of 2009"

International Climate Debate

- **Many countries have reversed their bans or planned phase-outs of Nuclear Energy**
 - UK, Italy, Sweden, Belgium
 - European Union as a whole has repudiated its past skepticism
- **53 New Nuclear Plants under construction worldwide (47,200 MWs)**

- "To create more of these clean energy jobs, we need more production, more efficiency, more incentives. And that means building a new generation of safe, clean nuclear power plants in this country. It means making tough decisions about opening new offshore areas for oil and gas development. It means continued investment in advanced bio-fuels and clean coal technologies. And, yes, it means passing a comprehensive energy and climate bill with incentives that will finally make clean energy the profitable kind of energy in America."

– President Obama
State of the Union Address
Jan. 27, 2010



New Nuclear Plants

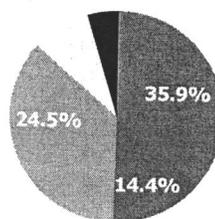


Potential Locations for New Nuclear Plants



Financing: Perspective on Electric Sector Capital Spending

- Industry in early stages of major capital investment cycle
- Total capex for 2010-2030: **\$1.5 trillion - \$2 trillion**
 - New nuclear only part of that
 - Need for new generating capacity higher in carbon-constrained world
 - Approx one-third of U.S. generating capacity is > 30 years old = inefficient



Financing New Nuclear Capacity

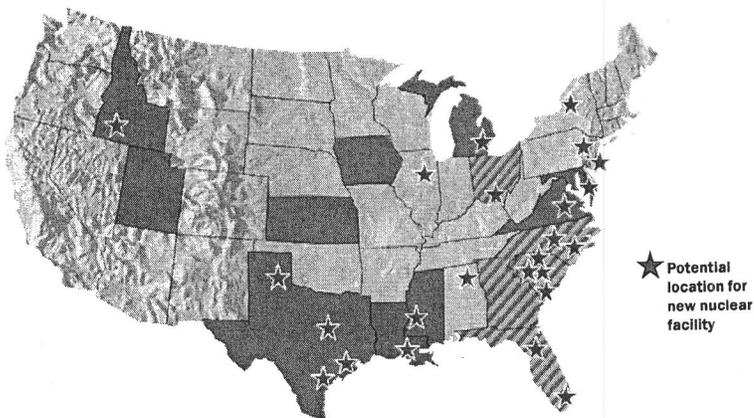
- Financing is single largest challenge
- Structural challenge: very large projects relative to the size of the companies building them
- This challenge can be managed
 - Supportive rate policies at the state level and/or
 - Loan guarantees from the federal government
 - Non-recourse to sponsor's balance sheet
 - Higher leverage (up to 80 percent)
 - Tax incentives

Loan Guarantee Program Moving Forward

- **Loan guarantee authority**
 - \$18.5 billion in nuclear loan volume authorized
 - First four projects = approximately \$38 billion in loan volume
 - Additional \$36 billion loan volume in president's FY 2011 budget
- **Co-financing from export credit agencies in France, Japan will supplement U.S. loan guarantee authority**
- **Rule change to allow ECA financing and collateral-sharing approved in 2009**
- **Cost of loan guarantees still an open issue**

State Policies Supporting New Nuclear

- Legislation
- Regulation
- ▨ Both legislation and regulation



EIA's Estimated Levelized Cost of New Generation Resources, 2016

Resource	2016	2021	2026	2031	2036	2041
Conventional Coal	85	64.5	3.7	23.0	3.5	94.6
Advanced Coal with CCS	85	87.4	6.2	25.2	3.8	122.6
Conventional Combined Cycle	87	23.0	1.6	55.7	3.7	83.9
Advanced CC with CCS	87	43.6	2.6	65.8	3.7	115.7
Advanced Combustion Turbine	30	38.5	4.0	71.2	10.7	124.3
Wind	35.1	122.7	10.3	0.0	8.5	141.5
Solar PV	21.7	376.6	6.2	0.0	12.9	395.7
Geothermal	90	86.0	20.7	0.0	4.8	111.5
Hydro	52	97.2	3.3	6.1	5.6	114.1

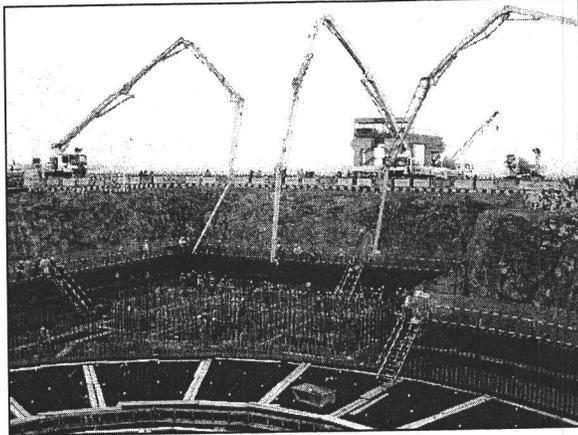
Source: Energy Information Administration, Annual Energy Outlook, April 2009 SR-OIAF/2009-03

New Nuclear Will Be Competitive

Levelized Cost of Electricity (2007 cents per kilowatt-hour)

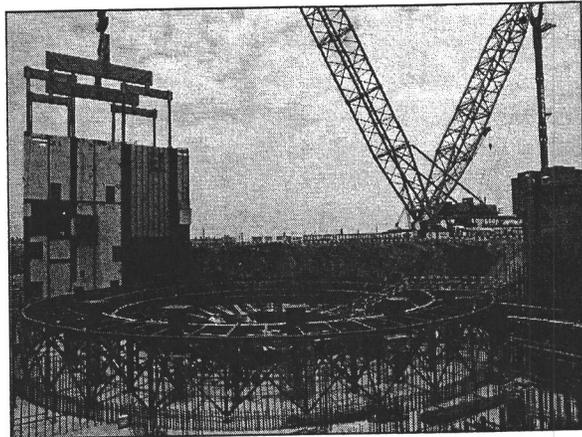
Combined cycle (low gas price)	4-7
Coal	5-9
Nuclear	6-13
Biopower	8-10
Coal with CCS	9-15
Combined cycle (high gas price)	10-16
Solar PV	14-30

Source: National Research Council of the National Academies, America's Energy Future: Technology and Transformation



New Plants Mean Jobs

**Up to 2,400 During Peak Construction
400 to 700 Permanent Operations Jobs**



New Jobs -- Continued

**\$4 Billion in New Investment since 2007
More than 15,000 New Jobs in Nuclear-related
sector**

U.S. Manufacturers Ramping Up

Supply Chain and Fuel Supply Expansion Plans

- AREVA and Northrop Grumman
Newport News, Va.
- Shaw Group and Westinghouse
Lake Charles, La.
- Curtis Wright
Cheswick, Pa.
- Alstom
Chattanooga, Tenn.
- National Enrichment Facility
Eunice, N.M.
- American Centrifuge Project
Portsmouth, Ohio
- GE Hitachi Nuclear Energy
Wilmington, N.C.



Site Preparations Are Underway

Vogtle Units 3 and 4

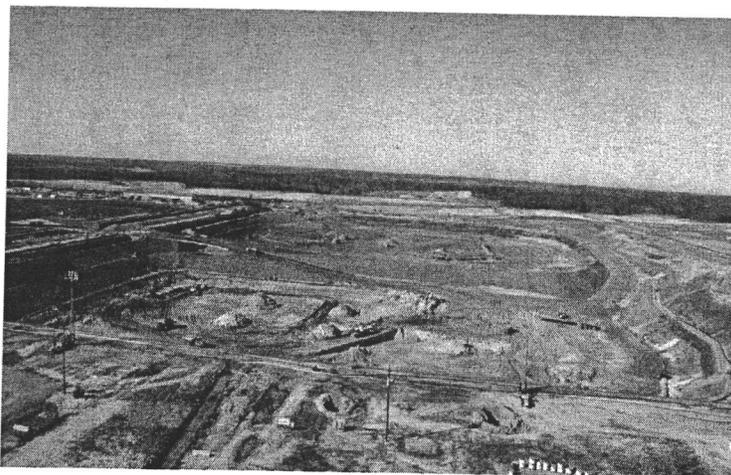
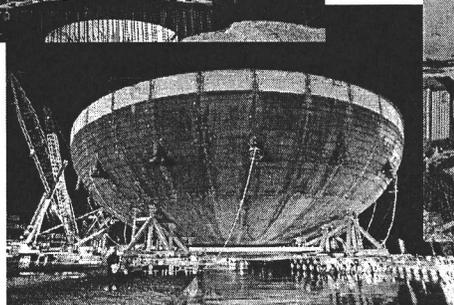
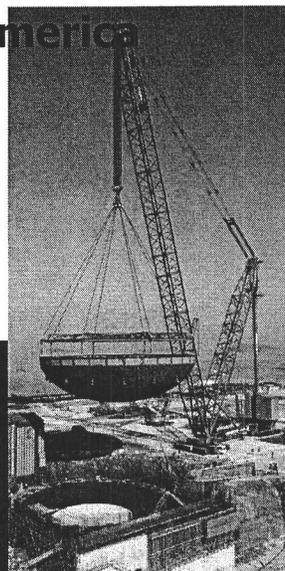
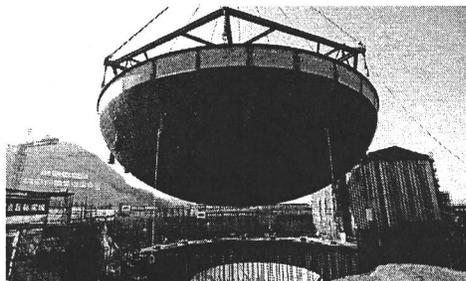


Photo Courtesy Southern Company

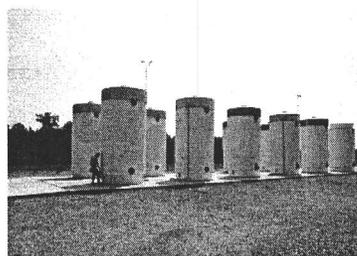
Today China, Tomorrow America



Photos Courtesy Shaw Group

Used Fuel Management: A Reasoned Approach

- Three-part strategy
 - Long-term technology development to recycle nuclear fuel
 - Eventually ... permanent disposal facility
 - Interim storage
- Appointment of a Blue Ribbon Commission to conduct reasoned reassessment of the government's program



Advanced Nuclear Technology

- **The Next Generation of Nuclear Reactors – “Generation 3 or 3+ Technology**
- **Advanced versions of Familiar Light Water Reactor Technology**
 - **Boiling Water Reactors/Pressurized Water Reactors**
- **Evolutionary Rather than Revolutionary**
 - **More Standardized Design**
 - **Improved Safety**
 - **Design Simplicity**

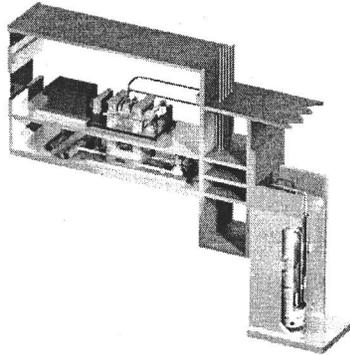
Standardization will reduce the cost of building subsequent plants and operating all plants

Advanced Nuclear Applications

- **Modular, scalable or innovative LWR’s**
 - **NuScale**
 - **B&W mPOWER**
 - **Westinghouse IRIS**
- **Mini, distributed & fuel-cycle applications**
 - **Hyperion**
 - **Toshiba 4S**
 - **GE Hitachi PRISM**
- **HTGR’s for process heat and hydrogen**
 - **PBMR, Areva and General Atomics**

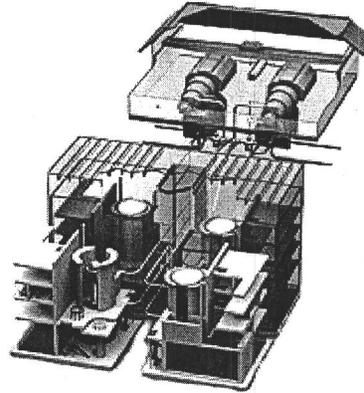
Modular Light Water Reactors

NuScale



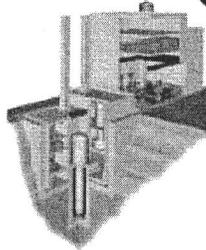
Single-unit side view of the NuScale system design

B&W mPOWER

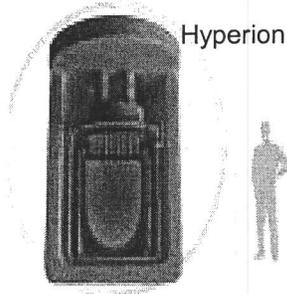


Mini Reactors

TOSHIBA
Micro Nuclear



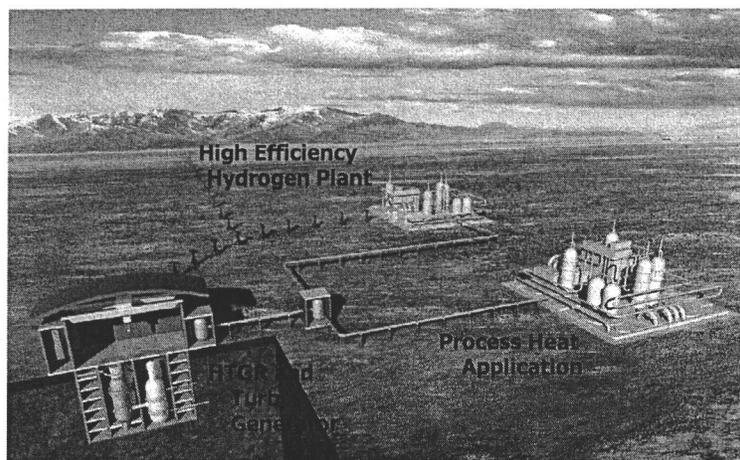
Hyperion



Reactors of the Future will Promote Synergies Between Fuel Sources

- **Next Generation Nuclear Plant**
 - High Temperature Gas-cooled Reactor
 - More reliable, safer, more proliferation-resistant
- **Able to generate emission-free, competitively-priced process heat, hydrogen and oxygen**
- **Future nuclear offers non-traditional benefits**
 - Transportation sector emissions reductions
 - Energy extraction efficiency improvements

The NNGP Concept: Increased Environmental & Energy Security Benefits

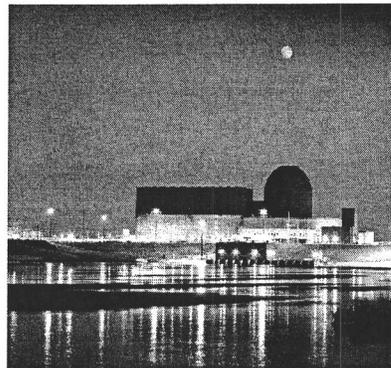


The Priorities for 2010 and Beyond

- **Operating plants: Safety, reliability is top priority**
- **New plants: Risk management is highest priority**
 - Disciplined project management essential
 - Ensure certainty, predictability in the licensing process
 - Firm up financing plans
 - Sustain programs to grow nuclear work force
 - Provide investment stimulus to expand nuclear supply chain
- **Industry's major opportunity: Reinforcing and strengthening the new political mandate**

Questions?

- Mike McGarey
Nuclear Energy Institute
202-739-8118
mfm@nei.org
- For more information:
www.NEI.org



New Nuclear Plant Status



Company	Location (site)	Design	# of Units	Early Site Permit (ESP)	Construction / Operating License Submittal	Docket Date	Number of Units Under Active NRC Review
Alternate Energy Holdings / Unistar	Payette County, ID	-	1	-	4Q 2011		
Amarillo Power / Unistar	Vicinity of Amarillo, TX	EPR	1	-	TBD		
Blue Castle Holdings, LLC	Green River, UT	-	-	-	-		
Constellation / Unistar	Calvert County, MD (Calvert Cliffs)	EPR	1	-	7/13/07 & 3/14/08	1/25/08 & 6/3/08	1
Constellation / Unistar	Oswego County, NY (Nine Mile Point)	EPR	1	-	9/30/08	12/12/08	
Detroit Edison	Fermi, MI (Fermi)	ESBWR	1	NYD*	9/18/08	11/25/08	1
Dominion	Louisa County, VA (North Anna)	ESBWR	1	Approved November 2007	11/27/07	1/28/08	1
Duke	Cherokee County, SC (William States Lee)	AP1000	2	-	12/13/07	2/25/08	2
Duke	Davie County, NC	NYD*	-	Under consideration	NYD*		
Duke	Oconee County, SC (Oconee)	NYD*	-	Under consideration	NYD*		
Entergy	West Feliciana Parish, LA (River Bend)	NYD*	-	-	9/25/08	12/4/08	
Entergy (NuStart)	Clalborne County, MS (Grand Gulf)	NYD*	-	Approved April 2007	2/27/08	4/17/08	
Exelon	Clinton, IL (Clinton)	NYD*	-	Approved March 2007	NYD*		
Exelon	Victoria County, TX	NYD*	-	Submitted March 2010	NYD*		
Florida Power & Light	Miami-Dade County, FL (Turkey Point)	AP1000	2	-	6/30/09	9/8/09	2
Luminant	Glen Rose, TX (Comanche Peak)	APWR	2	-	9/19/08	12/2/08	2
NRG Energy / STPNOC	Matagorda County, TX (South Texas Project)	ABWR	2	-	9/20/07	11/29/07	2
PPL Corp. / Unistar	Luzerne County, PA (Bell Bend)	EPR	1	-	10/10/08	12/19/08	1
Progress Energy	Wake County, NC (Harris)	AP1000	2	-	2/19/08	4/17/08	2
Progress Energy	Ley County, FL	AP1000	2	-	7/30/08	10/6/08	2
PSEG	Lower Alloways Creek, NJ (Salem/Hope Creek)	-	-	To submit Spring 2010	NYD*		
South Carolina Electric & Gas	Fairfield County, SC (V.C. Summer)	AP1000	2	-	3/27/08	7/31/08	2
Southern Company	Burke County, GA (Vogtle)	AP1000	2	Approved August 2009	3/31/08	5/30/08	2
Southern Company	TBD	NYD*	NYD*	NYD*	NYD*		
Southern Ohio Clean Energy	Pikeston, OH	-	-	Under consideration	Under consideration		
Park Alliance	Jackson County, AL (Bellefonte)	AP1000	2	-	10/30/07	1/18/08	2

* Not Yet Determined
Updated: 3/10



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NARUC & Grants & Research

- NARUC members are the State PUCs that regulate investor-owned utilities
 - <http://www.naruc.org>
- G&R Dept. addresses research and facilitates dialogue on key questions facing Commissions
- 9 current projects covering infrastructure, environment, regulatory design, finance, security and other issues for the gas, water, electric, telecom sectors
- Demand-side & Clean Energy plays some role in about 1/2 of our projects

Federal Funders: EPA, Dept. of Energy, Dept. of Homeland Security
Partnerships with FCC, NCS, FERC, private sector, non-governmentals



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Typical Disclaimer

- Today's presentation is all about my opinions, not NARUC policy or any of its members. Hopefully my opinions are mostly in agreement with those.
- *"There are no facts about the future, just good guesses and bad guesses."*
 - Prof. Michael Dworkin, University of Vermont Law School



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Summary

- Where we are now is sitting on a fence
- Factors are forcing change in the electric sector
- Implications of demand-supply balance
- Implications of a CO₂ price
- “Smart” climate policy & efficiency
- Crazy prognostications
- Potential directions



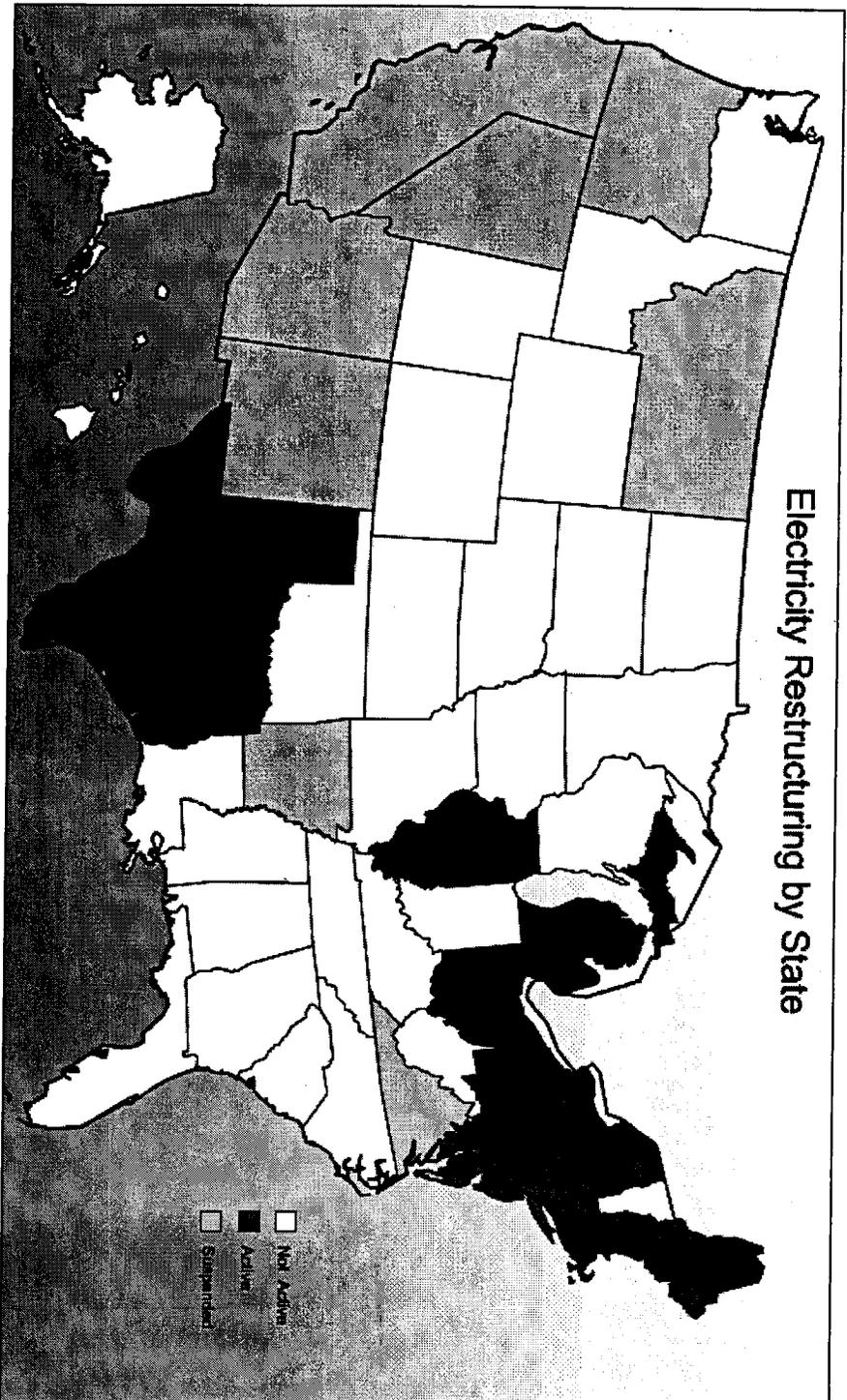
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Where are we now?

- Where we are going tomorrow starts with where we are today
- Let's explore key trend factors from recent times:
 - Market structure
 - The tools and technology we use
 - Environmentally-aware energy policies
 - Electricity delivery policy



Two Models Walk Into A Bar...



...and Decide They've Had Enough Of Adjusting Their Markets

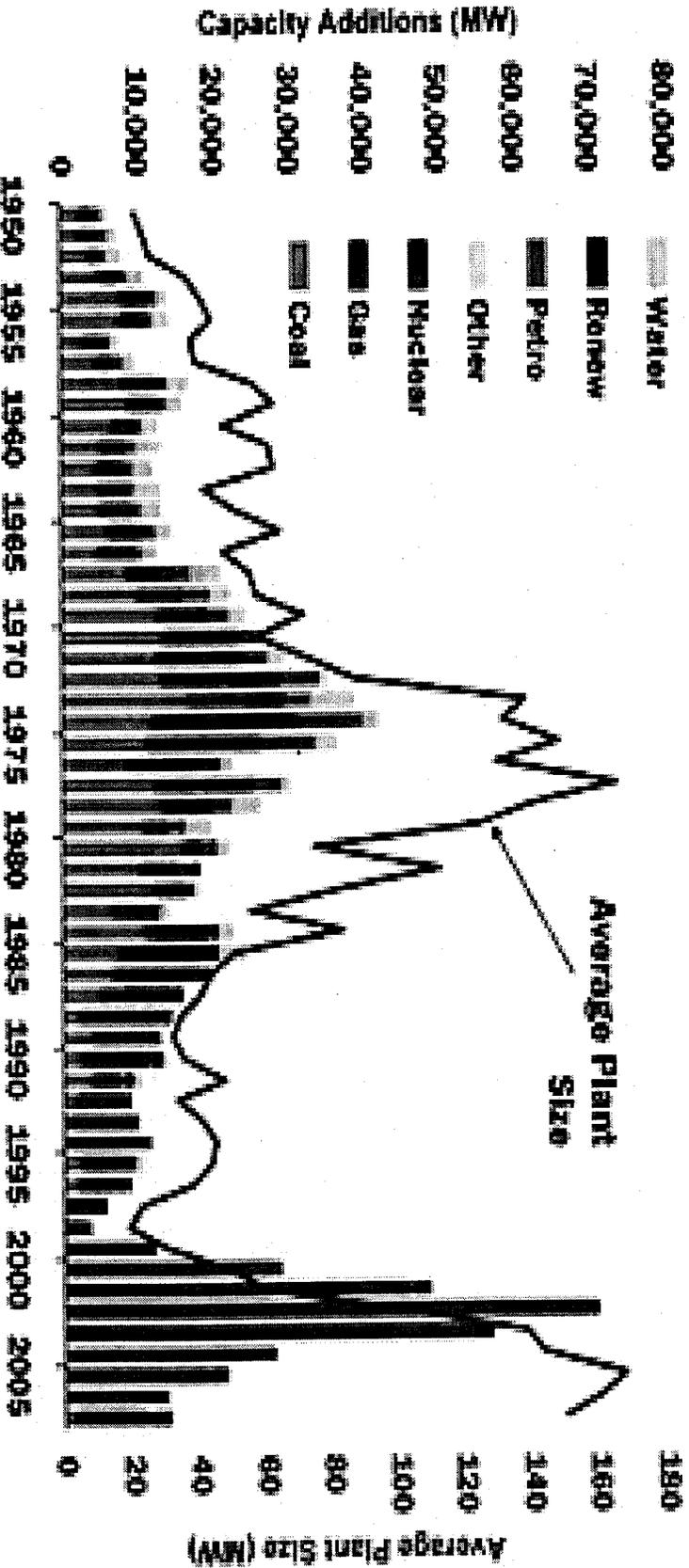
Source: Energy Information Administration, status as of April 2008



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Generation Additions

Capacity Brought Online by Fuel Type and Average Plant Size 1950-2007

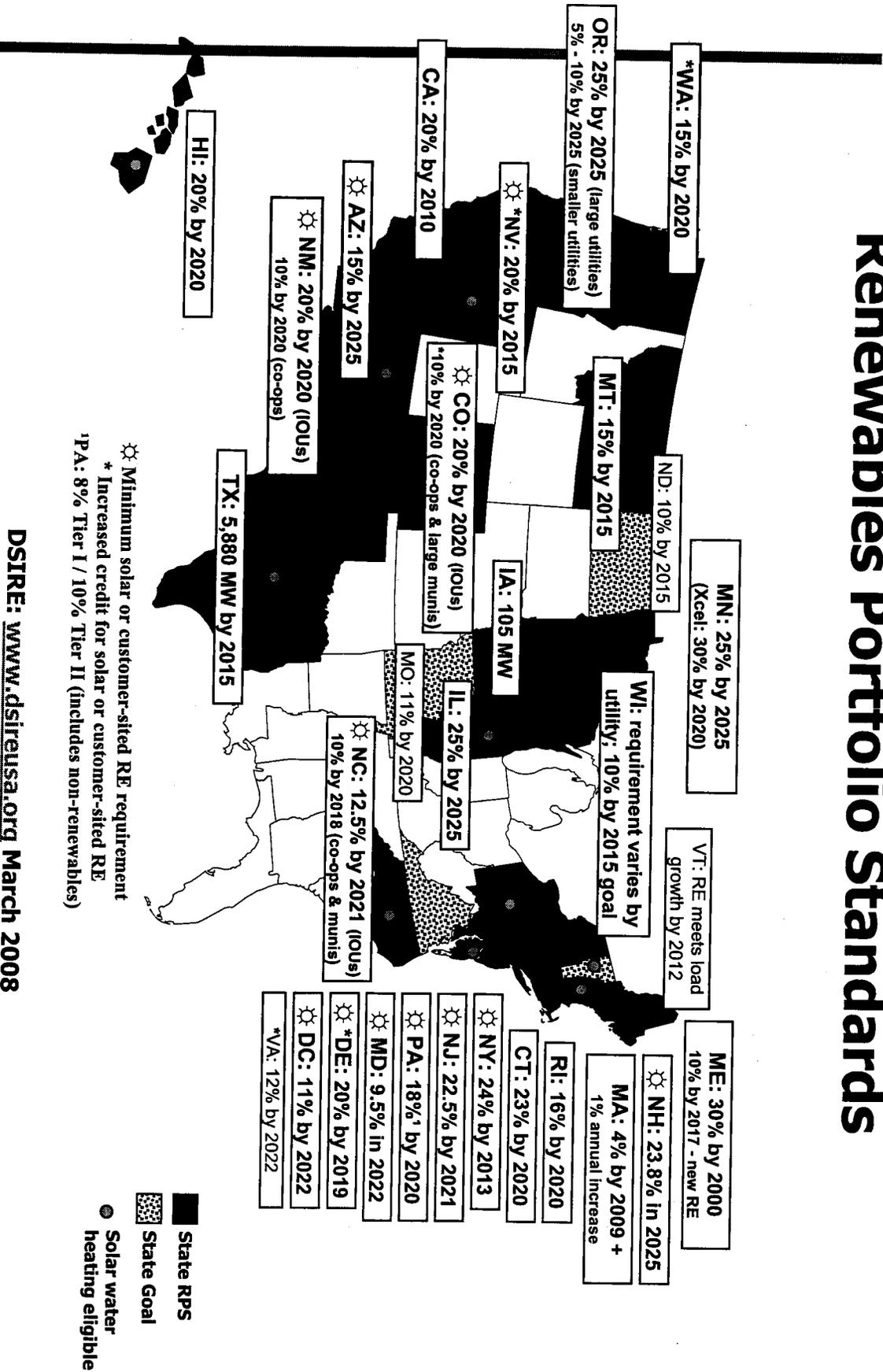


Source: Federal Energy Regulatory Commission
Updated 1/08



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Renewables Portfolio Standards



☀ Minimum solar or customer-sited RE requirement
 * Increased credit for solar or customer-sited RE
¹PA: 8% Tier I / 10% Tier II (includes non-renewables)

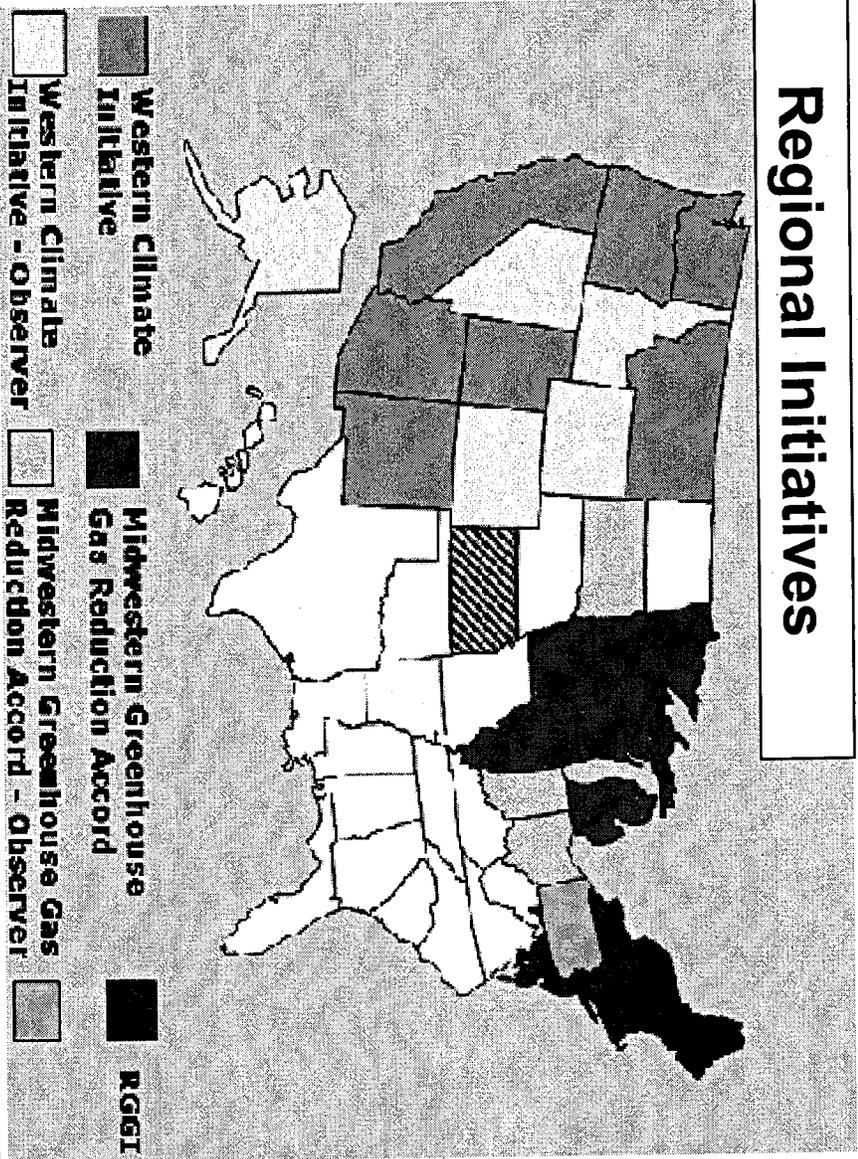
DSIRE: www.dsireusa.org March 2008



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Climate Policy in the Regions

Regional Initiatives

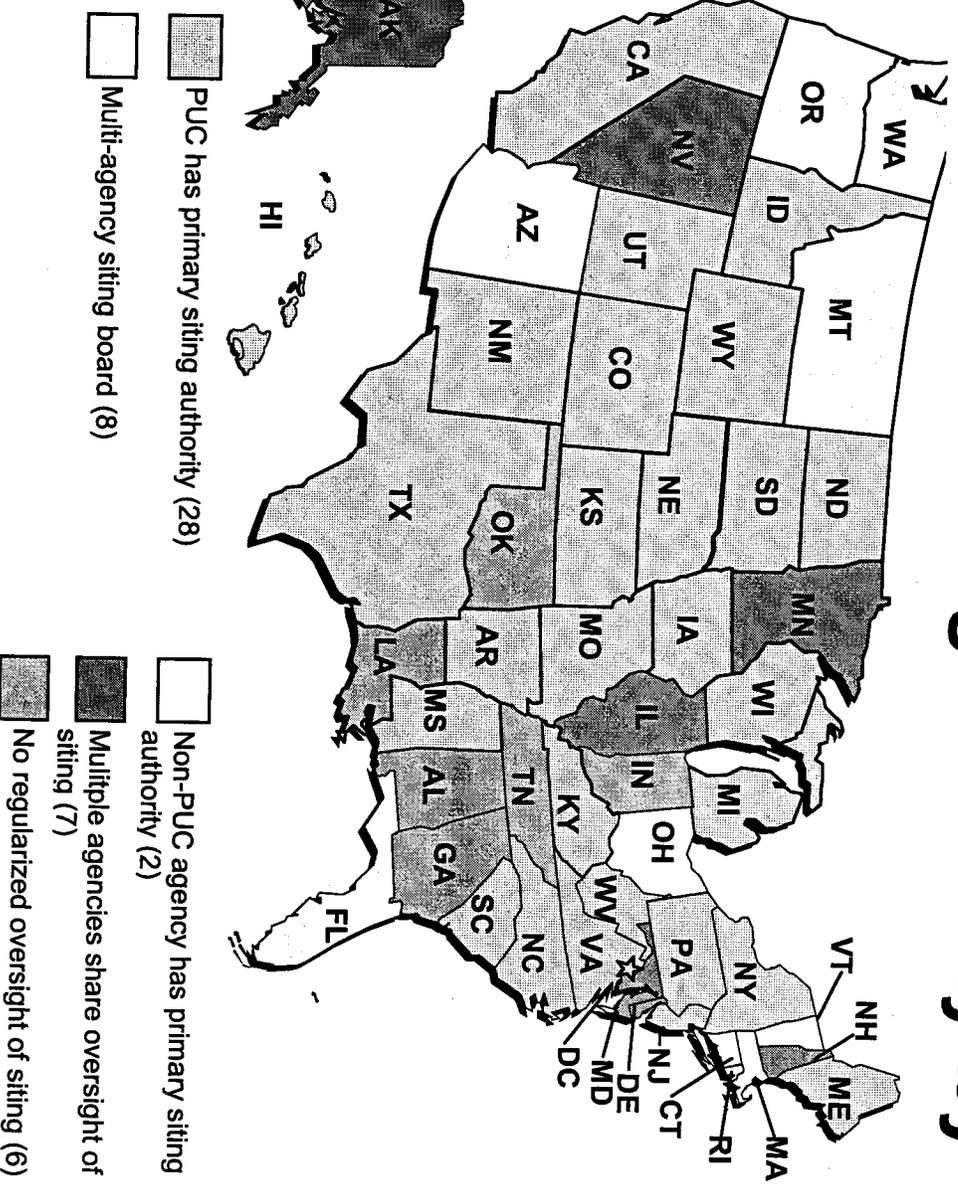


Source: Pew Center on Global Climate Change



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Transmission Siting Authority by State

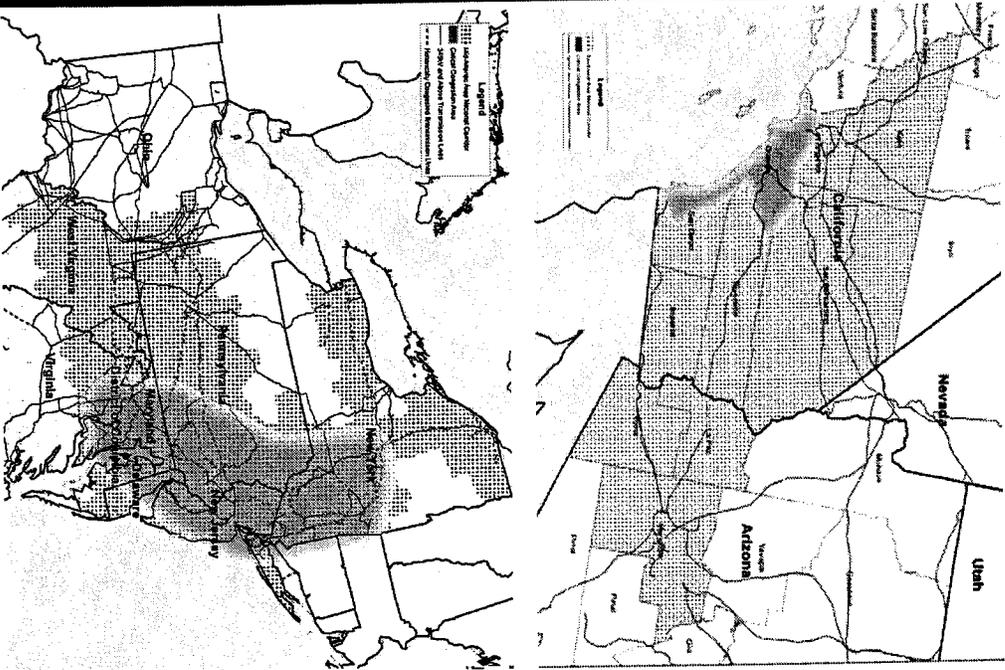


Source: EEL, Transmission Line Siting Regulations
2001, updated by J. McGarvey

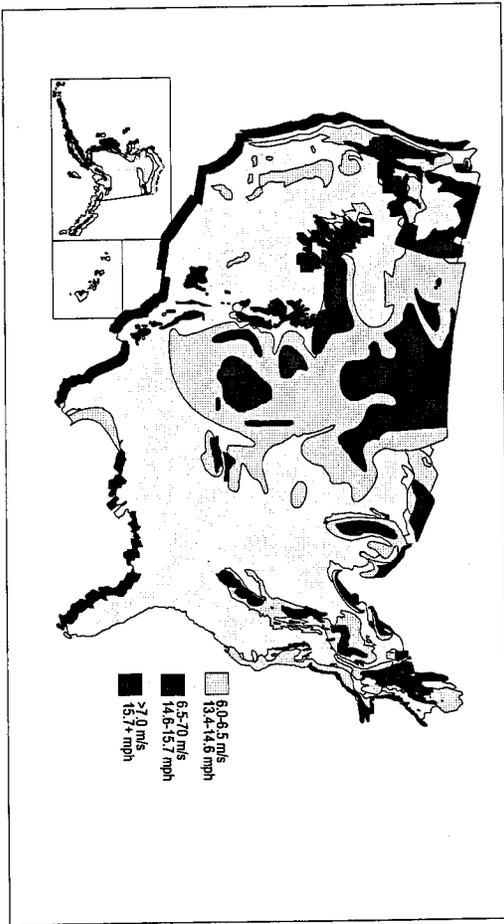


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Transmission Corridors & Crisis



What's Next?



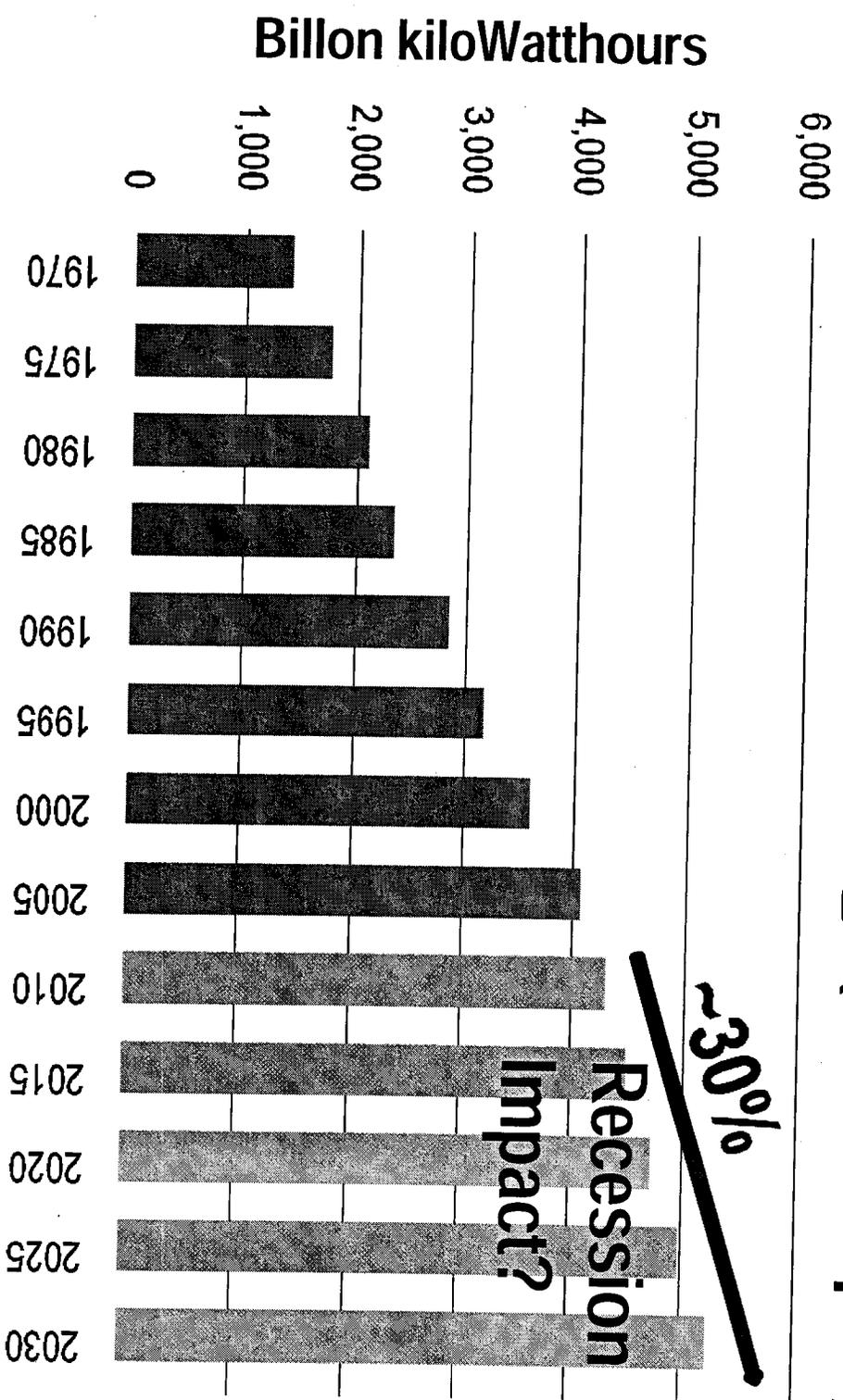
SOAPBOX

On transmission siting and other issues handled at State Commissions:
Insulating decision-making from those affected by the decision does not lead to better decision-making.



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Demand is growing (we hope)



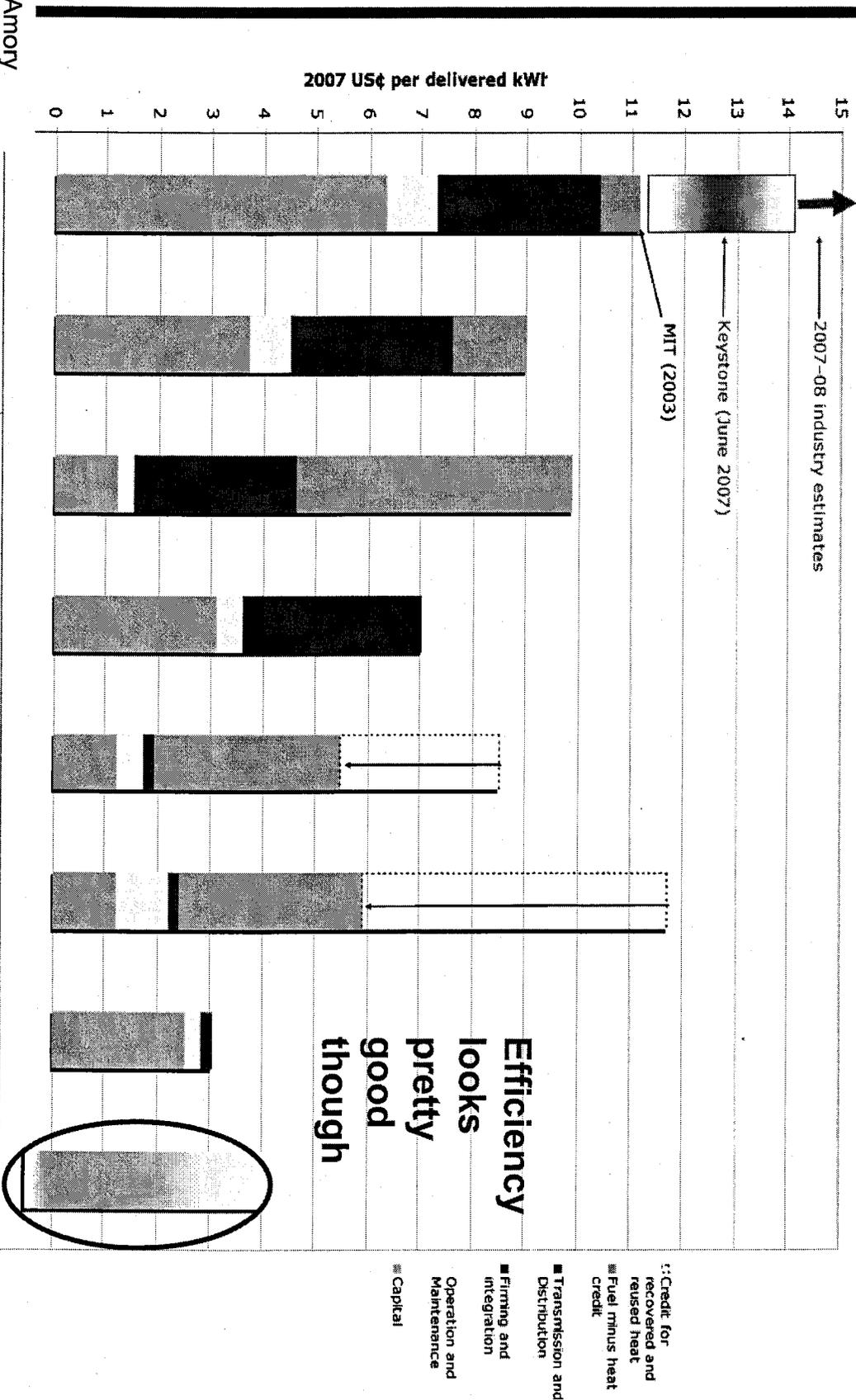
Sources: U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2006* and *Annual Energy Outlook 2008 Early Release*
*Electricity demand projections based on expected growth between 2006-2030



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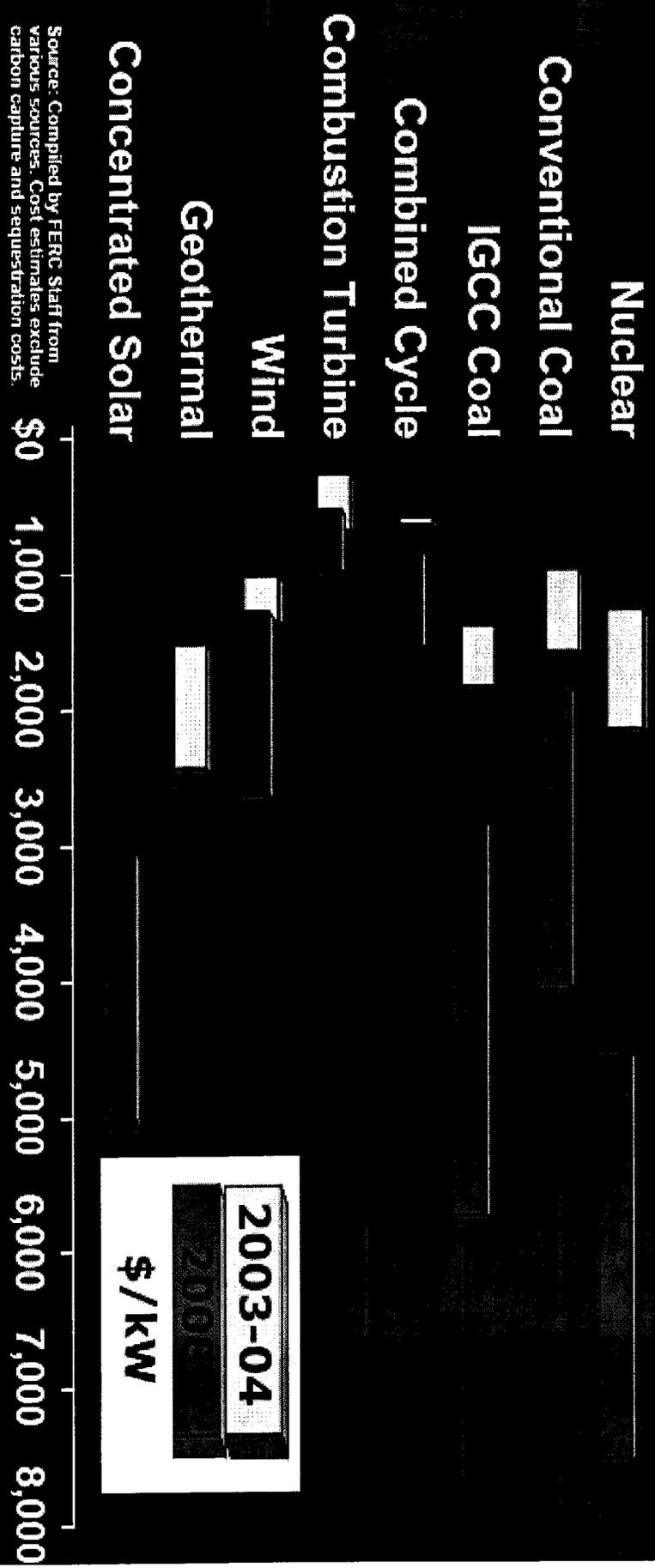
Resource Choices Looked Tough Before

Cost of new delivered electricity



Per Amory Lovins, 2008

Estimated Cost of New Generation



Source: Compiled by FERC Staff from various sources. Cost estimates exclude carbon capture and sequestration costs.

Per Eric Holdsworth, EEI



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A “Good Guess” on Climate



- EPA may force the hand of Congress
- 113th Congress (2013): national GHG legislation
- No Post-Copenhagen framework for after 2012
- Lingering Uncertainties:
 - Will Congress make rapid progress or hit a reef?
 - How fast will EPA move on Clean Air Act intentions?
 - The economy, and (related) the stimulus package
 - What would/ will an energy bill look like?
- Likely to be C&T
 - Allowance auction and allocation, cost containment, and State programs are key issues of interest to NARUC, and others interested in reliability, affordability, and program effectiveness



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More Demand, Less Supply, and Making More Demands From Our Supply.

- Inescapably, this means higher electric prices
- Strong upward pressure from:
 - New capacity additions to serve demand, as much as \$1.5 trillion (EEI) exceeds current capitalization.
 - Climate may cost \$1 trillion by 2030
 - Fuel and waste costs
 - New capabilities: smart grids, transportation, storage, generation resource priorities
 - Reliability, resiliency, security, and other issues

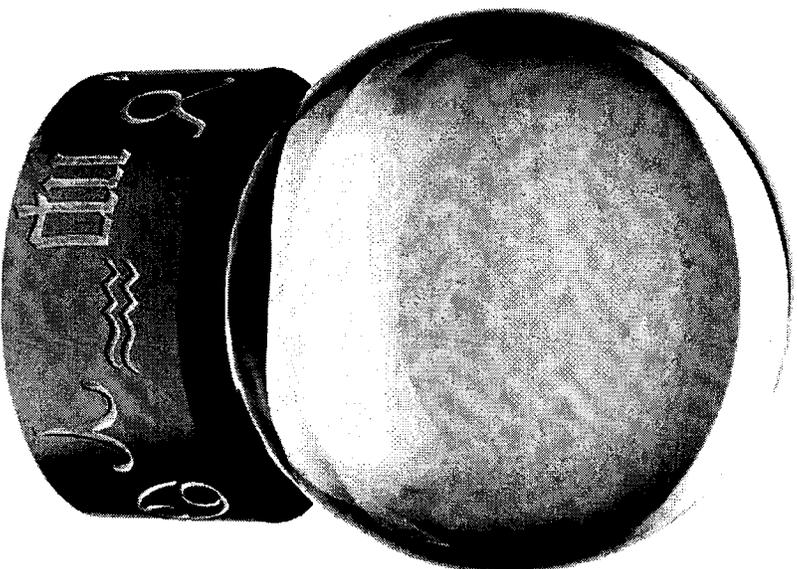


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So Where Are We Headed?

“We’ve been asking the question: ‘Given this price forecast, what should we invest in?’ The real question is, ‘Given that we *don’t* **know** what prices are, what should we invest in?’”

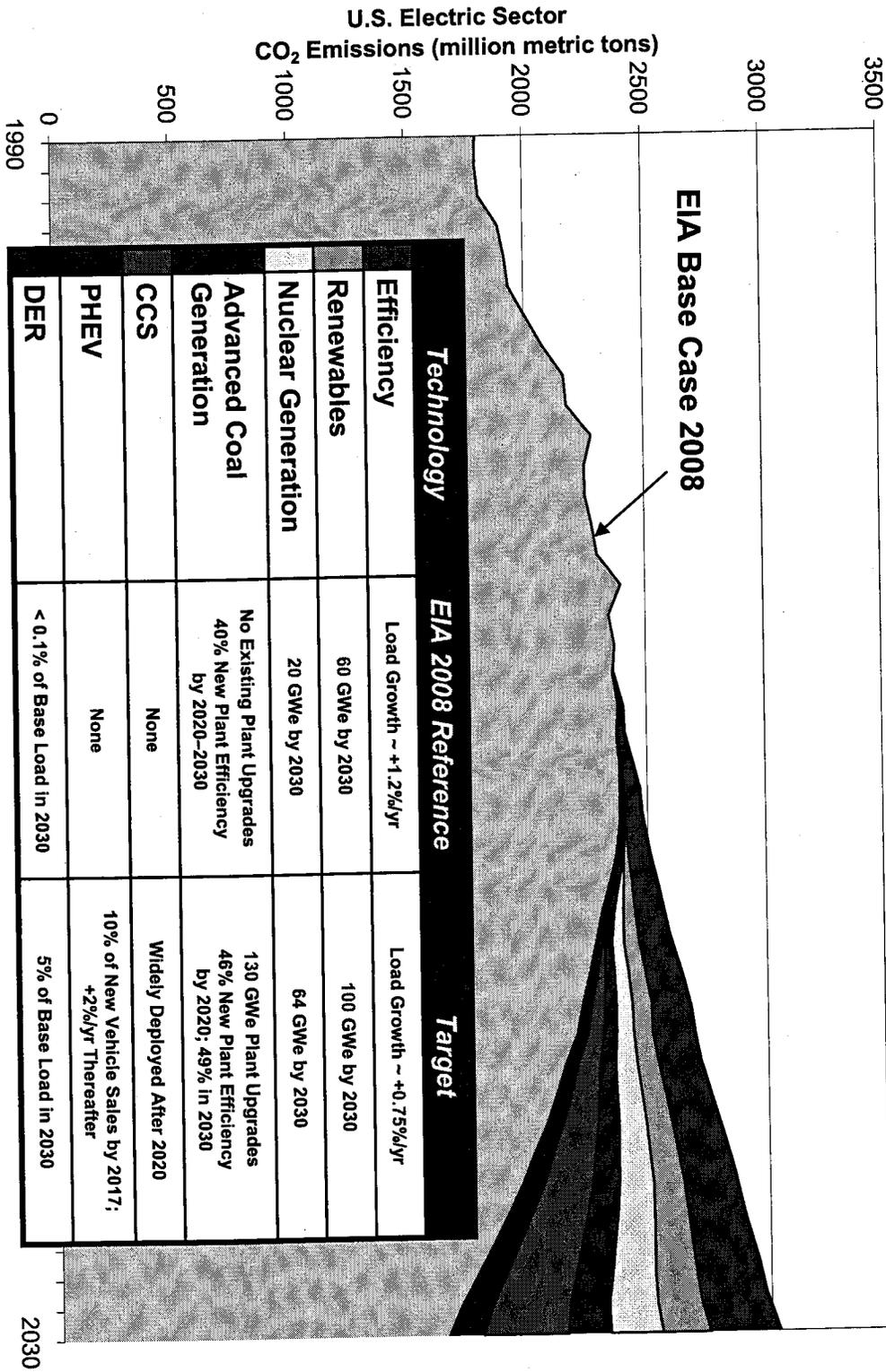
—Lee Raymond, CEO
Exxon-Mobil (WSJ 4-8-05)





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EPRRI Prism Analysis





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MERGE Economic Model Results:

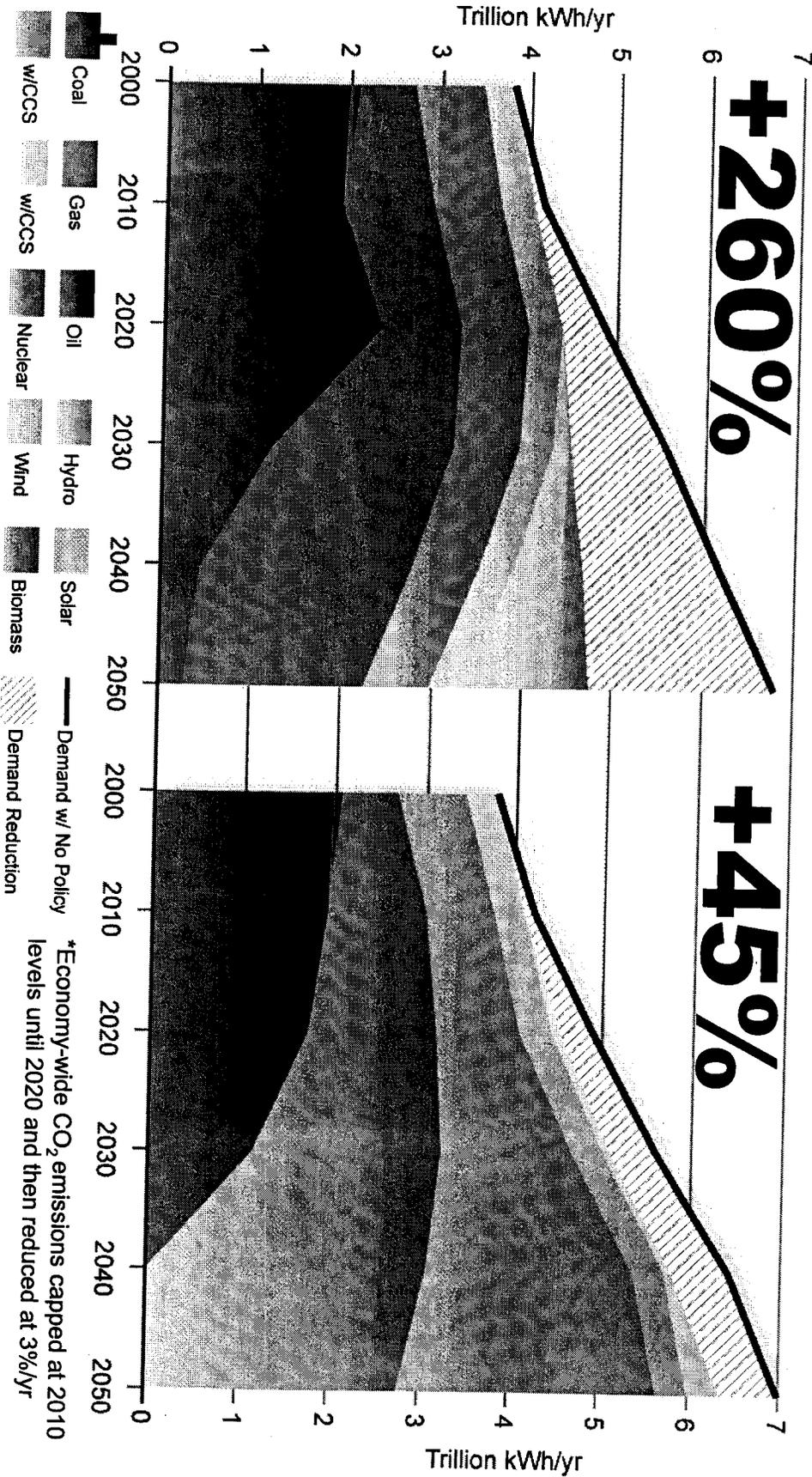
1 Real Electricity Prices Increase - 2000 to 2050

Limited Portfolio

+260%

Full Portfolio

+45%

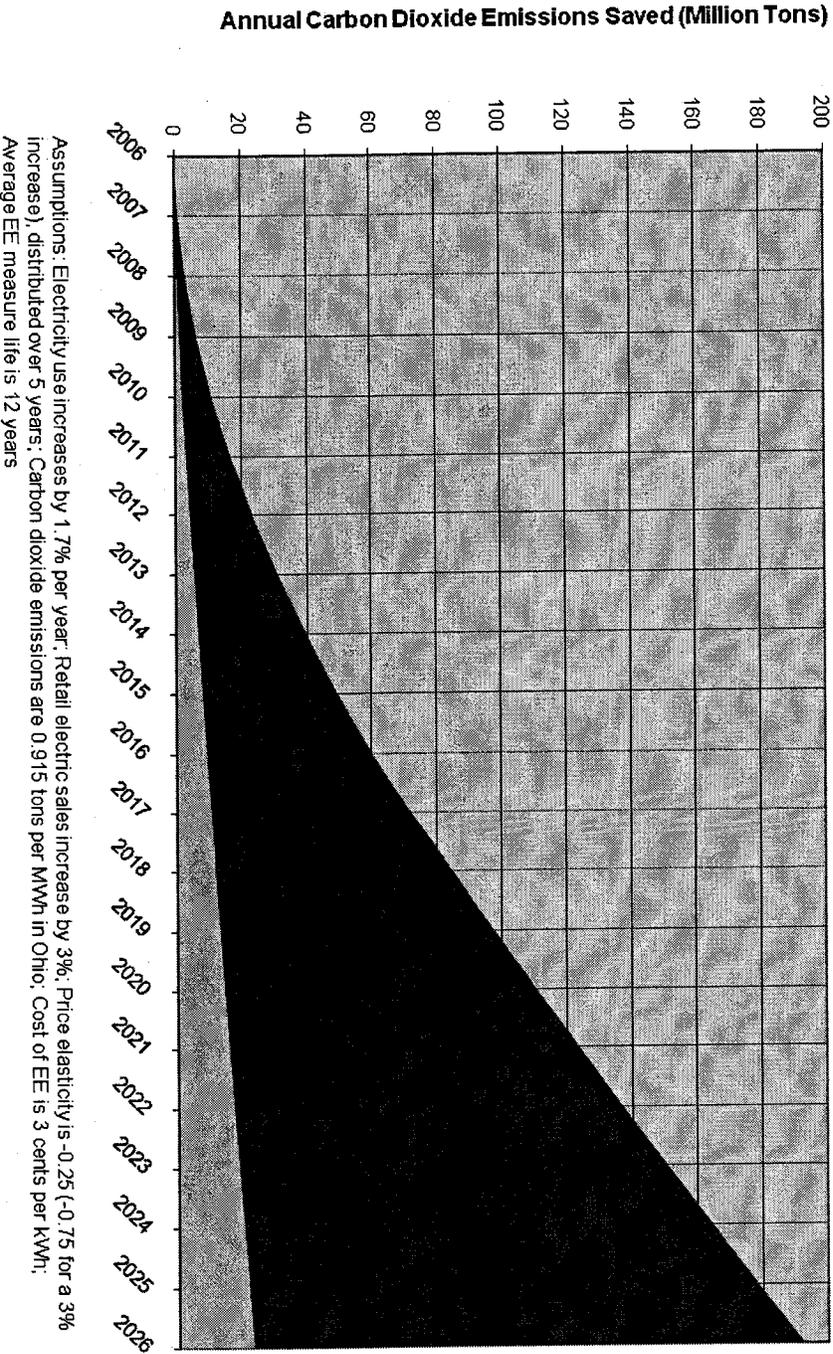




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Targeting efficiency saves 7x more carbon per consumer \$ than carbon prices alone

Annual CO₂ Emissions Saved by: Increasing Rates 3%; and Increasing Rates 3% to Fund Energy Efficiency (Ohio Example)



Assumptions: Electricity use increases by 1.7% per year. Retail electric sales increase by 3%. Price elasticity is -0.25 (-0.75 for a 3% increase), distributed over 5 years. Carbon dioxide emissions are 0.915 tons per MWh in Ohio. Cost of EE is 3 cents per kWh. Average EE measure life is 12 years

- Annual carbon dioxide emissions avoided from raising rates 3% and funding EE
- Annual carbon dioxide emissions avoided from raising rates 3%
- Cumulative CO₂ emissions avoided from raising rates 3%, 2006-2026: 209 million tons
- Cumulative CO₂ emissions avoided from raising rates 3% and funding EE, 2006-2026: 1,557 million tons



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Question one: what model?

- Is the cost-based, vertically regulated utility model more effective at fleet transformation?
- Are we going to need market models that keep a price signal in the game?
- Regulatory certainty versus an innovation motivator

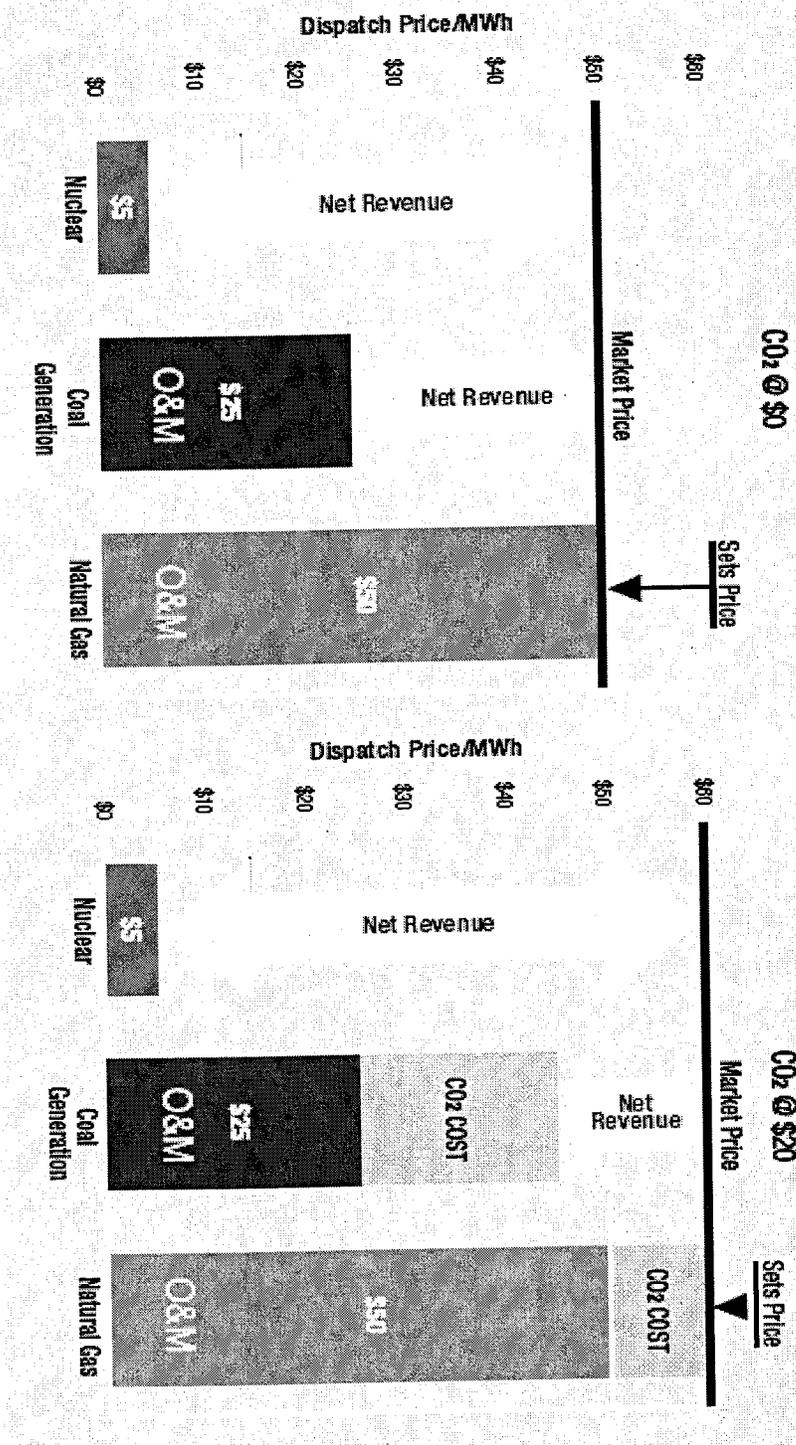


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Contra markets: CO2 cost adds payouts to every unit in the bid stack

FIG. 1

How EMISSIONS PENALTIES AFFECT MARKET PRICES AND NET REVENUES

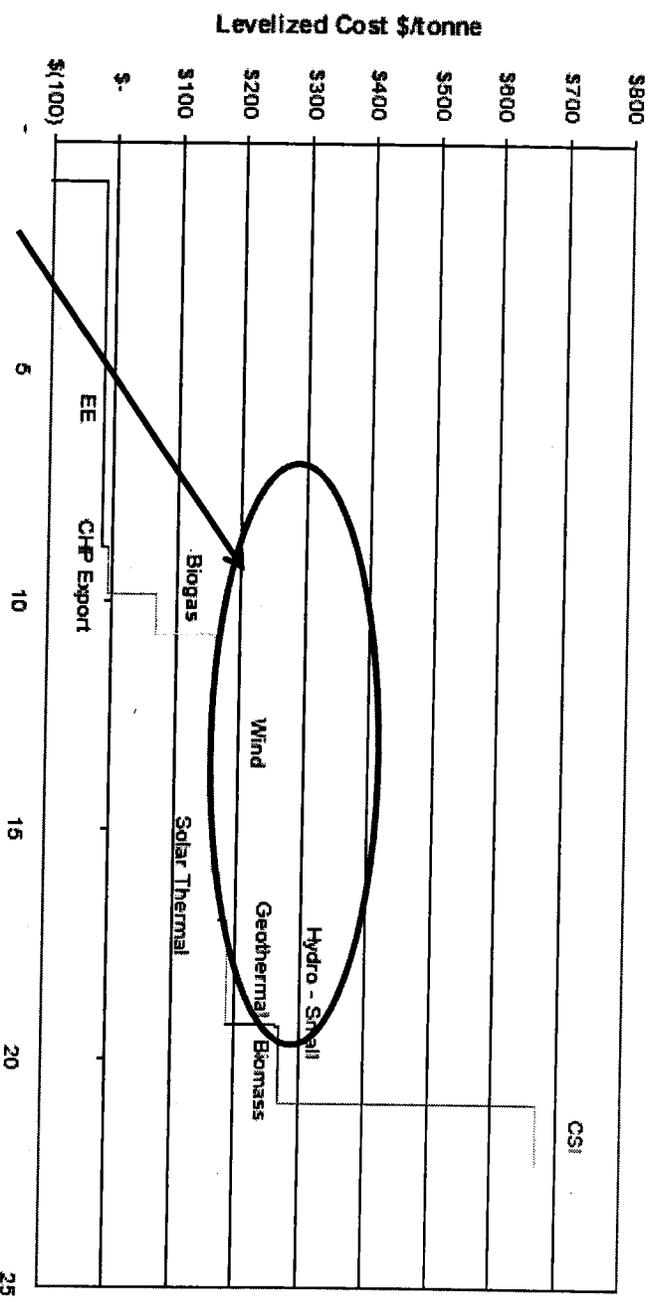


Source: "The Change in Profit Climate" -- Public Utilities Fortnightly May 2007 --Victor Niemeier, EPRI



Contra monopolies:
Utility procurement may not be as CO2 price responsive as you'd think

CO2 Supply Curve of Selected Low-Carbon Resources



CO2 price must be in the \$150/tonne range to induce investment in renewable energy beyond the RPS

Source: E3 analysis for California PUC, assumes RPS in effect



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Question Two: What Scenario?

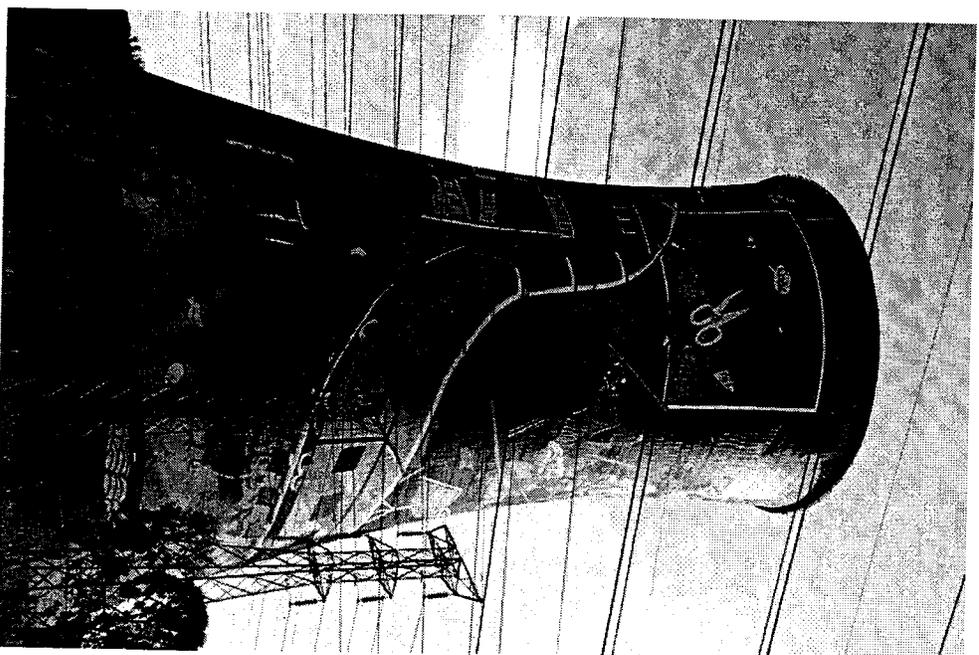
- Four wild-eyed scenarios to help imagine the future:
 - One Big Baseload Utility
 - Merchants & Intermittents
 - The Microgrid March
 - General Motors & Electric
- None of these are particularly plausible: intent is to imagine the possible boundary conditions



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The Big Baseload Utility

- Strategy: focus on baseload capacity (coal with CCS, new nuclear)
- Investments: Large, centralized.
- Utility structure: “One utility, owned by Warren Buffet” – size and capital advantage
- Market structure: Vertically integrated
- Implications for technology
- Implications for regulatory structure

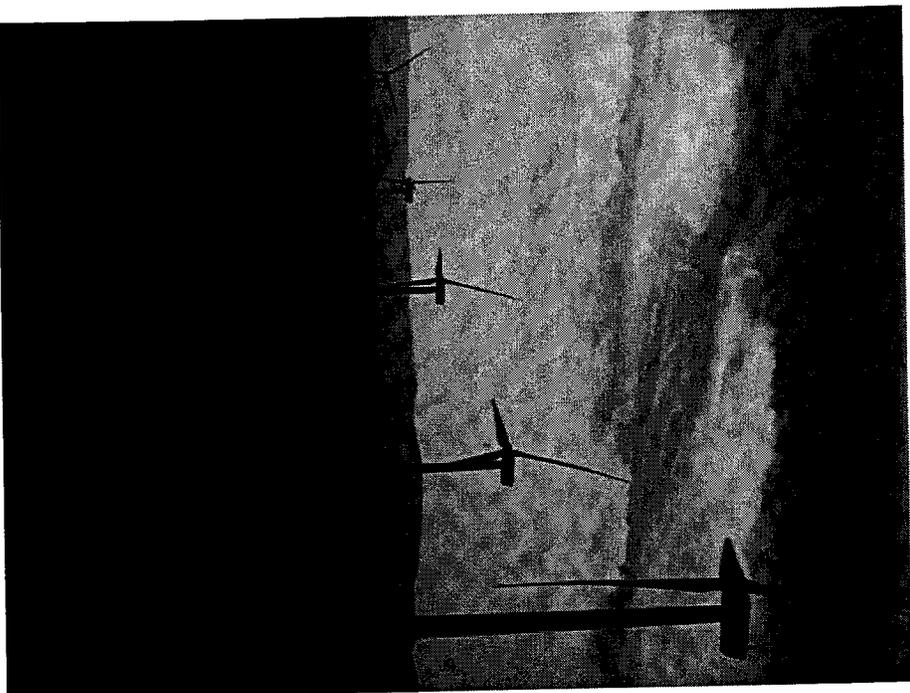




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Merchants & Intermittents

- Strategy: focus on energy resources over capacity resources (gas, biomass, CSP and wind); transmission (for firming and intermittents)
- Investments: More diffuse, more players.
- Utility structure: Similar to what we have now, a variety of sizes and shapes
- Market structure: As above, but accommodates strong deregulation perspective
- Implications for price
- Implications for regulatory structure





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The Microgrid March

- Strategy: focus on efficiency, demand response, distributed resources
- Investments: Extremely diffuse, much on the distribution-side
- Utility structure: “We help our customers manage their energy use”
- Market structure: disaggregated, “utility” redefined
- Implications for consumer involvement & empowerment
- Implications for regulatory structure

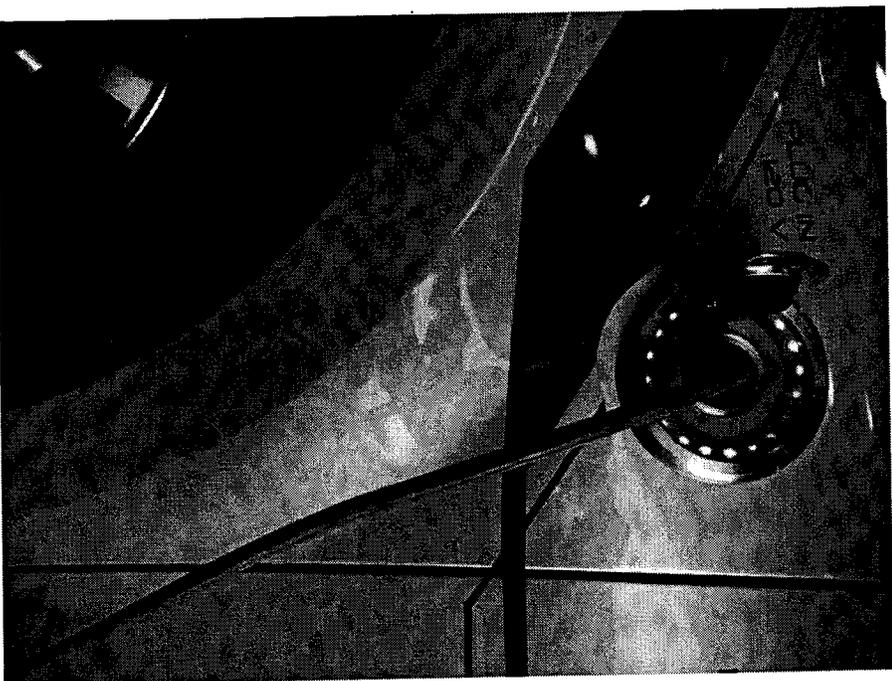




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General Motors & Electric

- Strategy: Transportation electrification and smart grid as game-changers
- Investments: Large, centralized.
- Utility structure: "We're Xcel and Exxon too"
- Market structure: A mix of models
- Implications for economics, markets
- Implications for regulatory structure





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What does this mean for regulators? For States?

- New market structures and business models will have to emerge
- States (and provinces) can be proactive or reactive
- Regulators care about cost and reliability. Is low-carbon a factor to weigh, or is it a constraint under which we must (at all costs) abide?



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Efficiency Seems Obvious

Costs less than a power plant!

Pays you back – now with local benefits!

NIMBY-proof!

Terrorist-proof!

Hurricane-proof!

Hugo Chavez-proof!

Easy to install: no wires or pipes!

100% NOx and SOx-free!

Legal everywhere, and Yucca-free!

Bird / Bat-friendly!

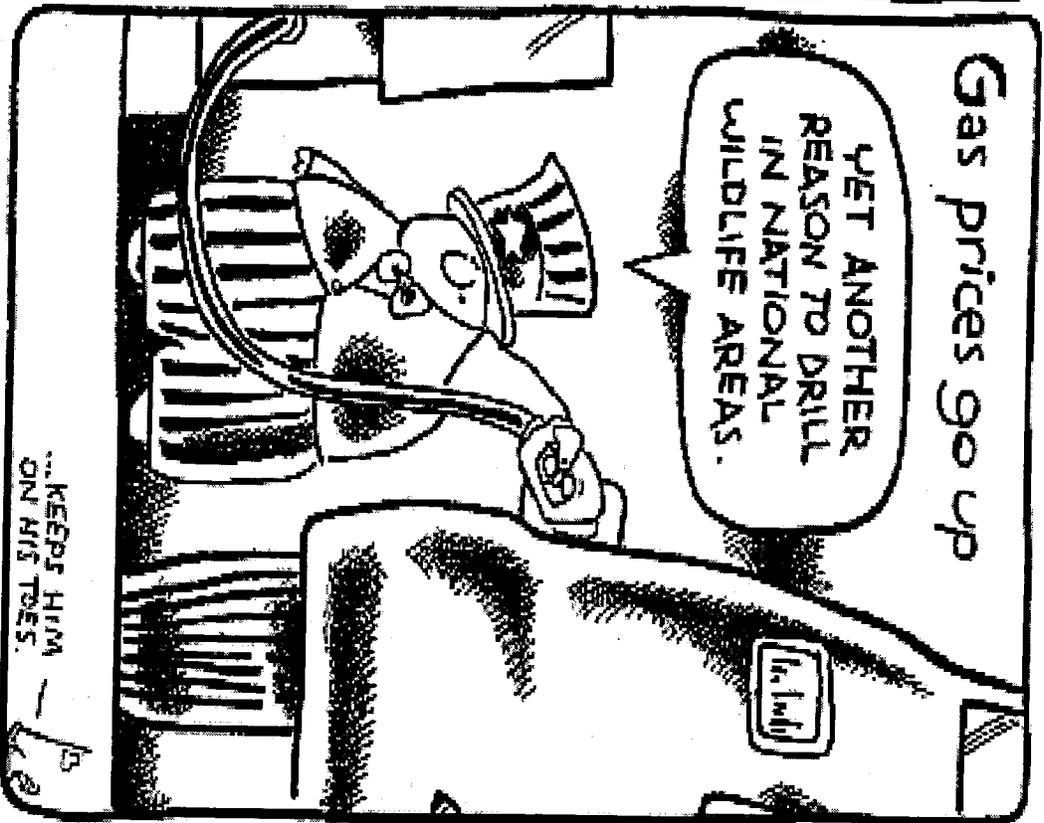
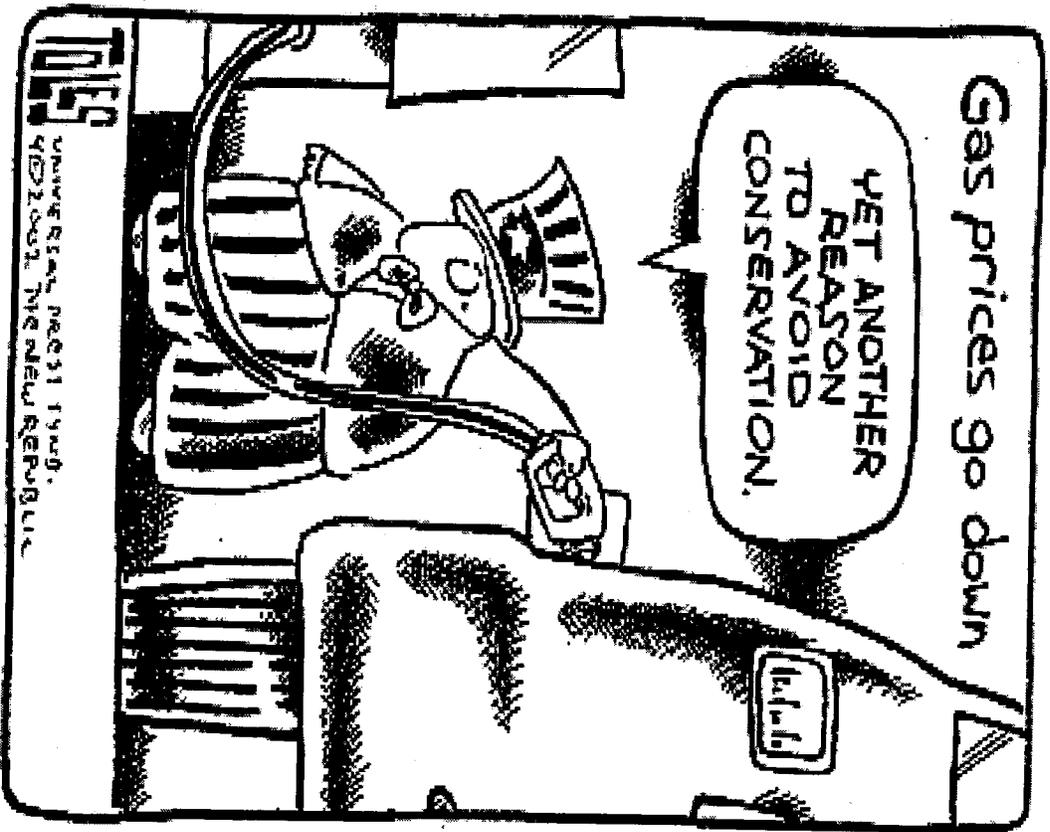
Good-looking!

More Popular Every Day!





Only! Consumers don't always listen to economists.



TOES
UNIVERSITY NEEDS TOUGH.
VIDEO: THE NEW REPUBLIC.

...KEEPS HIM ON HIS TOES.

TNR 4-C B



NARUC

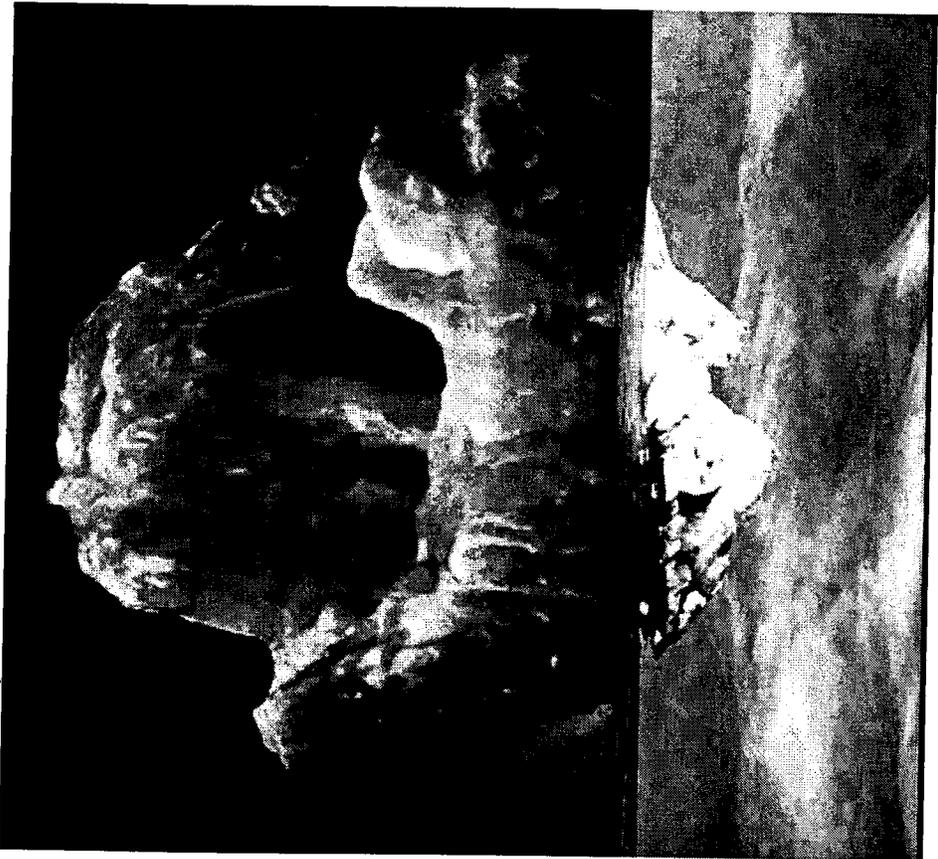
What this means for utilities

- Efficiency must be advantaged as the “first fuel”: our first priority among a broad national supply, delivery, and demand strategy.
- Seriously addressing the challenges we face means that for the first time, utilities may have to sell less.
- No utility can survive selling less over the long-term with the current business model.
- Falling sales almost inevitably means shrinking margins or rising prices or both.
- We may need to reconsider the idea of selling energy service rather than electricity or gas.
- (HOW?)
- In any event, it means changes.



NARUC

Won't selling less hurt the utility?

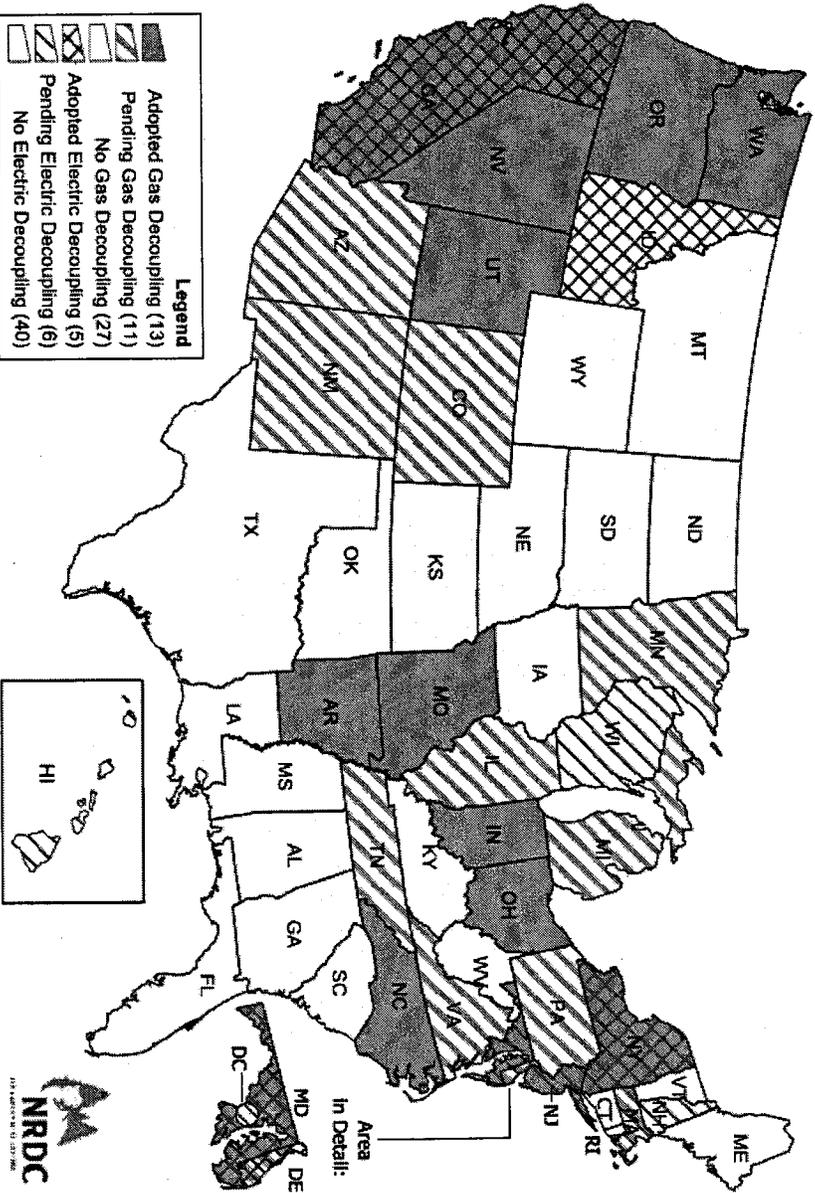




NARUC

The Audience Cheers (...right?)

Gas and Electric Decoupling in the US





NARUC

We'll need to run more than one horse

- Utilities aren't always the best providers of efficiency
 - Vermont, Delaware, etc.
 - ESCOs
- Decoupling looks tempting, but implementation details are deal-makers or –breakers
 - Who you apply it to (what class and class-size?)
 - How you apply it (what normalization and structure? How to prevent risk-transfers?)
 - What else you apply (what incentives?)
- Assuming the country wants to “flip the utility”, we'll need to revisit:
 - Technology and the extent of its deployment
 - Effectiveness and EM&V
 - Project and payback duration
 - Cost recovery
 - Incentives
 - Risk issues for Customer Classes, and social equity issues
 - The culture of implementation – is this a resource or what?
 - Policy consistency



NARUC

Without Smart (State) Programs, It's Not Gonna Be Pretty





NARUC

For the Feds

- Internalize GHG externalities: set a CO2 price
- Introduce new technologies, and bring down the cost of emerging technologies (RD&D)
- Support the deployment of a portfolio of supply resources (loan guarantees, tax credits, permitting, etc.)
- Provide technical assistance and resources.
- Use the siting hammer judiciously.
- Keep talking to each other and the States.



NARUC

For the States

- Respond to a price on carbon, but don't expect a miracle ✓
- Accelerate efficiency using a broad toolbox: non-utility EE providers, rate design for EE and DR, "loading" orders, carbon performance standards, EERS, investment incentives, guarantees, infrastructure authorities, etc. And yes, probably a good dose of decoupling. ✓
- Rediscover and update planning: IRP and Portfolio Management (and look regionally)
- New renewables: RPS is a tool that works, but transmission policy, interconnection, netmetering, and other strategies still need lots of improvement.
- New capacity: Accelerate the transition with explicit policies for low-carbon resources (e.g., CCS, nuclear) and find ways to turn energy-strong intermittent resources into stronger capacity resources.
- Promote a new business model for load-serving utilities. (Incentives, Decoupling, PBR, owned DG, etc.)
- Create new businesses for EE and carbon-reducing technologies (DG, smart grid, PHEVs, etc.)
- Keep talking to each other and to the Feds.



**I Will Now Confront
Your Most Challenging Questions!**



Or! Later if you prefer!

Miles Keogh, 202-898-2217 mkeogh@naruc.org

The Changing Climate in U.S. Renewable Electricity Markets & Policy Support

Matt Clouse
Office of Air & Radiation
U.S. Environmental Protection Agency
April 2010



Overview

- Introduction
- Observations on Renewable Electricity
- Background on Renewable Electricity in the U.S.
 - U.S. Power Sector
 - Renewable Electricity Potential & Barriers
- Evolving Policy Support for Renewable Electricity
 - Administration's Plan
 - State Actions
- Complexity of the Challenge

2

Introduction

U.S. Environmental Protection Agency

- 17,000 employees, 10 regional offices, and more than a dozen labs.
- Protect human health and the environment.
 - Focus on monitoring, mitigation, economics, regulatory and market programs
- One of a group of federal agencies engaged in actions to mitigate GHG emission
 - Along with Dept. of Energy, Dept. of Agriculture, etc.

3

Introduction

My Perspective

- EPA's Office of Air & Radiation
- Climate Protection Programs Division
 - Programs focused on reducing the environmental issues associated with energy use, particularly electricity use

My Role

- Renewable energy team lead
 - Direct a voluntary climate partnership program
 - Analysis of policy implications for renewable electricity

4

Observations

- Presentation has evolved from initial response to request to assess the mitigation potential renewable electricity could play in reducing U.S. GHG emissions ~83% from 2005 Levels by 2050
- There are many mitigation options, but the focus here is on renewable electricity in the power sector
- Other mitigation options include, but are not limited to:
 - End-use energy efficiency
 - Other non-emitting energy technologies e.g., nuclear
 - Carbon capture

5

Observations

- Renewables offer a portfolio of technologies that provide readily available, low carbon energy with co-benefits, such as environmental, financial risk minimization, and distributed economic benefits.
- They produce power with less GHGs and other air pollutants and conserve water* and finite resources.
- Renewables also: enhance national energy security*, reduce exposure to fossil-fuel price volatility, and provide substantial economic benefits e.g., job creation and technology development.

6

Observations

- Increasing renewable energy is critical for a comprehensive approach to climate change.
- Current federal and state policies have led to new, but limited renewable energy generation.
- Significant growth potential in renewable technologies can be achieved through new and improved policy support.
 - Plans to reduce GHGs ~80% by 2050 should help deploy renewables, but it is uncertain whether renewables will be directly or indirectly affected

7

Renewable Electricity in U.S.

Topics

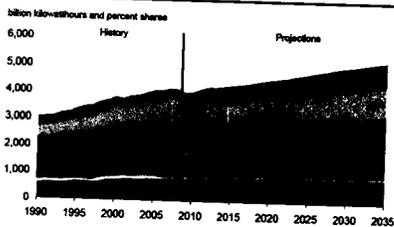
- U.S. Power Sector
- Renewable Electricity
 - Technologies
 - Potential
 - Barriers
- Governments' Role
- Policy Mechanisms

8

Renewable Electricity in U.S. U.S. Power Sector

Historical and Projected Fuel Mix

Renewables gain electricity market share; coal share declines

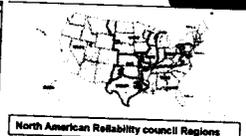
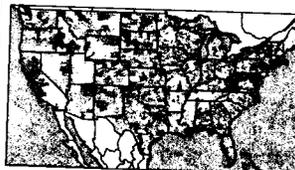


Richard Newell, SAIS, December 14, 2009

Source: Annual Energy Outlook 2010

9

Renewable Electricity in U.S. U.S. Power Sector



- kWh Sales = ~4,100 B kWh
 - Area = 8,080,464 km² (contiguous 48 states)
 - Population = 305 Million
- 239 Investor Owned utilities
- 2,009 publicly owned electric utilities
- 912 consumer-owned co-ops
- 10 Federal electric utilities

EIA electric service territory map. Copyright © 2009 EIA. All Rights Reserved. EIA data source: <http://www.eia.doe.gov/cas2/identity/epa/epm/terr.html>

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Renewable Electricity in U.S. Available Technologies

- Renewable energy technologies can be broadly categorized into four categories of deployment:
 - **technologically mature with established markets:** large and small hydro, woody biomass combustion, geothermal, landfill gas, crystalline silicon PV, solar water heating, and onshore wind;
 - **mature with relatively new and immature markets:** anaerobic digestion, concentrating solar dishes and troughs, mini- and micro-hydro and offshore wind;
 - **under development but approaching wider market introduction:** thin-film PV, concentrating PV, tidal range and currents, wave power, and solar thermal towers; and
 - **still in research stages:** organic and inorganic nanotechnology solar cells, artificial photosynthesis, ocean thermal and saline gradients, and ocean currents.

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Renewable Electricity in U.S. Theoretical Potential?

Theoretical Growth Potential?

- DOE & renewable trade associations have provided upper bounds estimates of potential capacity increases by 2025
 - Central generation ≈ 450 GW, distributed generation ≈ 150 GW
 - At that time, nonrenewable energy capacity was 900 GW (EIA).

Renewables	2007 (GW)	Potential Additions (GW)	Source Information
Hydro	78	13 by 2025	NHA 2008
Wind	15	300 by 2030	DOE 2008
Biomass	10	100 by 2025	ACORE 2007
Geothermal	2	15 by 2025	GEA 2008
Solar	0.5	164 by 2025	ACORE 2007
Ocean/tidal	0	10 by 2025	NHA 2008
Total	107	635 by 2025	ACORE 2007

Renewable Electricity in U.S. Resource Availability?

Wind Availability and Demand Centers



Red = demand centers
Blue = wind resources
Green = high wind resource and demand

Source: NREL, Accommodating High Levels of Variable Renewables, April 2009

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Renewable Electricity in U.S. Resource Availability?

Solar Resource in the US and Germany



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Renewable Electricity in U.S. Realizable Potential?

Realizable Potential?

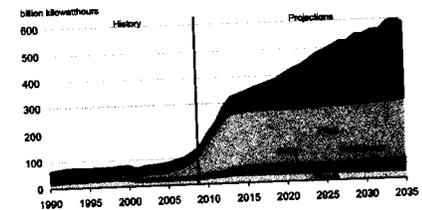
- Non-hydro renewables: potential in available external published studies ranges from 15% to 20% share of electricity generation in 2030 relative to baseline
 - After aggressive energy efficiency reductions (20% reduction in demand), 20% renewables relative to baseline is equivalent to 25% of electricity generation in 2030
 - Based upon recent national and international studies:
 - IEA, *Deploying Renewables* (Sept 2008)
 - McKinsey, *Reducing U.S. Greenhouse Gas Emissions* (Dec 2007)
 - DOE, *20% Wind Energy by 2030* (May 2008)
 - For comparison, Markey/Waxman RES proposal is for 15-20% in 2020

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Renewable Electricity in U.S. Realizable Potential?

Projected generation (EIA AEO 2010)

Nonhydropower renewable sources meet 41% of total electricity generation growth from 2008 to 2035

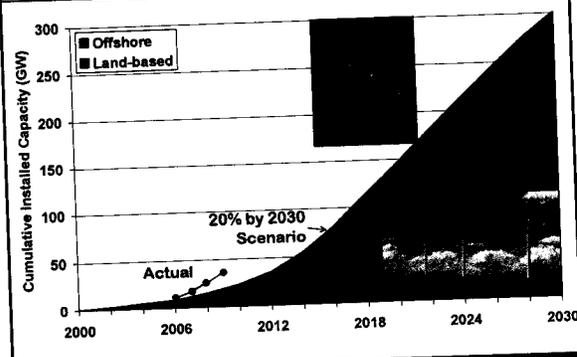


EIA Richard Newell, SAIS, December 14, 2009

Source: Annual Energy Outlook 2010 21

16

20% Wind by 2030 Scenario Requires 300 GW



Renewable Electricity in U.S. Barriers

Barriers to Renewable Electricity		
Economic	Expensive	
	Unique project & finance structures	
Regulatory/Structural	Lack of long-term policies & regulatory certainty	
	Land access & siting	Local ordinances & siting
	Transmission access	Inconsistent & limiting state interconnection policies
	Market & grid operations	Grid integration codes & standards
Behavioral	Lack of information on technologies & benefits	
Availability	Manufacturing and supply-chain constraints	
	Availability of skilled technicians	

Many of these barriers are regulatory and non-economic.

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Renewable Electricity in U.S. Role of Government

- Federal agencies
 - Environmental regulation
 - Energy research, development ... and deployment
 - Interstate energy market regulation
- State agencies
 - Intrastate energy utility regulation
 - Environmental regulation
- Local governments
 - Local permitting and siting

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Renewable Electricity in U.S. Current policy support

- Federal support
 - Tax credits/grants
 - Accelerated depreciation
 - Production and investment incentives
 - Stimulus grants
 - Commercialization and R&D
- State support
 - Renewable portfolio standards (RPS)
 - Renewable energy funds
 - Electricity market rules/rate policy
 - Net-metering
- Renewable energy markets
 - Mandatory (or compliance) = *push* renewables
 - Voluntary = *pull* renewables

20

Evolving Policy Support for Renewable Energy

- Topics
 - Addressing Barriers
 - Policy Options
 - Obama Administration's Energy Plan
 - Congressional Actions
 - State Actions
 - Complexity of the Challenge

21

Evolving Policy Support for Renewable Energy

Policy Framework

- Carbon Policies
 - Existing CAA options
 - New legislation, e.g. carbon cap and trade
- Complementary Policies
 - Renewable-specific policies
 - Policies supportive of an enabling infrastructure for renewables
 - EPA voluntary programs

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Evolving Policy Support for Renewable Energy

- Price signals from a cap and trade regime will provide important support for renewables, although are not likely to be sufficient to spur rapid, near-term deployment necessary to capture their full mitigation potential.
 - Timing and trajectory of carbon prices is critical, but unknown.
 - As for trajectory, reducing price uncertainty will facilitate scale-up.
- Complimentary policy support can hasten the uptake of available renewables and accelerate GHG abatement.
 - In the short-term, the technology options available to respond to C&T policy are limited e.g., CCS and nuclear.

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Evolving Policy Support for Renewable Energy

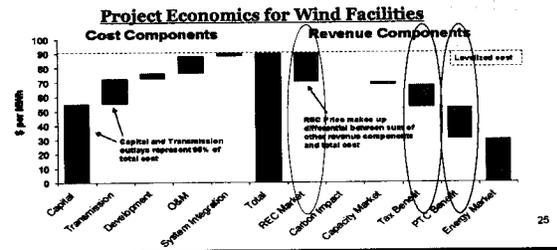
Complimentary Policy Options

- No single policy will support the desired scale-up.
- Supporting scale-up requires policies ...
 - for central station, distributed generation, and emerging technologies
 - and at different levels of government e.g., federal, regional, and state/local.
- These policies must address **KEY CHALLENGES** ...
 1. Project economics in order to hasten deployment
 2. Build transmission lines
 3. Improve grid management systems to incorporate more renewables

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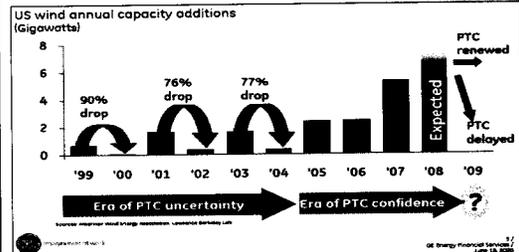
Evolving Policy Support for Renewable Energy

- Renewables use tax credits, accelerated depreciation, and RECs (voluntary & RPS) to bridge the gap between costs and power contract revenue.



Evolving Policy Support for Renewable Energy

- PTC expirations undermine investment in projects and manufacturing



Evolving Policy Support for Renewable Energy

Federal Renewable Electricity Standard (RES)

- Momentum has been building for a RES
- The House passed a RES and the Senate Energy & Natural Resources Committee passed a similar bill
 - Targets are roughly 15-20% by 2020, but effective levels are less
 - Pre-empting states' RES policies is a political challenge
- Getting the votes to pass the Senate bill is by no means assured

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Evolving Policy Support for Renewable Energy

ACESA's Energy Efficiency/Renewable Energy Provisions

- Combined Efficiency & Renewable Electricity Standard
 - FERC administers
 - Ramps up to 20% by 2020; level through 2039; TBD after 2039
 - 1/4 can be met with EE (States can petition to increase to 40%)
 - Alternative Compliance Payment (ACP) = \$25/MWh
 - Requirement on electric LDCs with sales > 4 mm MWh/yr
 - Exclusions from baseline: existing large hydro, new nuclear, and CCS
 - Concern: additionality of voluntary purchases
- Allowances to States (through SEED accounts)
 - For energy efficiency and renewable energy
 - 9.5% in 2012 declining to 4.5% from 2026-2050
 - At least 20% of total for RE
 - Can support REEP, building labeling, other EE

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Evolving Policy Support for Renewable Energy

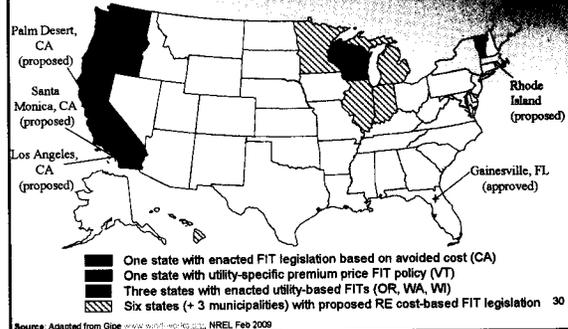
Feed-in Tariffs (FITs)

- U.S. policy debate has focused on RPS policies instead FITs but, if properly designed, FITs and RPS's can work well together:
 - RPS's govern percentage of demand to be met by renewables; FITs govern new supply development
 - RPS's address quantity and leave price to the market; FITs address price and leave quantity to the market
- Most current and proposed U.S. FITs are more restrictive than the European model:
 - Project size caps (1.5 MW in California)
 - Program size caps (500 MW in California, 4 MW in Gainesville, FL)
 - Program budget caps
 - Payments the same across technology types.
 - Payments are NOT based on renewable project cost
 - Exception for Gainesville, FL Regional Utilities PV FIT, modeled after Germany's FIT, which bases payment on PV project cost: \$0.26-0.32/kWh in 2009 and 2010, depending on system size and application.

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Evolving Policy Support for Renewable Energy

FIT Policies in the U.S.



Evolving Policy Support for Renewable Energy

Addressing Barriers: Transmission & Integration

Centralized Generation

- Work with states to plan for interstate transmission
 - Designate renewable energy zones for priority transmission build-out
 - Backstop authority to plan and site new lines
- Work with states on cost-recovery mechanisms
- Encourage coordination of balancing authorities
- R&D
 - transmission technologies
 - grid integration strategies
 - grid modernization applications

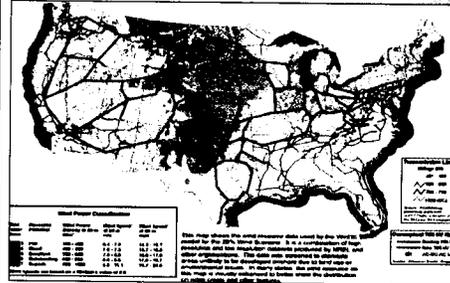
Distributed Generation

- Provide a minimum standards for inconsistent and limiting state interconnection policies
- Work with states to address utility throughput incentives
- Encourage rates that recognize the cost/benefit to the power system
- R&D
 - grid integration strategies
 - grid modernization applications

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Renewable Electricity in U.S.

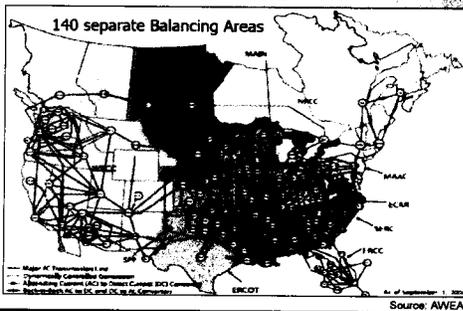
Transmission Superhighway?



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Renewable Electricity in U.S.

Three Interconnected Grids



33

Future for Renewables in the U.S.

Possible Climate Goals and Renewables Role

- The Administration plan and current Congressional draft bills have goals of reducing GHGs ~80% by 2050
- What will be the role of renewables in reducing emissions?
- There are some challenges to capturing renewables potential
 - Renewable potential is primarily limited by the lack of a market price for CO2 and unique market, regulatory and technical barriers
- Renewable strategies must address grid integration and transmission capacity challenges, project economics, and workforce capacity

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Contact Information

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 Climate Protection Partnership Division
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Emerging Green Power Market

- **Is individuals & organizations buying an environmentally-differentiated retail electricity product**
 - Green pricing: a green power option offered by more than 850 utilities
 - Competitive green power products offered by retail service providers in restructured states
 - Unbundled RECs sold by over 80 marketers
- **Is growing at avg. annual rate of 41% since 2004**
 - EPA's Green Power Partnership is a big part of that growth



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Voluntary Green Power Market (2)

- Is much more significant than most people realize
 - Supported 24 billion kWh of new renewables as of the end of 2008
 - New renewables were brought online on or after 1/1/1997
 - Exceeds new renewables demand from state RPS compliance

Year	Voluntary	Compliance (new renewables)
2004	~5,000	~5,000
2005	~10,000	~8,000
2006	~15,000	~12,000
2007	~20,000	~15,000
2008	~24,000	~18,000

Regulation establishes the floor; voluntary programs play an important role in encouraging additional action and innovation above the floor

Source: NREC 2009

Motivates Purchasers?

- Voluntary purchasers want to make a difference
 - Support renewables above what's required by law
- Multiple motivations
 - Support renewable energy growth
 - Reduce global greenhouse gas emissions & their footprint
 - Reduce other environmental impacts of non-renewable resources
 - Support energy independence and security
 - Market a differentiated product: "Made with renewable energy"
 - Green-e Marketplace certifies such products
- Environmental claims (emission reductions) are most frequently cited motivation

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Green Power Partnership

- Encouraging organizations to purchase green power to reduce the greenhouse gas intensity of the electricity sector
 - Green power is electricity from zero-emission* renewable energy sources built to after the inception of the voluntary market
- Targeting organizations with direct outreach and coordinating with green power retailers
 - Working with hundreds of leading organizations, including Fortune 500 companies, local, state, and federal government agencies, manufacturers and retailers, as well as colleges and universities
 - Offering credible purchase requirements, trusted market information, technical assistance, and EPA recognition
- Reducing the transaction costs and increasing the overall value proposition for Partners

39 39

1,200 Green Power Partners Purchasing 18 Billion kWh/year

Federal RES & the Voluntary Market

- Proposed Federal RES create a new Federal mandatory market, but make no mention of the voluntary market
- This omission raises the possibility that voluntary market purchases may not be additional to the RES if the new Federal RECs are not retired along with the non-Federal RECs
- EPA has provided comments saying that both bills should clarify Federal REC ownership for voluntary market REC contracts
 - Voluntary market REC contracts are unlikely to be clear about the disposition of the new Federal RECs
 - This change will help ensure voluntary purchases are not counted toward the Federal requirements. Not addressed in either bill
- Kerry-Boxer bill now includes language that says the voluntary market should be preserved in response to current Federal RES proposals

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STACY ANGEL

<http://www.epa.gov/cleanenergy/energy-programs/napee/resources/figure2-1.html>

Last updated on Tuesday, March 16, 2010



Clean Energy

You are here: [EPA Home](#) [Climate Change](#) [Clean Energy](#) [Clean Energy Programs](#)
[National Action Plan for Energy Efficiency](#) [Resources](#) [Guides and Papers](#) [Measuring Progress at the State Level - Advancing the Vision for 2025 Implementation Goals and Policy Steps](#).

Measuring Progress at the State Level - Advancing the Vision for 2025 Implementation Goals and Policy Steps.

Resources

Progress for Electricity Services

- Outreach Tools
- Guides and Papers
- Clean Energy Resources Database
- Energy Efficiency Benefits Calculator
- Energy Efficiency Workforce

The information below summarizes the status of a state-level policy or program for electricity services based on it being considered to be "complete" or "partial/some elements of policy in place." These two categories have been developed from more detailed information, based on the format used for the [Regional Implementation Meetings](#). If information was not readily available at the state level it is not included. If additional information on these policies is available based on a review of the current information on measuring progress, please send it to [Stacy Angel](mailto:angel.stacy@epa.gov) (angel.stacy@epa.gov) and it will be included as the information is updated in the future. Please note that the information below is as of the national baseline, December 2008. Activity in 2009 will be reflected in the next measuring progress update.

A more detailed explanation of the assessment for each of the implementation goals and the key policies or program steps in is provided in Appendix D of the [Full Vision for 2025 \(PDF\)](#) (112 pp., 696K, [About PDF](#)).

Implementation Goal and Key Steps	States Having Adopted Policy Step as of December 2008	
	Completely	Partially
Goal One: Establishing Cost-Effective Energy Efficiency as a High-Priority Resource		
1 Process in place, such as a state and/or regional collaborative, to pursue energy efficiency as a high-priority resource.	AR, AZ, CA, CO, CT, GA, HI, IA, ID, IL, IN, KS, MA, MD, ME, MN, MO, MT, NH, NJ, NM, NV, NY, OK, OR, PA, RI, UT, VT, WA, WV	0
2 Policy established to recognize energy efficiency as high-priority resource.	AR, AZ, CA, CO, CT, DE, HI, IA, ID, IL, KS, MA, MD, ME, MN, MO, MT, NJ, NM, NY, OH, OR, PA, RI, SC, TX, UT, VT, WA, WI	AK, DC, FL, GA, IN, KY, MI, NC, ND, NE, NH, NV, OK, SD, TN, VA, WV, WY
3 Potential identified for cost-effective, achievable energy efficiency over the long term.	CA, CT, DE, FL, GA, HI, IA, ID, IL, IN, KS, MA, MD, ME, MI, MO, MN, MT, NE, NH, NJ, NM, NY, OH, OK, OR, TX, UT, VT,	0

regional and/or national level.

KS, MA, MD, ME,
MN, MO, MT, NH,
NJ, NM, NV, NY, OH,
OR, RI, TN, TX, UT,
VT, WA, WI, WY

Goal Six: Developing State Policies to Ensure Robust Energy Efficiency Practices

- | | | | |
|----|---|--|--|
| 17 | State policies require routine review and updating of building codes. | CA, CO, CT, DC, FL, GA, IA, ID, KY, LA, MA, MD, MI, MT, NC, NJ, NM, OH, OK, OR, PA, RI, SC, UT, VA, VT, WA, WI | AL, AR, AZ, HI, IL, KS, ME, MO, MS, ND, NE, NH, SD, TN, TX, WY |
| 18 | Building codes effectively enforced. | <i>Not currently measured</i> | |
| 19 | State appliance standards in place. | AZ, CA, CO, CT, DC, DE, FL, GA, HI, IA, IL, MA, MD, ME, MI, MN, MO, MT, NC, NE, NJ, NM, NV, NY, OH, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI | 0 |
| 20 | Strong state and local government lead-by example programs in place. | CA, CT, FL, HI, LA, MN, NH, PA, UT, VA, VT | AL, AZ, CO, DC, DE, IA, IL, KY, MA, MD, ME, MI, MO, MT, NC, NJ, NM, NV, NY, OH, OR, RI, SC, TX, WA, WI |

Goal Seven: Aligning Customer Pricing and Incentives to Encourage Investment in Energy Efficiency

- | | | | |
|----|--|------------------------------------|--|
| 21 | Rates examined and modified considering impact on customer incentives to pursue energy efficiency. | AZ, CA, IA, ME, NY, OR, UT, WA, WI | CT, DC, DE, FL, ID, MD, NM, OK, VT, WY |
| 22 | Mechanisms in place to reduce consumer disincentives for energy efficiency (e.g., including financing mechanisms). | CA, CT, MA, MI, MN, NH | 0 |

Goal Eight: Establishing State of the Art Billing Systems

- | | | | |
|----|---|-------------------------------|--|
| 23 | Consistent information to customers on energy use, costs of energy use, and options for reducing costs. | <i>Not currently measured</i> | |
|----|---|-------------------------------|--|

Goal Nine: Implementing State of the Art Efficiency Information Sharing and Delivery Systems

- | | | | |
|----|---|------------------------------------|---|
| 24 | Investments in advanced metering, smart grid infrastructure, data analysis, and two-way communication to enhance energy efficiency. | <i>Not updated for 2008</i> | |
| 25 | Coordinated energy efficiency and demand response programs established by customer class to target energy efficiency for enhanced value to customers. | <i>Not currently measured</i> | |
| 26 | Residential programs established to use trained and certified professionals as part of energy efficiency program delivery. | MA, MD, ND, NJ, NV, NY, RI, VT, WI | 0 |

Goal Ten: Implementing Advanced Technologies

- | | | | |
|----|---|--|--|
| 27 | Policies in place to remove barriers to combined heat and power. | CA, CT, DC, GA, HI, IA, IN, KY, MA, NM, NV, NY, OR, WA, WI | AR, CO, FL, IL, KS, LA, MD, MI, MN, MO, MT, NC, NE, NH, NJ, OH, PA, SC, SD, TX, UT, VA, VT, WY |
| 28 | Timelines developed for the integration of advanced technologies. | <i>Not currently measured</i> | |



<http://www.epa.gov/cleanenergy/energy-programs/napee/resources/figure2-2.html>

Clean Energy

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Measuring Progress at the State Level - Advancing the Vision for 2025 Implementation Goals and Policy Steps.

Progress for Natural Gas Services

The information below summarizes the status of a state-level policy or program for natural gas services based on it being considered to be "complete" or "partial/some elements of policy in place." These two categories have been developed from more detailed information, based on the format used for the [Regional Implementation Meetings](#). If information was not readily available at the state level it is not included. If additional information on these policies is available based on a review of the current information on measuring progress, please send it to [Stacy Angel](mailto:angel.stacy@epa.gov) (angel.stacy@epa.gov) and it will be included as the information is updated in the future. Please note that the information below is as of the national baseline, December 2008. Activity in 2009 will be reflected in the next measuring progress update.

A more detailed explanation of the assessment for each of the implementation goals and the key policies or program steps in is provided in Appendix D of the [Full Vision for 2025 \(PDF\)](#) (112 pp., 696K, [About PDF](#)).

Resources

- Outreach Tools
- Guides and Papers
- Clean Energy Resources Database
- Energy Efficiency Benefits Calculator
- Energy Efficiency Workforce

Implementation Goal and Key Steps	States Having Adopted Policy Step as of December 2008	
	Completely	Partially
Goal One: Establishing Cost-Effective Energy Efficiency as a High-Priority Resource		
1 Process in place, such as a state and/or regional collaborative, to pursue energy efficiency as a high-priority resource.	AR, CA, CO, CT, IA, KS, MA, MN, MO, MT, NJ, OK, OR, WA	0
2 Policy established to recognize energy efficiency as high-priority resource.	CA, CO, DE, IA, KS, MA, MN, MT, NJ, NM, NY, OR, SC, UT, VT, WI	AR, CT, DC, FL, GA, MD, ME, MI, MO, NV, OH, SD, VA, WA, WY
3 Potential identified for cost-effective, achievable energy efficiency over the long term.	CA, DE, IA, IL, IN, KS, MI, MN, MO, NH, NJ, NM, NY, OH, OR, WA, WI	0
4 Energy efficiency savings goals or expected energy savings targets established consistent with cost-effective potential.	CA, IA, MI, MN, NH, NJ, OR, WA, WI	AR, CO, DE, MA, UT, VT
5 Energy efficiency savings goals and targets integrated into state energy resource plan, with provisions for regular updates.	0	CA, MT, NM, OH, OR, UT, VA, VT, WI
6 Energy efficiency savings goals and targets integrated into a regional energy resource plan.	Not currently measured	

- | | | | |
|----|--|--------------------|---|
| 21 | Rates examined and modified considering impact on customer incentives to pursue energy efficiency. | CA, IA, NY, UT, WA | 0 |
| 22 | Mechanisms in place to reduce consumer disincentives for energy efficiency (e.g., including financing mechanisms). | 0 | 0 |

Goal Eight: Establishing State of the Art Billing Systems

- | | | |
|----|---|-------------------------------|
| 23 | Consistent information to customers on energy use, costs of energy use, and options for reducing costs. | <i>Not currently measured</i> |
|----|---|-------------------------------|

Goal Nine: Implementing State of the Art Efficiency Information Sharing and Delivery Systems

- | | | | |
|----|--|------------------------------------|---|
| 26 | Residential programs established to use trained and certified professionals as part of energy efficiency program delivery. | MA, MD, ND, NJ, NV, NY, RI, VT, WI | 0 |
|----|--|------------------------------------|---|

Goal Ten: Implementing Advanced Technologies

- | | | |
|----|---|-------------------------------|
| 28 | Timelines developed for the integration of advanced technologies. | <i>Not currently measured</i> |
|----|---|-------------------------------|



The ENERGY STAR Partnership and Utility-Funded Energy Efficiency Programs

Maureen McNamara, U.S. EPA

April 8, 2010

 Learn more at energystar.gov



Focus on Energy Efficiency

- Now more than a decade of experience
 - Reliable, low-cost resource
 - Lower emissions
- Tremendous potential to meet new demand
- Helps address other system needs
 - Lowers peak demand
 - Can reduce transmission bottlenecks

 2



ENERGY STAR Overview

- Voluntary, public-private partnership
- Recognized, trusted symbol
- Program goals:
 - Reduce energy use
 - Reduce greenhouse gas emissions
- Vast network of partners
- 2009 energy savings:

 3

ENERGY STAR Portfolio



- Define and educate on energy/environmental performance through a single designation: ENERGY STAR
- Product Efficiency
- New/Existing Home Efficiency
- Commercial Building Efficiency
- Industrial Efficiency



EPA

7

ENERGY STAR Products



ENERGY STAR Products

- An opportunity to save energy with every purchasing decision
- More than 60 types of products
 - Lighting
 - Heating and cooling
 - Appliances
 - Office equipment
 - Home electronics
 - Battery charging systems
 - Commercial food service

EPA

8

ENERGY STAR Homes



ENERGY STAR Homes

- At least 15% more energy efficient than homes built to the 2004 IRC
- Include additional energy-saving features that typically make them 20-30% more efficient than standard homes

Typically Includes:

- ✓ Effective Insulation Systems
- ✓ High-performance Windows
- ✓ Tight Construction and Ducts
- ✓ Efficient Heating and Cooling System
- ✓ Appliances and Lighting
- ✓ Third-party Verified

EPA

9

Energy Performance Rating

Is 10 MPG high or low for an automobile?



**Fuel Efficiency
MPG**



Is 90 kBtu/SF/YR high or low for an office building?



**Energy Efficiency Rating
1 - 100**



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Industrial Sector

- ENERGY STAR partnership includes 17 industrial sectors (subsectors); 600 partners
- Enhances corporate energy management with full set of tools
- Cornerstone is energy performance measurement
- More than 50 plants have earned the ENERGY STAR



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ENERGY STAR Industrial Focuses

Focus	Years Active	Scope	Peer Exchange Network	Industrial Energy Guide	Energy Performance Indicator	
Cement Manufacturing	5	75% of U.S.-based clinker production	*	Published	Released 2 nd Version - Fall 2010	✓
Corn Refining	6	95% of U.S.-based refining capacity	*	Published	Released	✓
Food Processing • Cakes & Crackers • Juice • Potato Products • Tomato Products	4	80% of U.S.-based processed fruit, vegetable, and grain sales	*	Published	Draft Released Released Draft	✓
Glass Manufacturing • Fiberglass • Flat glass • Container glass	4	50 % of U.S. flat container and fiberglass sales	*	Published	Summer 2010 Released Released	✓
Motor Vehicle Manufacturing	7	95% of the industry with U.S.-based production	*	Published	2 nd Version Released	✓
Petrochemical Manufacturing	3	83% of U.S.-based production capacity	*	Published	Draft	

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Why Utilities/EEPS?



- Utilities/EEPS can help reduce common market barriers, e.g.,

Barrier	Role in reducing barrier
Higher first cost	Financial incentive
Lack of product/service availability	Upstream or stocking incentive
Consumer education	Customer direct outreach/local PR
Supply channel education	Supply channel training/local PR



19

Utility/EEPS role

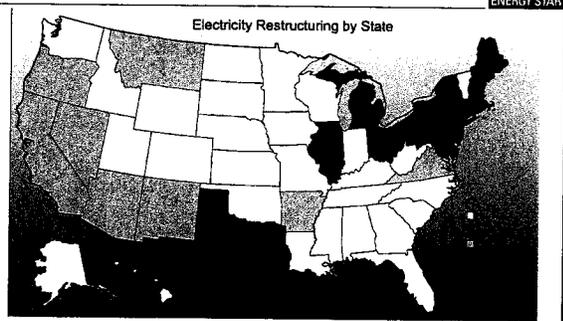


- Raise consumer awareness on the value of ENERGY STAR qualified buildings, products, homes, and services and promote related best practices
- Engage local partners in cooperatively promoting qualified products and services
- Meet state/local mandates for reducing KW, kWh, and air pollution



20

Then: Restructuring legislation major driver of \$



Source: EIA, http://www.eia.doe.gov/countries/electricity/restructuring/restructure_elect.html

21

Key EPA Actions Lay Foundation for Regulation of GHG Emissions Under the Clean Air Act

INTRODUCTION

During the week of March 29, 2010, the Environmental Protection Agency (EPA) concluded two groundbreaking proceedings that initiated the regulation of greenhouse gas (GHG) emissions under the Clean Air Act (CAA). One of these actions is a joint rulemaking with the National Highway Traffic Safety Administration (NHTSA) that sets GHG emission standards and Corporate Average Fuel Economy (CAFE) standards for passenger cars and light-duty trucks in model years 2012 through 2016. The first CAA regulation to mandate GHG emission controls also represents a significant shift in federal vehicle regulation, in that it creates a harmonized framework for federal GHG and fuel economy programs that supersedes California's own vehicle GHG standards.

The second action is a reconsideration of previous EPA guidance governing the starting date for regulation of GHG emissions from stationary sources (such as power plants and factories) under the Prevention of Significant Deterioration (PSD) and Title V programs. As a result of language in the CAA requiring limits under the PSD and Title V programs for all "regulated pollutants", EPA's regulation of vehicle GHG emissions triggers GHG regulation for stationary sources. EPA's new interpretation will require certain new and modified facilities to install "best available control technology" for GHG emissions and obtain operating permits once the vehicle GHG standards become enforceable on January 2, 2011.

NEW GHG AND FUEL ECONOMY STANDARDS FOR MOTOR VEHICLES

The vehicle GHG and fuel economy standards originate with two seminal legal developments. The first was the Supreme Court's 2007 decision in *Massachusetts v. EPA*, in which the Court ordered EPA to make a science-based finding as to whether GHG pollution from motor vehicles contributes to an endangerment of public health and welfare (or find that any such determination was impossible). EPA responded to the Court's mandate in December 2009, finding that mobile source GHG emissions contribute to climate change that endangers public health and welfare—a decision that, under Section 202 of the CAA, triggered an obligation for EPA to establish GHG emission standards for motor vehicles.

The second key development was California's protracted effort to implement its own vehicle GHG emission standards. The CAA generally prohibits states from establishing their own vehicle standards. However, Section 209 of the CAA allows California to apply for a waiver of this rule; Section 177 of the CAA allows other states to adopt California vehicle standards in lieu of federal standards. When EPA denied California's petition for a waiver for its GHG emission standards in March 2008, California quickly appealed the decision. These actions raised the possibility that automakers could be subject to three overlapping and potentially inconsistent regulatory programs—the California GHG standards, federal GHG standards resulting from the *Massachusetts* decision, and federal CAFE standards. To avoid this outcome, the Obama Administration, the state of California, and major

automakers negotiated a landmark agreement in May 2009, calling for a national framework that would harmonize these three major regulatory programs and resolve pending and future litigation over vehicle emission standards.

The joint EPA/NHTSA standards released last week fulfill that agreement, reflecting an unprecedented degree of coordination between EPA's Section 202 vehicle GHG standards and NHTSA's CAFE standards.¹ Under the new regulation, both agencies have adopted separate "attribute curves" for passenger cars and light trucks in model years 2012 through 2016, establishing a unique GHG emissions standard—and a corresponding fuel economy standard—for each vehicle with a particular "footprint" (a measure of vehicle size). Manufacturers can comply simultaneously with both the Section 202 and CAFE standards by ensuring that their production fleets meet or exceed the sales-weighted average of standards derived from these attribute curves.

The joint standards also allow manufacturers to comply through a variety of flexible mechanisms. Manufacturers that exceed the GHG or fuel economy standards will be awarded credits that can be: (1) "carried back" to offset compliance shortfalls in up to three prior model years; (2) "banked" to ensure compliance in future model years; (3) transferred between the passenger car and light truck fleets of a single manufacturer (subject to some limits under the CAFE program); or (4) sold to other manufacturers. Credits can also be earned towards the GHG standards (but not the CAFE standards) by improving air conditioner efficiency and reducing refrigerant leakage. Consistent with the existing CAFE program, manufacturers can earn additional credits toward one or both programs by selling alternative fuel vehicles or electric drive vehicles; such credits for flex-fuel vehicles will be revisited for model year 2016.

Under the agencies' vehicle sales forecasts, the standards will cause the national vehicle fleet to achieve an average fuel economy of 34.1 miles per gallon in model year 2016, and average GHG emissions of 250 grams CO₂-equivalent per mile. Over the lifetime of these vehicles, EPA expects the standards to save 77.7 billion gallons of gasoline and avert 962 million metric tons CO₂-equivalent emissions, at an average cost of approximately \$950 per vehicle by model year 2016 (which the agency expects will be exceeded by total fuel cost savings of approximately \$4,000 per vehicle in model year 2016).

RECONSIDERATION OF THE "JOHNSON MEMORANDUM"

Because of the structure of the CAA, EPA's promulgation of GHG standards for motor vehicles triggers regulatory consequences for stationary sources under the PSD and Title V programs—consequences that EPA sought to address through its second major action last week, which determined the timing of GHG regulation under PSD and Title V. Under the CAA and EPA's PSD regulations, new or modified stationary sources with the potential to emit 100 or 250 tons per year of any pollutant "subject to regulation" under the CAA must obtain preconstruction permits and install "best available control technology." Title V requires stationary sources to obtain operating permits if they emit at least 100 tons per year of any pollutant "subject to regulation."

¹ The state of California is currently implementing its obligations under the agreement by amending its GHG standards to recognize compliance with the new federal standards as a compliance option for the California standards.



Until last week, EPA's interpretation of the phrase "subject to regulation" would have caused PSD and Title V requirements to apply to GHGs as soon as the new motor vehicle GHG standards were promulgated. That interpretation originated with challenges to PSD permits brought by environmental organizations in 2007 and 2008, which advanced the theory that EPA regulations requiring monitoring of CO₂ emissions from major stationary sources made CO₂ "subject to regulation" for purposes of PSD. Consequently, then-EPA Administrator Stephen Johnson signed a memorandum in December 2008 (known as the "Johnson Memorandum") concluding that GHGs only would become "subject to regulation" once EPA promulgated regulations requiring "actual control" of these pollutants. Under the Johnson Memorandum, the motor vehicle GHG standards promulgated by EPA last week would have satisfied this "actual control" criterion and triggered immediate regulation of GHGs under both PSD and Title V.

Instead, EPA's reconsideration of the Johnson Memorandum defers the applicability of these programs to GHGs. The document reaffirms the basic reasoning and conclusions of the Johnson Memorandum, after considering various alternative interpretations of the phrase "subject to regulation." However, EPA departs significantly from the Johnson Memorandum in determining that "actual control" of GHG emissions takes place when actual compliance with the vehicle GHG standards is first required, not when the standards are promulgated. Because vehicles that comply with EPA standards for model year 2012 cannot be introduced into commerce until January 2, 2011, the reconsideration defers PSD and Title V regulation of GHG emissions until that date. This interpretation will afford EPA additional time to produce guidance on the implementation of these programs and allow state permitting authorities to prepare for the additional responsibilities of regulating GHG emissions.

The reconsideration also determined that non-GHG PSD and Title V permit applications that are pending when GHGs become "subject to regulation" would not be permitted to omit requirements applicable to GHG emissions; that is, there will be no grandfathering of permit applications that are already under consideration once GHG limits are required under PSD and Title V programs. This issue was not discussed in the proposed reconsideration, but was raised by stakeholders during the public comment phase.

EVALUATION AND ANTICIPATED FUTURE ACTIONS

Together, these interlocking decisions represent significant milestones in EPA's ongoing effort to use the CAA to regulate GHG emissions—a process set in motion in 1999 when environmental organizations (later joined by the state of Massachusetts and other parties) first petitioned EPA to regulate vehicle GHG emissions. Barring intervention by Congress, EPA's reconsideration of the Johnson Memorandum removes any doubt that CAA regulation of GHG emissions from stationary sources will take place early next year. Because there will be no grandfathering of PSD or Title V permit applications, sources that do not anticipate completing the permitting process by January 2, 2011 will need to be prepared to revise or resubmit their permit applications to include "best available control technology" (and meet other applicable requirements) for GHGs.

EPA's next major action in this area is expected to be a "Tailoring Rule" (proposed in September 2009) that will establish a timetable for phasing in PSD and Title V regulation of GHG emissions in 2011. On February 22, 2010, EPA Administrator Lisa Jackson wrote a letter to Sen. Jay Rockefeller (D-WV) in which she said she expected that the Tailoring Rule would limit the initial coverage of the PSD and Title V programs to facilities

with emissions “substantially higher” than 25,000 tons CO₂-equivalent per year. In addition, she said that the final rule likely would provide that, for the first half of 2011, only facilities that already must apply for PSD and Title V permits as a result of their non-GHG emissions would need to address their GHG emissions in their permit applications. Separate from the Tailoring Rule, EPA is also expected to release administrative guidance over the coming year that will aid state permitting authorities in applying PSD requirements to GHG emissions, particularly the requirement that sources apply “best available control technology.”

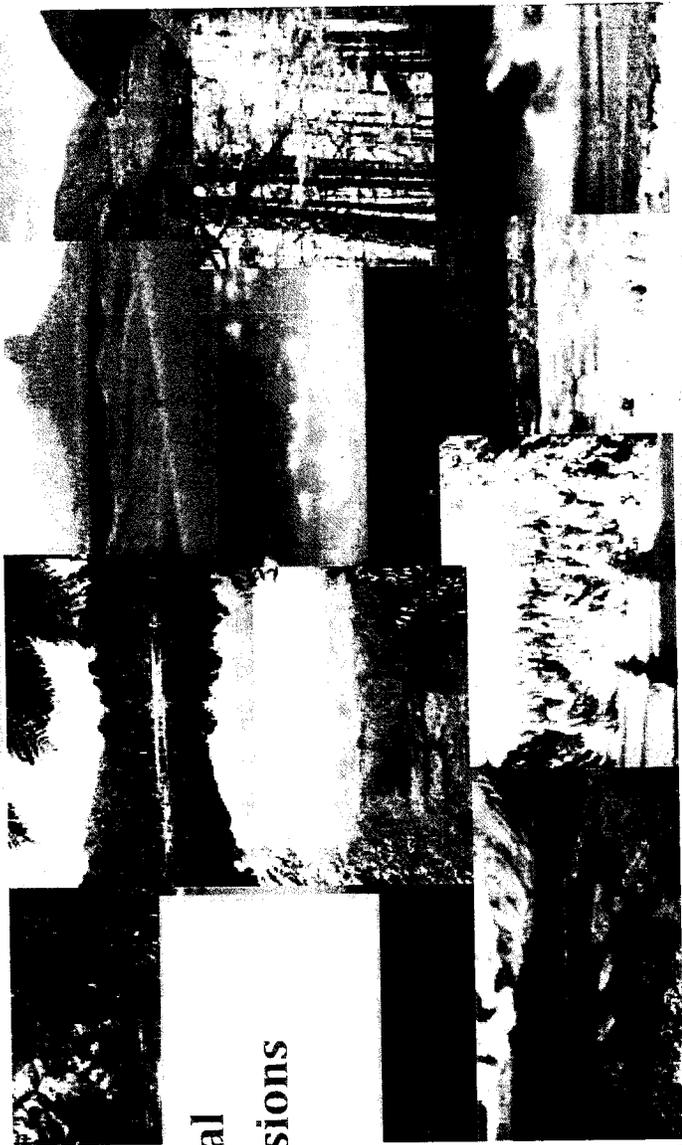
Potential developments in Congress could also have an important impact on PSD, Title V, and other CAA requirements for GHG emissions from stationary sources. For example, Sen. Lisa Murkowski (R-AK) has introduced a Congressional resolution that would disapprove EPA’s December 2009 “endangerment finding” for GHGs. Were such a resolution to pass, it would effectively remove EPA’s authority to regulate GHGs and would scuttle the agreement with California and the automakers. Also, Sen. Rockefeller has said he may introduce a bill suspending any exercise of EPA’s authority to regulate stationary source GHG emissions for two years; the Rockefeller bill includes an explicit exclusion for motor vehicle regulation.

Lastly, EPA’s vehicle GHG standards may be challenged by some of the same parties who have filed petitions for review of EPA’s “endangerment finding.” If successful, such challenges would also eliminate EPA’s authority to regulate GHGs and vitiate the Administration’s agreement with California and the automakers.

FOR ADDITIONAL INFORMATION

Van Ness Feldman closely monitors congressional and executive branch developments on climate change and energy policy, and is in a strong position to provide expert analysis and advice on emerging legislation and regulatory activity, the surrounding policy and political debate, and the implications for your organization. If you would like more information about these latest EPA actions or other matters relating to EPA regulation of GHG emissions, please contact Richard Penna, Kyle Danish, Stephen Fotis, or any member of the firm’s Climate Change practice at (202) 298-1800. Those interested in on-going coverage of climate change policy developments may wish to subscribe to the weekly Climate Change Policy Update at <http://www.vnf.com/news-signup.html>.

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**State and Provincial
Greenhouse Gas Emissions**
April 2010

Website:
EPA climate change
.gov

Pacific NorthWest
Economic Region



Montana



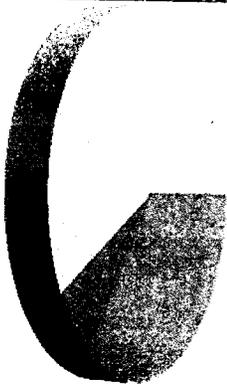
■ Transportation
■ Electricity
■ Other

Idaho



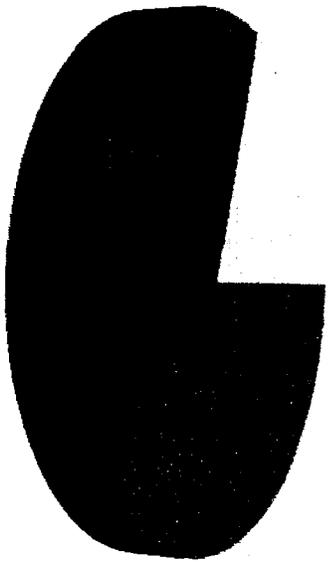
■ Transportation
■ Electricity
■ Other

Alaska



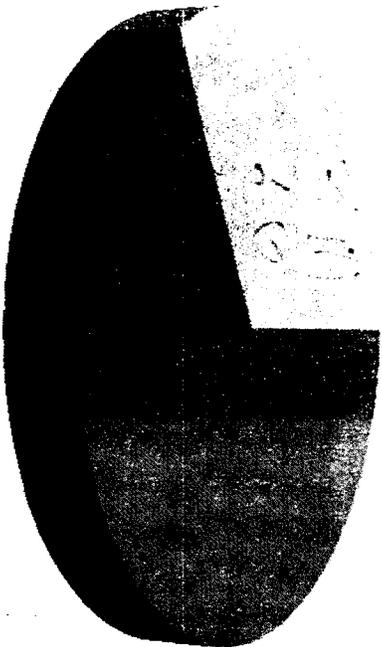
■ Transportation
■ Electricity
■ Other

Oregon



■ Transportation
■ Electricity
■ Other

Washington



■ Transportation
■ Electricity
■ Other

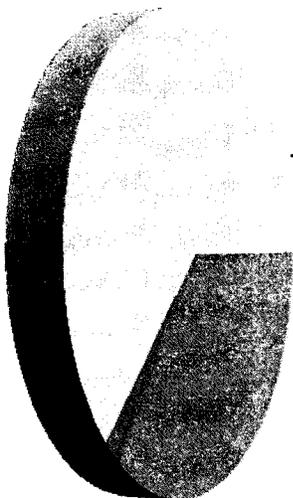
Greenhouse Gas Emissions by Sector

Saskatchewan



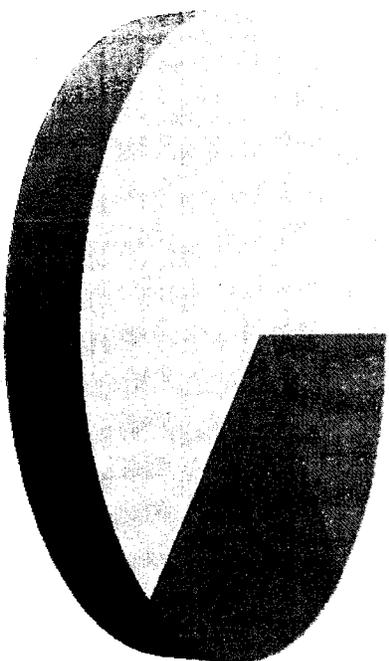
■ Transportation
■ Electricity
■ Other

British Columbia



■ Transportation
■ Electricity
■ Other

Alberta

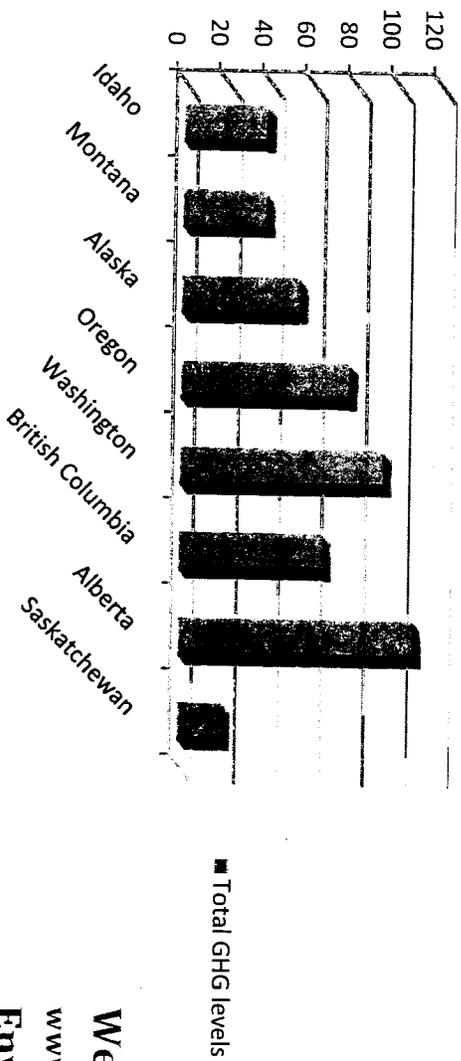


■ Transportation
■ Electricity
■ Other

Other:

Residential
Commercial
Fossil Fuel Industry
Industrial Processes
Waste Management
Agriculture

State and Provincial Annual Emissions Million Metric Tons of Carbon Dioxide Equivalent (MMtCO_e)



Western Climate Initiative
www.westernclimateinitiative.org
Environment Canada

www.ec.gc.ca/pdb/ghg/ghg_home_e.cfm

PNWER

2200 Alaskan Way, Suite 460
Seattle, Washington
Phone: (206) 443-7723
www.pnwer.org

*Pacific NorthWest
Economic Region*

Designation of North American Emission Control Area to Reduce Emissions from Ships

The International Maritime Organization has officially designated waters off North American coasts as an area in which stringent international emission standards will apply for ships. These standards will dramatically reduce air pollution from ships and deliver substantial air quality and public health benefits that extend hundreds of miles inland. This fact sheet contains an overview of this new geographic emissions control program.

Overview

On March 26, 2010, the International Maritime Organization (IMO) amended the International Convention for the Prevention of Pollution from Ships (MARPOL) designating specific portions of U.S., Canadian and French waters as an Emission Control Area (ECA). The proposal for ECA designation was introduced by the U.S. and Canada, reflecting common interests, shared geography and interrelated economies. In July 2009, France joined as a co-proposer on behalf of its island territories of Saint-Pierre and Miquelon, which form an archipelago off the coast of Newfoundland. Allowing for the lead time associated with the IMO process, the North American ECA will become enforceable in August 2012.

Ships are significant contributors to the U.S. and Canadian mobile-source emission inventories, though most are flagged or registered elsewhere. Ships complying with ECA standards will reduce their emissions of nitrogen oxides (NO_x), sulfur oxides (SO_x), and fine particulate matter (PM_{2.5}). In 2020, emissions from these ships operating in the ECA are expected to be reduced annually by 320,000 tons for NO_x, 90,000 tons for PM_{2.5}, and 920,000 tons for SO_x, which is 23 percent, 74 percent, and 86 percent, respectively, below predicted levels in 2020 absent the ECA. The overall cost of the North American ECA is estimated at \$3.2 billion in 2020, while



its benefits are expected to include preventing as many as 14,000 premature deaths and relieving respiratory symptoms for nearly five million people each year in the U.S. and Canada. The monetized health-related benefits are estimated to be as much as \$110 billion in the U.S. in 2020.

The area of the North American ECA includes waters adjacent to the Pacific coast, the Atlantic/Gulf coast and the eight main Hawaiian Islands.¹ It extends up to 200 nautical miles from coasts of the United States, Canada and the French territories, except that it does not extend into marine areas subject to the sovereignty or jurisdiction of other States.

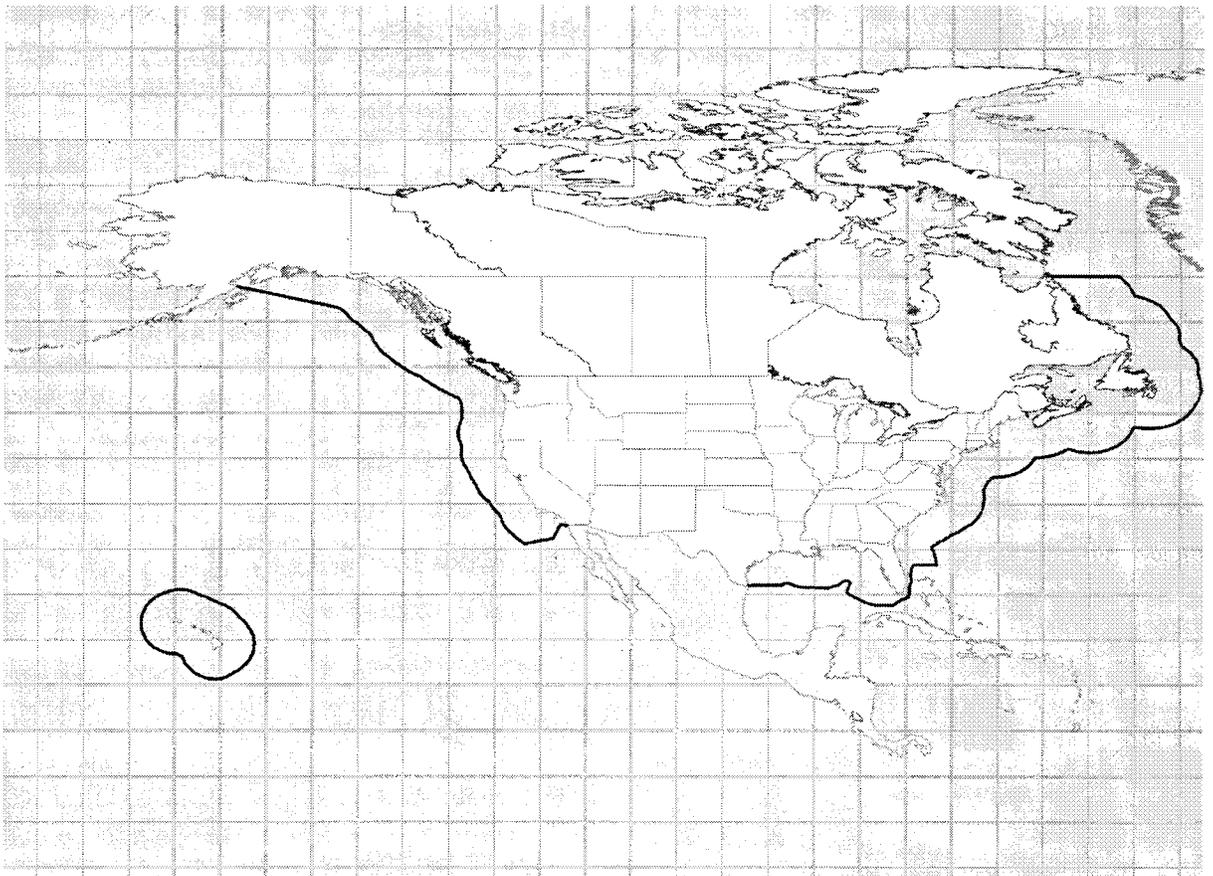


Figure 1: Area of the North American ECA

EPA is continuing to investigate whether other areas of the United States and its territories may benefit from ECA designation. We are currently performing analyses to examine whether ECA designation would be appropriate for the U.S. territories of Puerto Rico and the U.S. Virgin Islands. Some other areas for future consideration include the Pacific U.S. territories, smaller

¹ As used here, the main Hawaiian Islands include the islands of Hawaii, Maui, Oahu, Molokai, Niihau, Kauai, Lanai, and Kahoolawe. These islands are the main populated islands of the Hawaiian Islands chain, with the exception of Kahoolawe, which is an uninhabited nature reserve.

Hawaiian Islands, and Western Alaska. If further information supports the need for an ECA designation in any of these areas, a separate proposal would be submitted to the IMO, following the criteria contained in the international treaty known as MARPOL Annex VI.

The Need to Reduce Emissions from Ships

The diesel engines that power ships are significant mobile source emitters. The largest ship propulsion engines being produced today must meet relatively modest emission requirements.² In addition, both the main propulsion and the smaller auxiliary engines installed on these ships operate on fuel that can have extremely high sulfur content. As a result, these ships generate significant emissions of fine particulate matter (PM_{2.5}), NO_x, and SO_x that contribute to nonattainment of the National Ambient Air Quality Standards for PM_{2.5} and ozone. Emissions from these engines also cause harm to public welfare, contributing to visibility impairment and other detrimental environmental impacts across the United States.

Many of our nation's most serious ozone and PM_{2.5} nonattainment areas are affected by emissions from ships. Currently more than 30 major U.S. ports along our Atlantic, Gulf of Mexico, and Pacific coasts are located in nonattainment areas for ozone and/or PM_{2.5}.³

EPA has been advancing a coordinated strategy for many years to control air pollution from large ships. In addition to our Clean Air Act program⁴, designation of U.S. waters as an ECA is a key component of EPA's strategy. Also, the ECA and other requirements of Annex VI are implemented in the United States through regulations adopted under the Act to Prevent Pollution from Ships (APPS). Finally, EPA's Clean Ports USA Program, as part of our broader National Clean Diesel Campaign, fosters innovation to achieve additional emission reductions from existing diesel engines and nonroad equipment at ports.

Air pollution from ships is expected to grow over the next two decades. Without EPA's coordinated strategy, by 2030, NO_x emissions from ships would be projected to more than double, growing to 2.1 million tons a year while annual PM_{2.5} emissions would be expected to almost triple to 170,000 tons. The North American ECA ensures that emissions from ships that operate in our waters and ports will be reduced significantly, delivering substantial benefits to large segments of our population, as well as to marine and terrestrial ecosystems.

Emission Control Area Standards

In October 2008, the member states of IMO agreed to amend MARPOL Annex VI, adopting new tiers of NO_x and fuel sulfur controls. The most stringent of these new emission standards

² The modest Tier I engine NO_x standards continue through 2010, the marginally lower Tier II standards apply from 2011 through 2015.

³ U.S. Army Corps of Engineers, Principal Port Rankings for 2008.

⁴ EPA's CAA program includes regulations at 40 CFR parts 94, 1042, 1043, and 1065. See www.epa.gov/otaq/oceanvessels.htm#regs.

apply to ships operating in designated ECAs, including the newly-designated North American ECA. The table below summarizes the Annex VI standards that apply globally and within ECAs.

Table 1: International Ship Engine and Fuel Standards (MARPOL Annex VI)

	Year	Fuel Sulfur	NO _x
Emission Control Area	Today to July 2010	15,000 ppm	
	2010	10,000 ppm	
	2015	1,000 ppm	
	2016		Tier III (Aftertreatment-forcing)
Global	Today to January 2011		Tier I (Engine-based controls)
	2011		Tier II (Engine-based controls)
	Today to January 2012	45,000 ppm	
	2012	35,000 ppm	
	2020 ^a	5,000 ppm	

Note:

^a Subject to a fuel availability study in 2018, may be extended to 2025.

The 2015 fuel sulfur standard of 0.1 percent fuel sulfur (1,000 ppm) is expected to reduce PM and SO_x emissions by more than 85 percent from today's levels. This most stringent ECA fuel standard is expected to be met through fuel switching. In most cases, ships already have the capability to store two or more fuels. However, to meet the 1,000 ppm fuel sulfur requirement, some vessels may need to be modified for additional distillate fuel storage capacity. As an alternative to using lower sulfur fuel, ship operators may choose to equip their vessels with exhaust gas cleaning devices ("scrubbers"). In this case, the scrubber extracts sulfur from the exhaust.

The current Tier I NO_x standards range from 9.8 to 17 g/kW-h, depending on engine speed. The Tier II standards represent a 20 percent NO_x reduction below Tier I, and the Tier III standards represent an 80 percent NO_x reduction below Tier I. We expect ships to meet the Tier III standard through the use of high-efficiency aftertreatment technology.

Costs

The costs of implementing and complying with the ECA are expected to be small in comparison to the health and welfare benefits and on par with the costs of achieving similar emissions reductions through additional controls on land-based sources. We estimate the total costs of improving the emissions of ships operating in the ECA from current performance to ECA standards will be approximately \$3.2 billion in 2020. The cost to reduce a ton of NO_x, SO_x and PM is estimated at \$2,400, \$1,100 and \$10,000, respectively, which makes this program a very cost-effective method to improve air quality in the U.S. and Canada.

The economic impacts of complying with the program on ships engaged in international trade are expected to be modest. For example, operating costs for a ship in a route that includes about 1,700 nautical miles of operation in the ECA may increase by about 3 percent. This operating cost increase would raise the cost of transport of a 20 foot container by about \$18.

Benefits

The U.S. coastline and much of the interior of the country will experience significant improvements in air quality due to reduced PM and ozone from ships complying with ECA standards. Coastal areas will experience the largest improvements; however, significant improvements will extend hundreds of miles inland to reach nonattainment areas in states such as Nevada, Tennessee and Pennsylvania. National treasures such as the Grand Canyon National Park and the Great Smoky Mountains will also see air quality improvements.

The North American ECA is expected to yield significant health and welfare benefits. ECA standards will begin to reduce ship-related adverse health impacts for the U.S. and Canada in 2012. EPA estimates that the annual benefits in 2020 will include preventing between 5,500 and 14,000 premature deaths, 3,800 emergency room visits, and 4,900,000 cases of acute respiratory symptoms in 2020. These benefits will increase beyond 2020, as normal fleet turnover occurs and more vessels complying with the 2016 NOx standards set sail.

The monetized health benefits in 2020 in the U.S. are projected to range from \$47 to \$110 billion in 2006 U.S. dollars, assuming a 3 percent discount rate.

For More Information

You can access the ECA standards, the proposal to the IMO and related documents on EPA's Office of Transportation and Air Quality web site at: www.epa.gov/otaq/oceanvessels.htm

For additional information, please contact the Assessment and Standards Division at

asinfo@epa.gov, 734-214-4636, or:
Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency
2000 Traverwood Dr.
Ann Arbor, MI 48105

What is the Chicago Climate Exchange?

Chicago Climate Exchange (CCX[®]) administers the world's first and North America's only active voluntary, legally binding integrated trading system to reduce emissions of all six greenhouse gases, with offset projects worldwide



CCX: A Global Exchange Family

Chicago Climate Exchange™ (CCX)

- Launched 2003 with 14 members, now 450+ members

Chicago Climate Futures Exchange™ (CCFE)

- CFTC-regulated futures exchange for U.S. SO₂ and NO_x allowances, RGGI allowances
- Launched by CCX in December 2004, world's first and leading environmental derivatives exchange

European Climate Exchange™ (ECX)

- FSA-regulated futures market for European CO₂ Allowances
- Launched by CCX April, 2005 – 80-90% of EU exchange traded volume

Montreal Climate Exchange™ (MCeX)

- Joint venture with Montreal Bourse
- Launched May 30, 2008

Tianjin Climate Exchange™ (TCX)

- Joint venture with China National Petroleum Corp. and City of Tianjin
- Launched September 25, 2008

India Climate Exchange™

- (In development)



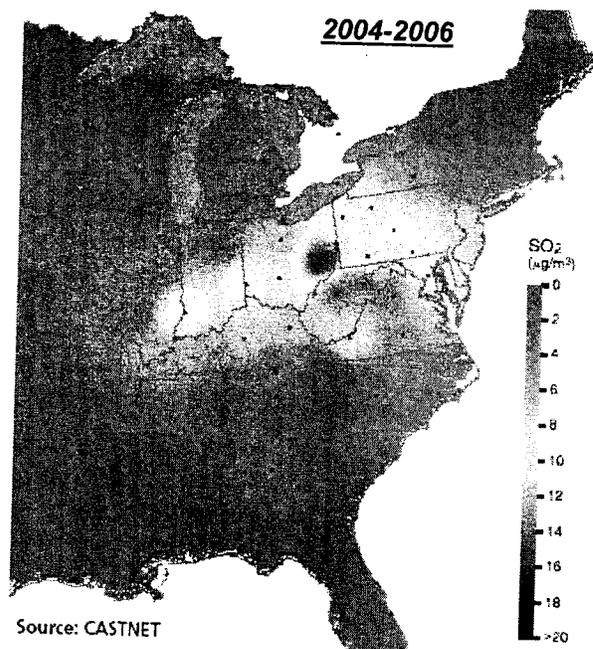
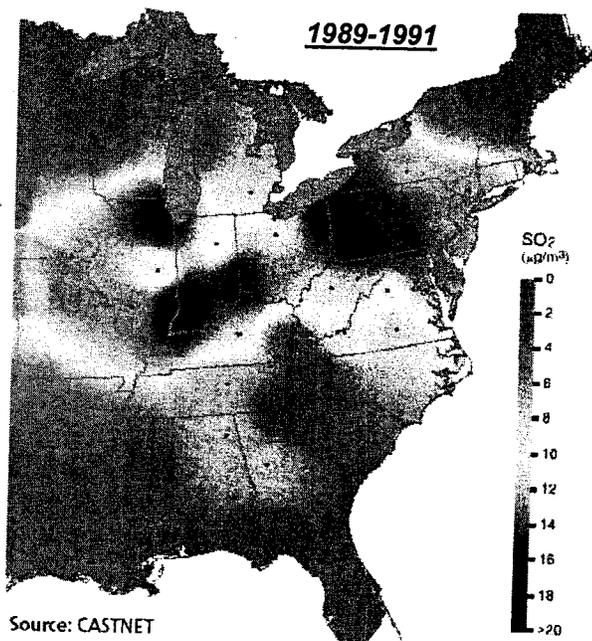
Why Emissions Trading?

- Proven, least-cost, and comprehensive tool for managing emissions
- Rewards environmental innovation and strategic planning
- Helps advance coherent management practices and technological innovation
- Attaches a value to a scarce resource
- Reveals hidden assets and hidden costs throughout operations
- Multiple successes: US SO₂, lead phase-out (gasoline), NO_x, EU ETS
- Offers the maximum environmental return on investment



Impact of Trading on SO₂ Pollution

Annual Mean Ambient SO₂ Concentration

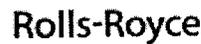
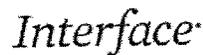
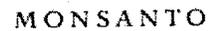
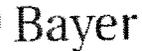


Based on EPA's latest air quality trends data the national composite average of SO₂ annual mean ambient concentrations decreased 48 percent between 1990 and 2005.



CCX Members are Sector Leaders

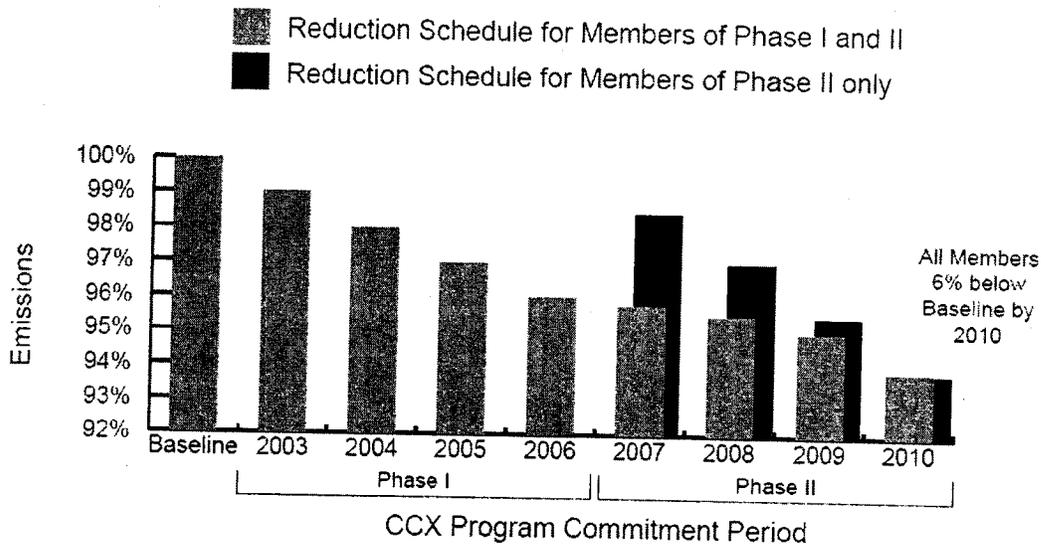
A Selection of Members



CCX Legally Binding Reduction Schedule For Direct-Emitting Members (2003-2010)

Phase I: Members made legally binding commitments to reduce or trade 1% per year from 2003-2006, for a total of 4% below Baseline.

Phase II: Members make a legally binding commitment to reduce to 6% below baseline by 2010.
Baseline = Avg. emissions from years 1998-2001 (Phase I), emissions from year 2000 (Phase II)



CCX is synergistic with and complementary to all emerging policy, precludes none – Whether state, regional, national, voluntary or mandatory.

Why Members Join

- ✓ To create shareholder value
- ✓ To manage ^a risk
- ✓ To demonstrate corporate and environmental transparency
- ✓ To obtain first-mover advantage in emissions trading
- ✓ To get ahead of policy

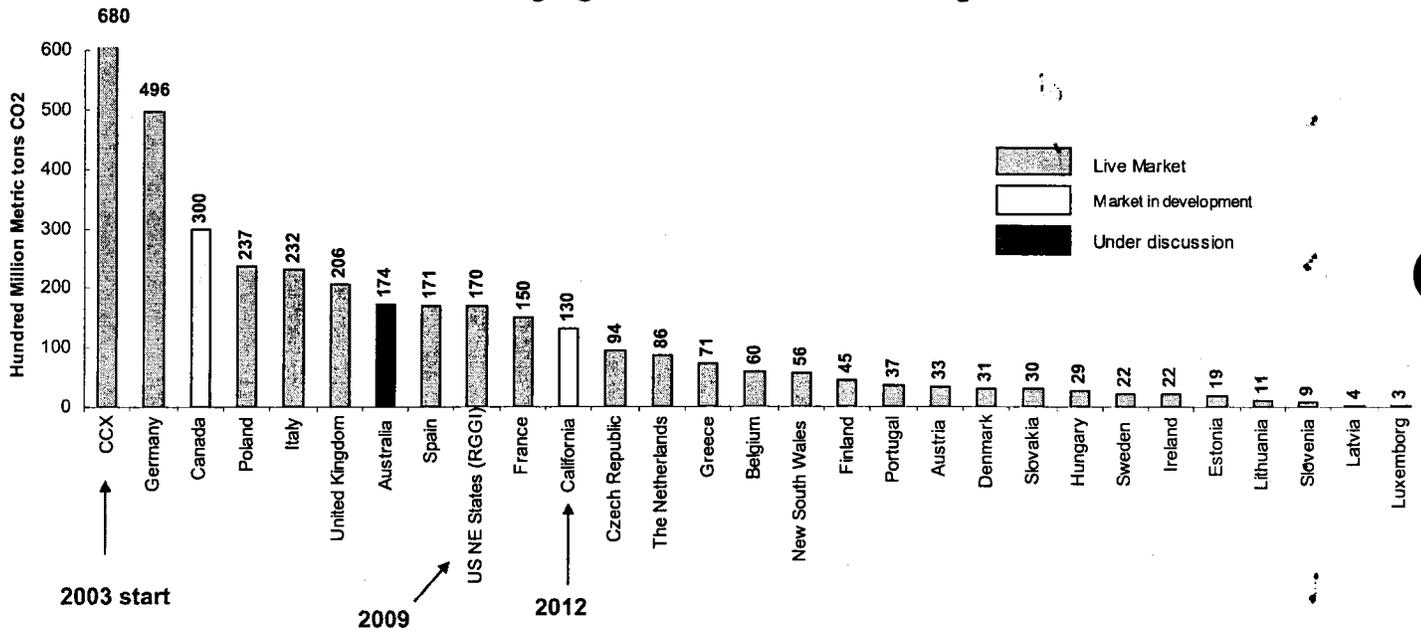
CCX



*If you don't have a seat
@ the table, you're on the
menu!*

CCX Baseline Emissions Greater than Largest EU National Allocation Plan

Size of Live, Emerging, Possible GHG Trading Markets



Emissions Quantification & Verification

- Prescribed emission quantification methods
- Annual true-up
- Independent standardized verification
 - conducted by FINRA



Comprehensive Market Structure

Member's Electronic Market Registry

Chicago Climate Exchange
 Chicago Climate Exchange Position Statement
 Organization: CCX View Only Company
 as of: Sun Feb 15 2004

Direct Emission Reduction: 0 metric tons CO2 equivalent (rounded)

1. Total Holdings of CCX Carbon Financial Instruments
 (Exchange Allowances plus Offsets plus Early Action Credits, in hundred metric tons CO2)

Instrument	2003	2004	2005	2006
CCX Allowances	0	0	0	0

2. Exchange Allowance Holdings

Instrument	2003	2004	2005	2006
CCX Allowances	0	0	0	0
1% market pool withholding	0	0	0	0
Amount in sept 2003 auction	0	0	0	0
Market Holdings	0	0	0	0

3. Exchange Offset Holdings

Instrument	2003	2004	2005	2006
Exchange Offset Holdings	0	0	0	0

4. Exchange Early Action Credit Holdings

Instrument	2003	2004	2005	2006
Exchange Early Action Credit Holdings	0	0	0	0

All Carbon Financial Instruments quantities are rounded to the nearest hundred metric tons CO2

Comprehensive Rules System

- Emitters: Standard baseline, multi-year allowance stream equal to reduction targets
- Offset Providers (project credits)
- Liquidity Providers
- Associate Members

Web-accessible secure
 Electronic Trading
 Platform

Strip	Bid	Ask	Buy	High	Low	Last	Volume	Pin
CCX030201	10.00	10.00	0	10.00	10.00	10.00	0	
CCX030202	10.00	10.00	0	10.00	10.00	10.00	0	



CCX Emission Offset Projects

Verified Offset projects sequester or eliminate GHGs to earn Carbon Financial Instruments (CFI)

Current pre-defined offset types:

- Agricultural Methane
- Landfill Methane
- Coal Mine Methane
- Agricultural Soil Carbon
- Rangeland Soil Carbon
- Forestry
- Renewable Energy
- Ozone Destruction
- Others in development
- *All projects must be independently verified by an approved entity*



Minnesota dairy farmer receives first check from sales of CCX Offsets for methane destruction (Approx. \$10k for 1 year)

CCX Offset Rules can be found at: <http://www.chicagoclimateexchange.com/docs/offsets>



Rural Economic Opportunity: Near-term potential for U.S. Land-based GHG Mitigation

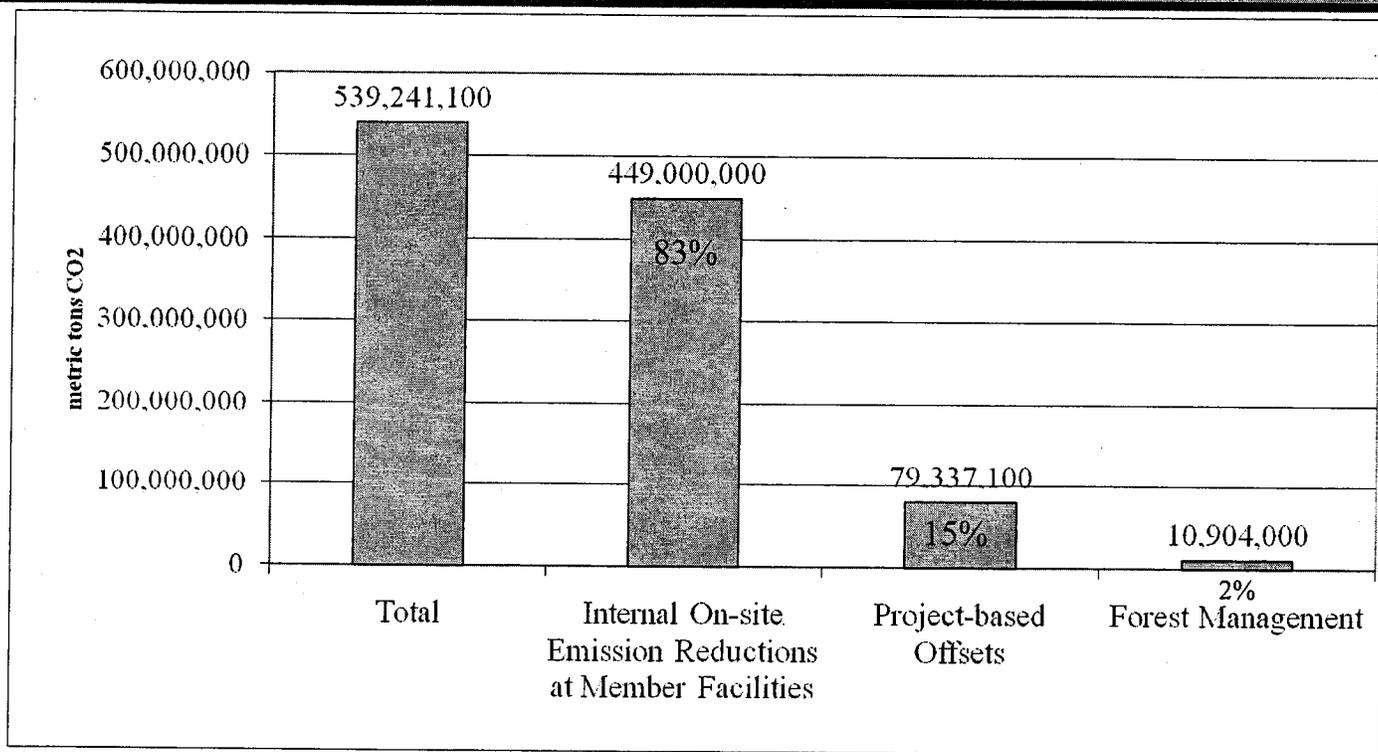
Action	Plausible Near-term Scale (mtCO ₂ /yr)	Annual Value at \$30/mtCO ₂
Soils BMP (CT, grazing land)	100 million	\$3 billion
Forestation, forest management	250 million	\$7.5 billion

Further opportunities arise from methane capture, fertilizer management, crop-based fuels, wind/solar etc.

Source: Greenhouse Gas Mitigation Potential in U.S. Forestry and Agriculture
United States Environmental Protection Agency, November 2005



GHG Mitigation By CCX Members 2003 - 2008* (metric tons CO₂)



*As of 1-26-10



How CCX Members have Reduced GHG Emissions

- Power sector:** power plant retrofits, expanded use of natural gas, hydro, nuclear, demand management programs
- Commercial/Industrial:** automated controls, improved lighting and motors, LEED buildings, reduced use of fluorocarbon gases in semiconductor plants, abatement of nitrous oxide at chemical plants
- Renewable energy:** recovered methane, wind power, biomass fuels
- Carbon sequestration:** reforestation, forest management, agricultural best management practices
- High-potency GHGs:** thermal destruction of GHGs that also deplete the ozone layer



Legislative Energy Horizon

Canadian Policy Overview on Climate Change

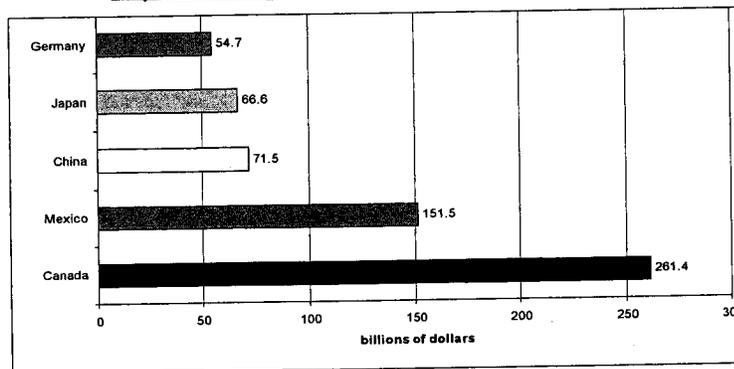
Thursday, April 8, 2010

Marc LePage
Special Advisor, Climate Change and Energy

Canada

Canada/US trade
We are each others largest trading partners...

Top 5 Trading Partners (U.S exports 2008)

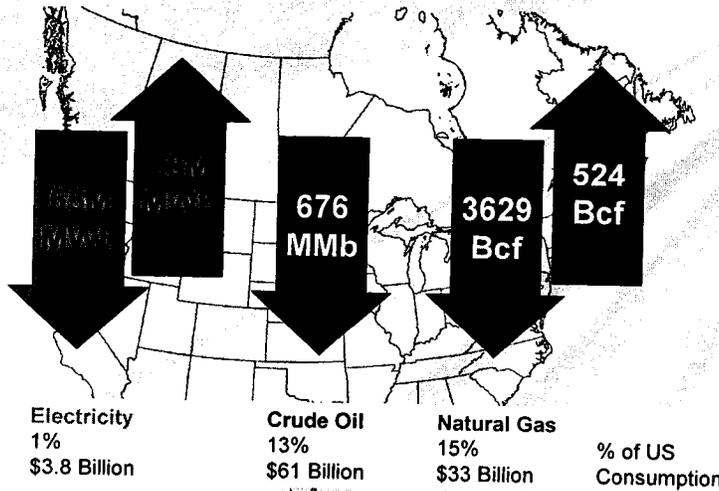


- Electricity, oil, gas, and increasingly solar panels, wind turbines...
- Integrated economies need harmonized regulations and open borders...

Canada

Canada US Energy Trade (2008)

Canada's energy exports to the US = \$122 billion
Canadian exports satisfied 9% of total US demand
Cross-border direct investment in energy – \$90 billion



Providing
Energy
Security

Canada

Addressing Climate Change

- Reduce GHG emissions by 17% below 2005 levels by 2020
 - 90% of electricity from non-emitting sources
- Aligned with U.S. objectives
- Achieving these objectives will be a challenge
- Important we work together to ensure our energy security and economies are not compromised

Ensuring
Environmental
Stewardship

Canada

Addressing climate change

Canada's GHG policies:

Aggressive action to achieve our objectives

• We have invested in:

- Renewables: Fastest growing energy sector at \$1.5 billion
- Energy efficiency: Residential, buildings, transportation, integrated communities
- Technology: Over \$3 billion committed by governments towards CCS demonstration projects

• We have regulated:

- Fuel consumption, renewable fuels standards, efficiency performance standards

Ensuring
Environmental
Stewardship

Canada

5

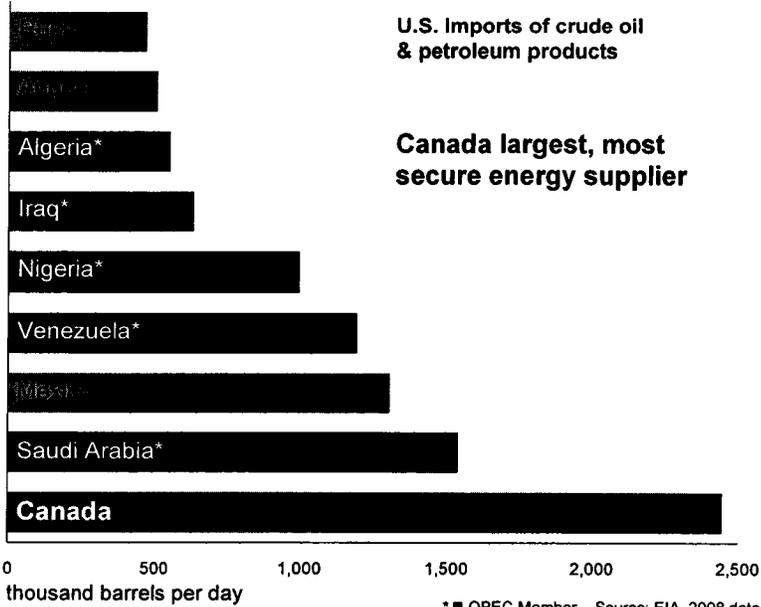
The Canada-US Clean Energy Dialogue

Working together to improve energy
performance

- 1- Smart Grid
- 2- Carbon sequestration and capture (CCS)
- 3- Collaborative R and D (cars, materials)

Canada

Canada key to energy security



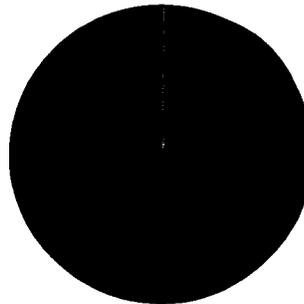
Providing
Energy
Security

Canada

Canada key to energy security

Global energy demands

- 82% of the world's known oil reserves are state controlled or managed by national oil companies
- Only 18% is openly accessible to the market
- Two thirds of that accessible oil is in Canada's Oil Sands



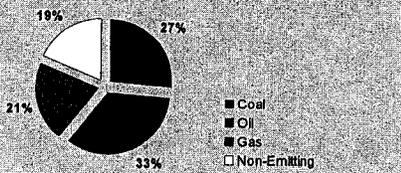
Providing
Energy
Security

Canada

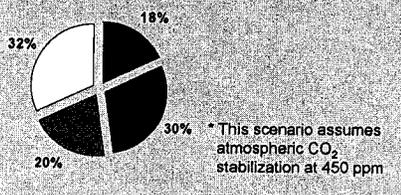
Canada key to energy security

Oil Sands essential in transition to lower carbon economy

World Energy Outlook
Primary Energy Demand 2007



Primary Energy Demand 2030*



- Canada investing in renewable and cleaner fossil fuels; committed to energy efficiency
- Transition to lower carbon economy is long-term; oil a dominant fuel for decades
- Canada's oil sands part of a global shift to heavier crudes



Providing Energy Security

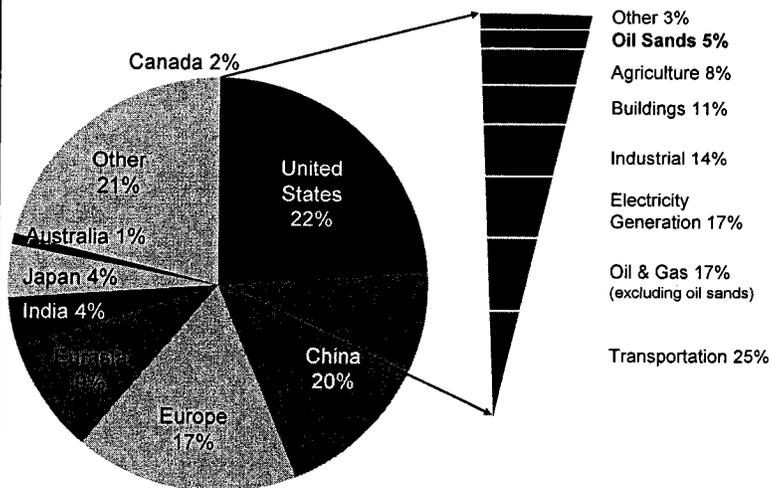
Canada

Oil sands: The facts in perspective

Greenhouse Gas Emissions

GHG by country

Canada's GHG by sector

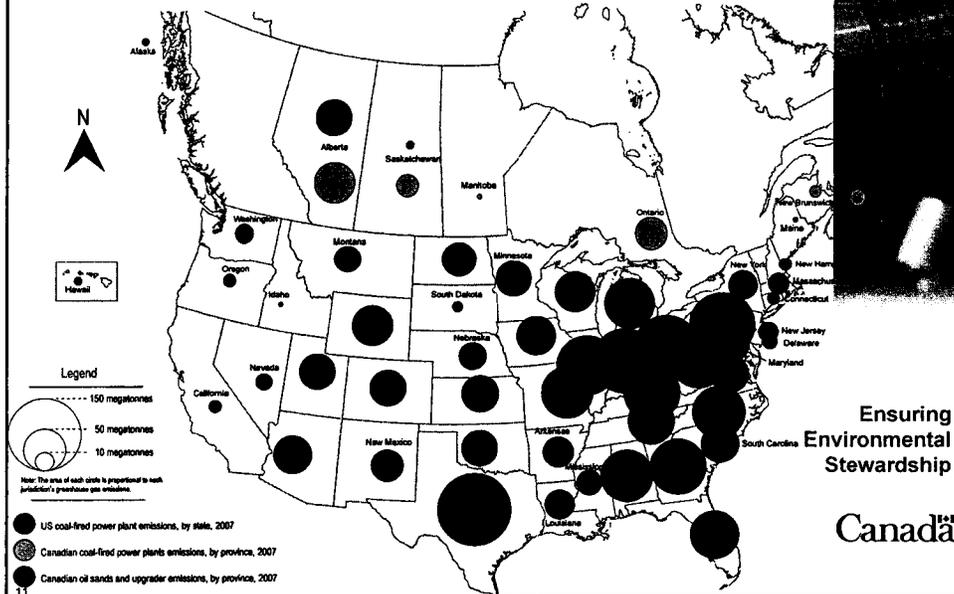


Ensuring Environmental Stewardship

Canada

Oil sands: The facts in perspective

GHG Emissions in Perspective



Ensuring
Environmental
Stewardship

Canada

In addition to Alberta's \$2 billion investment, Budget 2009 allocated \$650 million to CCS demonstration projects

- Shell *Quest*, which will capture CO₂ from an existing oil sands upgrader for permanent storage in a saline aquifer (AB -\$745 m /GoC - \$120 m).
- TransAlta *Project Pioneer* for construction of a new power plant equipped with post-combustion capture of around 1 Mt. (AB -\$436 m /GoC - \$343 m)
- Enhance *Carbon Trunk Line Project* to capture up to 1.9 Mt of CO₂ from an existing fertilizer plant and later, an upgrader. (AB \$495 m/GoC \$63 m)
- Swan Hill Synfuels Project for in-situ coal gasification (ISCG) and enhanced oil recovery (AB only - \$285 m)

Ensuring
Environmental
Stewardship

Canada

THE GLOBE AND MAIL ★

Thursday, January 28, 2010 2:36 PM

Manulife backs wind farm

Andrew Willis

Ontario's renewable energy sector gathered another blue chip endorsement Thursday, as insurer Manulife Financial led a \$179-million financing for a wind farm planned for the farmlands near Windsor, Ont.

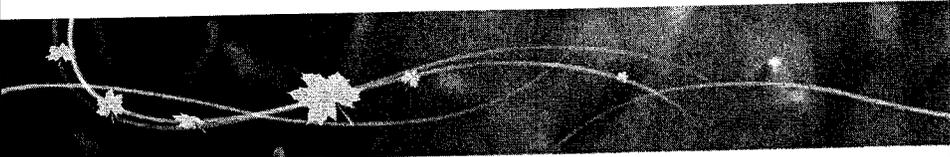
Manulife (**MFC-T19.88-0.16-0.80%**) is the lead lender and arranger in the financing package for Inverenergy Wind North America, which plans a 52-megawatt project that will be home to 52 turbines, housed on 80-metre towers. Over the past five years, Manulife financed three other successful Inverenergy wind projects, in Michigan, Colorado and Idaho.

The new Ontario facility will be 64 kilometres northeast of Windsor, near a large industrial base. Electricity generated by the Inverenergy project will be sold to the Ontario IESO competitive wholesale market, with the pricing framework in place for the next 20 years under a contract struck with the Ontario Power Authority.

Manulife bills itself as a leading arranger and provider of debt financing for renewable energy projects in Canada, with a role in \$1.4-billion of loans to 11 projects in the past five years.

Inverenergy now operates wind power plants that generate 2,000 megawatts of power.

Canada



Overview of the U.S.-Canada Clean Energy Dialogue

Legislative Energy Horizon Institute

April 7, 2010



Leadership and the Clean Energy Dialogue (CED)

- President Obama and Prime Minister Harper launched the U.S.-Canada Clean Energy Dialogue in an announcement following their first bilateral meeting on February 19, 2009
- The CED was created to enhance collaboration on the development of clean energy technologies to reduce greenhouse gas emissions and address climate change
- Initiative is led by the Honourable Steven Chu, Secretary of the Department of Energy (U.S.) and the Honourable Jim Prentice, Minister of the Environment (Canada)



2

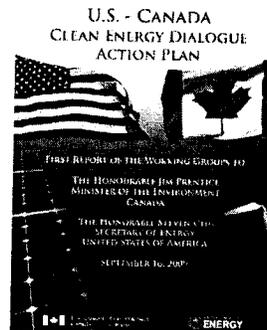
Mechanisms for conducting CED work

- Three bilateral working groups were established to implement the work of the CED:
 - Clean Energy Technology, with a focus on CCS
 - Electricity Grid
 - Clean Energy R&D
- Working groups include representatives from:
 - Canada: Environment Canada, Natural Resources Canada, Agriculture Canada, NSERC, NRC, provincial representatives
 - U.S.A.: Department of Energy, Environmental Protection Agency
- Environment Canada and the U.S. Department of Energy lead the CED initiative
 - Responsible for overall policy direction and advice, tracking progress and monitoring the policy context

3

Implementing joint projects under the CED

- Roundtable meeting was held in Washington in June 2009 to discuss recommendations and plan CED activities
 - Participants included private sector advisors, stakeholders, and government representatives
- Following the Roundtable, working groups developed an *Action Plan* that identifies 20 joint initiatives in support of the three priority areas (CCS, Electricity Grid, R&D)
- Initiatives generally focus on:
 - New technology demonstration projects
 - Alignment of key regulatory standards
 - Collaborative R&D
 - Public awareness and outreach



4

Overview of carbon capture and storage (CCS) initiatives

1. Collaborate on CO₂ injection, storage and monitoring initiatives
2. Facilitate enhanced research links between Canadian and U.S. CCS researchers on next generation technologies
3. Work towards compatible CCS rules, standards and practices across jurisdictions
4. Develop a North American Carbon Atlas
5. Share and disseminate best practices on large-scale CCS demonstration projects
6. Coordinate strategies for public engagement on CCS
7. Establish an annual bilateral CCS conference to advance items outlined above

5

Overview of electricity grid initiatives

1. Increase opportunities for trade in clean electricity (working with industry and other levels of government)
2. Advance smart grid and clean power technologies
3. Realize the potential of power storage and the role it may play in the expansion of renewable energy capacity across North America
4. Build the power work force of tomorrow
5. Host a regular Canada-U.S. Smart Grid Forum to assess progress in greening the electricity system

6

Overview of clean energy research and development initiatives

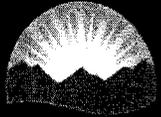
1. Develop a Clean Energy RD&D Collaboration Framework
2. Undertake collaborative development of a Clean Energy RD&D Roadmap
3. Launch several collaborative projects:
 - Expand ENERGY STAR criteria and programs
 - Undertake analysis of feasibility of converting mountain-pine-beetle-killed trees to biofuels
 - Conduct research to improve productivity and harvesting methods in the use of algal biomass
 - Improve energy efficiency in the transportation sector by coordinating R&D in the area of lightweight materials development
 - Develop a demand response quick assessment tool for the use of utilities, aggregators and building owners

7

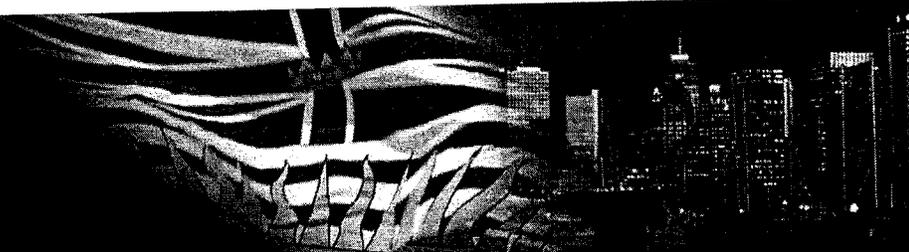
Next Steps – Achieving Results

- Working groups are currently implementing the initiatives identified in the Action Plan
 - Examples
 - Workforce Forum – Toronto
 - SmartGrid Forum – Canadian Embassy
 - Trade Conference -- Chicago, May 19/20
- Progress report Spring 2010

8



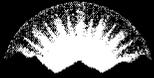
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COLUMBIA**
The Best Place on Earth



**Energy Horizon Institute
Luncheon Presentation**

**Hon. Naomi Yamamoto
Minister of State for intergovernmental Relations
Province of British Columbia**

**April 7, 2010
Washington D.C.**



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BRITISH
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The Best Place on Earth



BRITISH
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Governor
Brian Schweitzer

VIC
COO



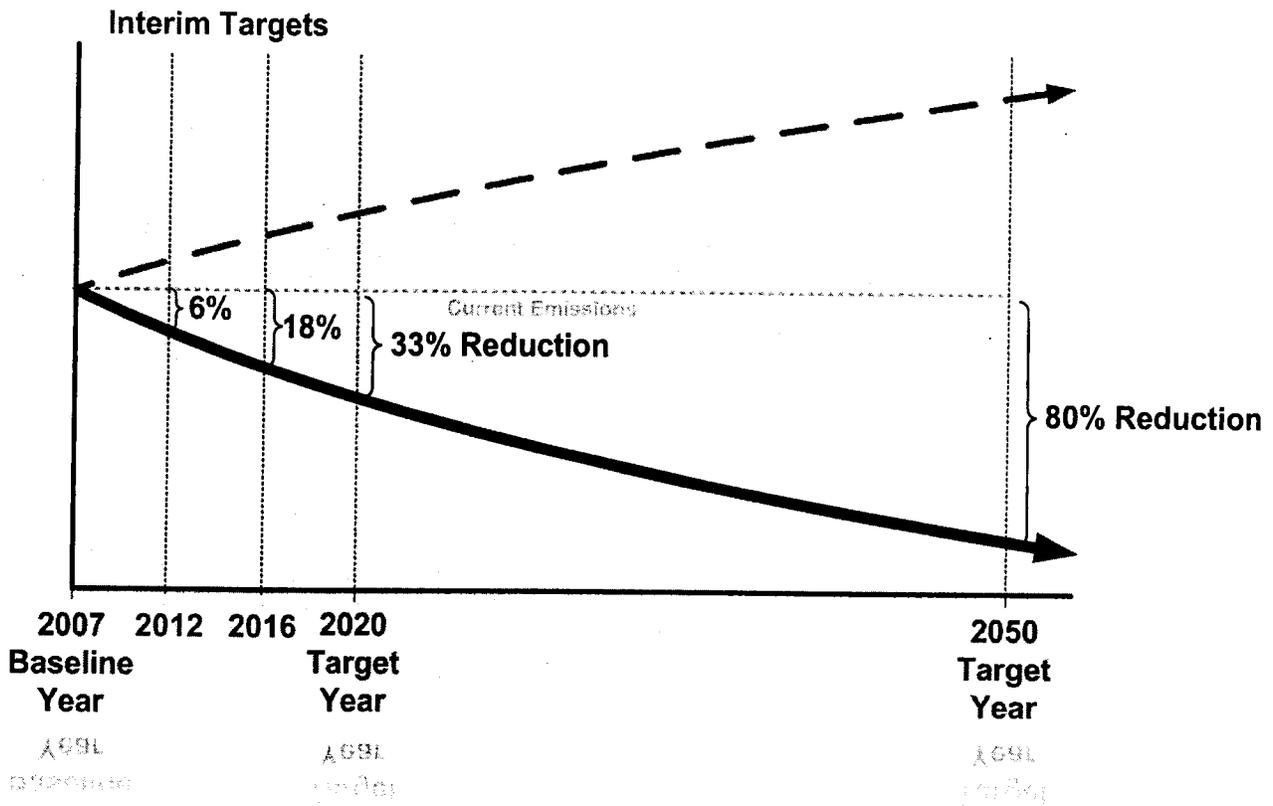
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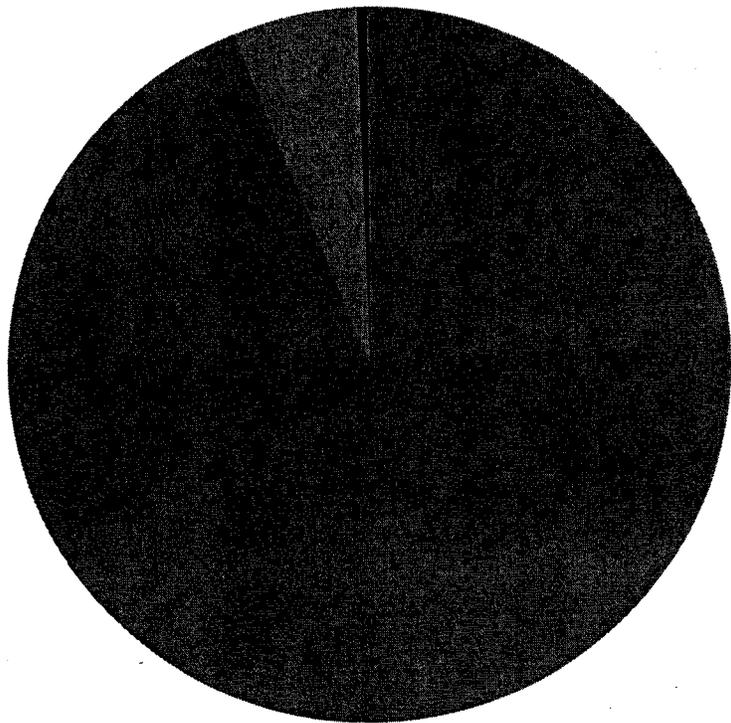




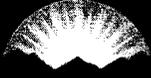
British Columbia: Legislated Climate Action Targets



British Columbia Electricity Generation By Source

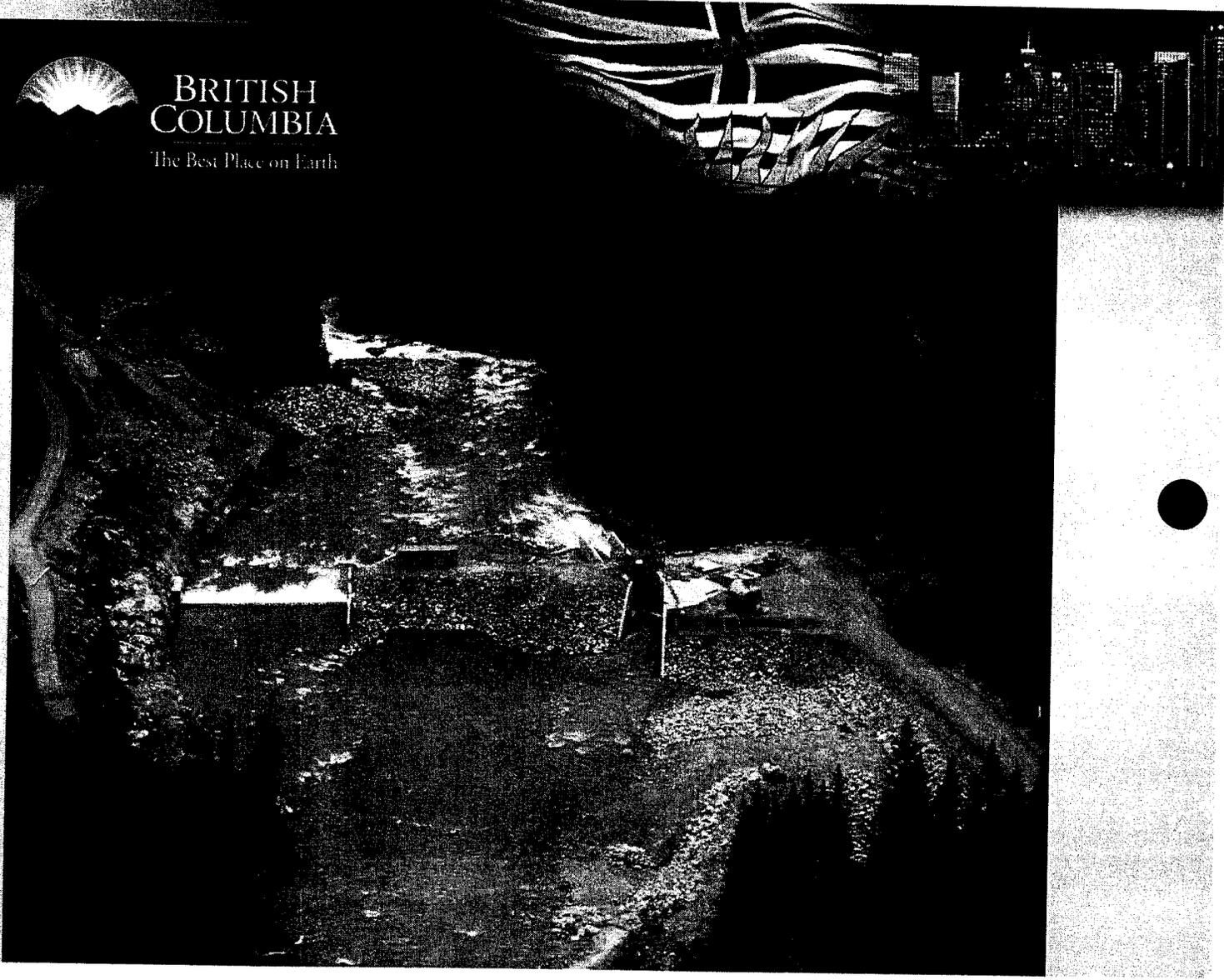


- Zero Carbon
- Low Carbon
- Conventional Carbon



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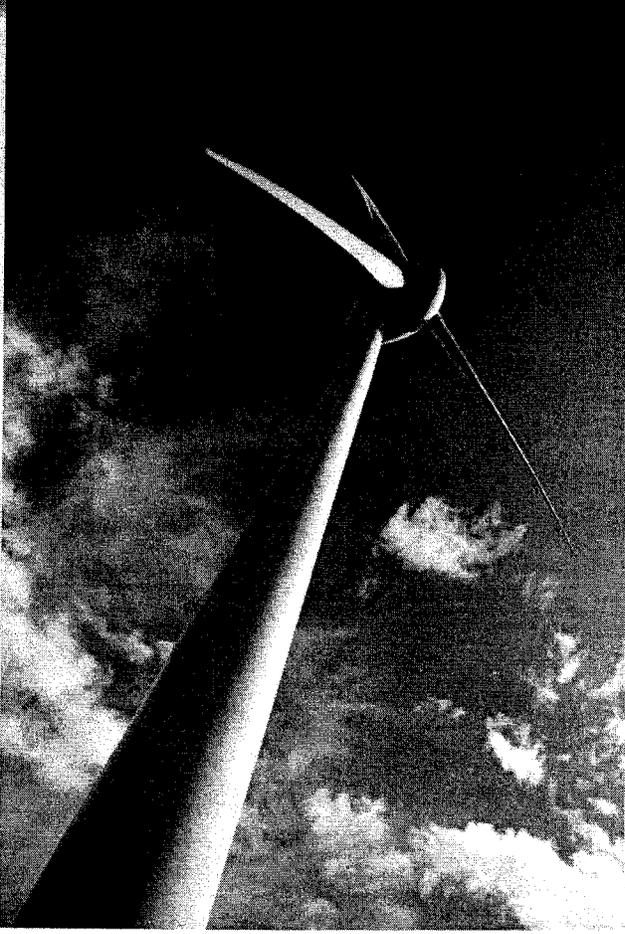
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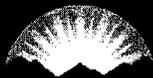




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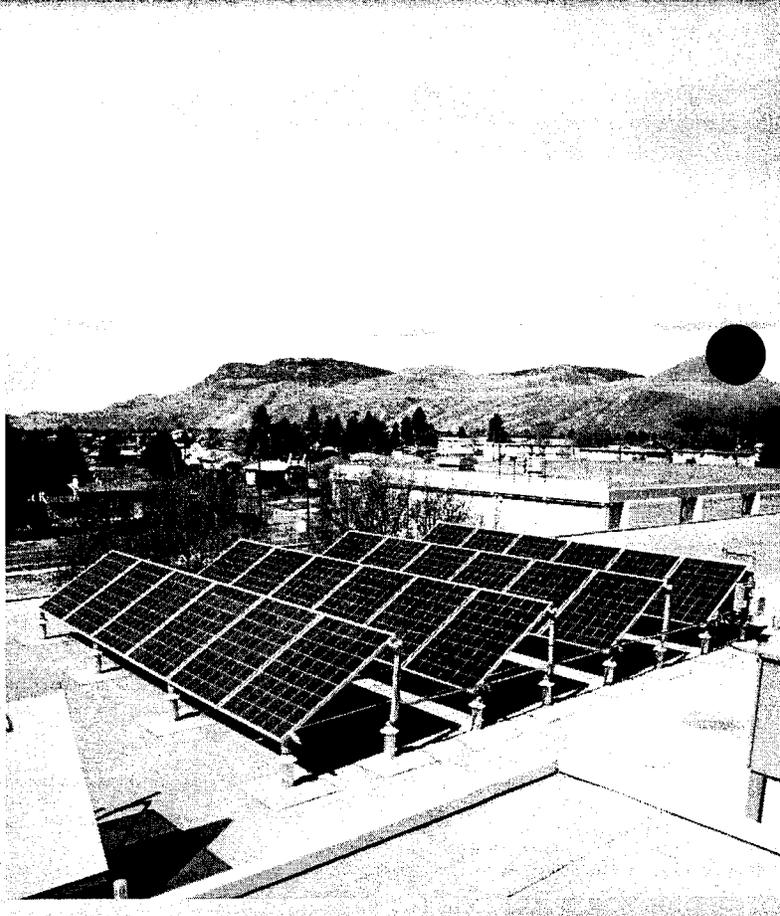
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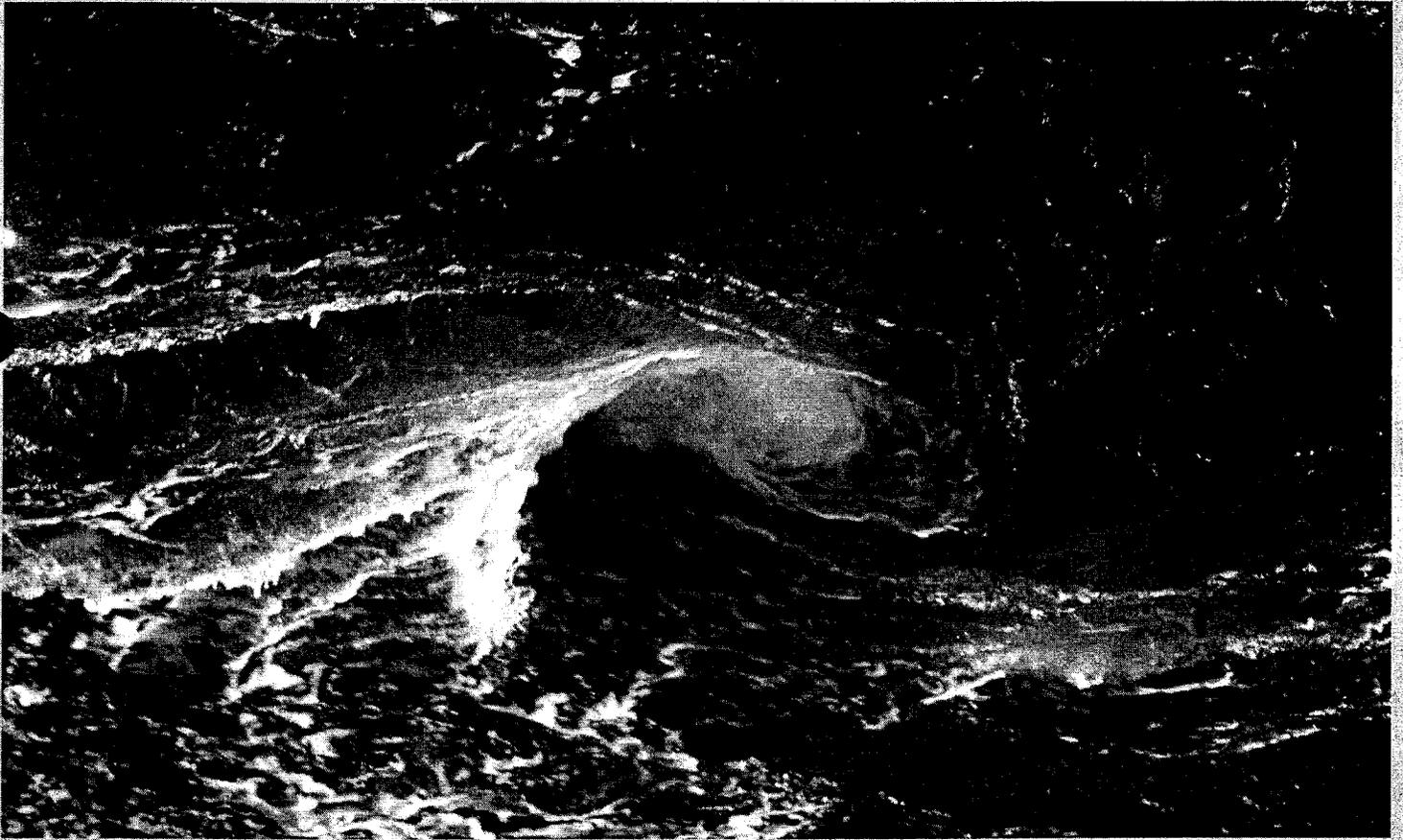
BRITISH COLUMBIA

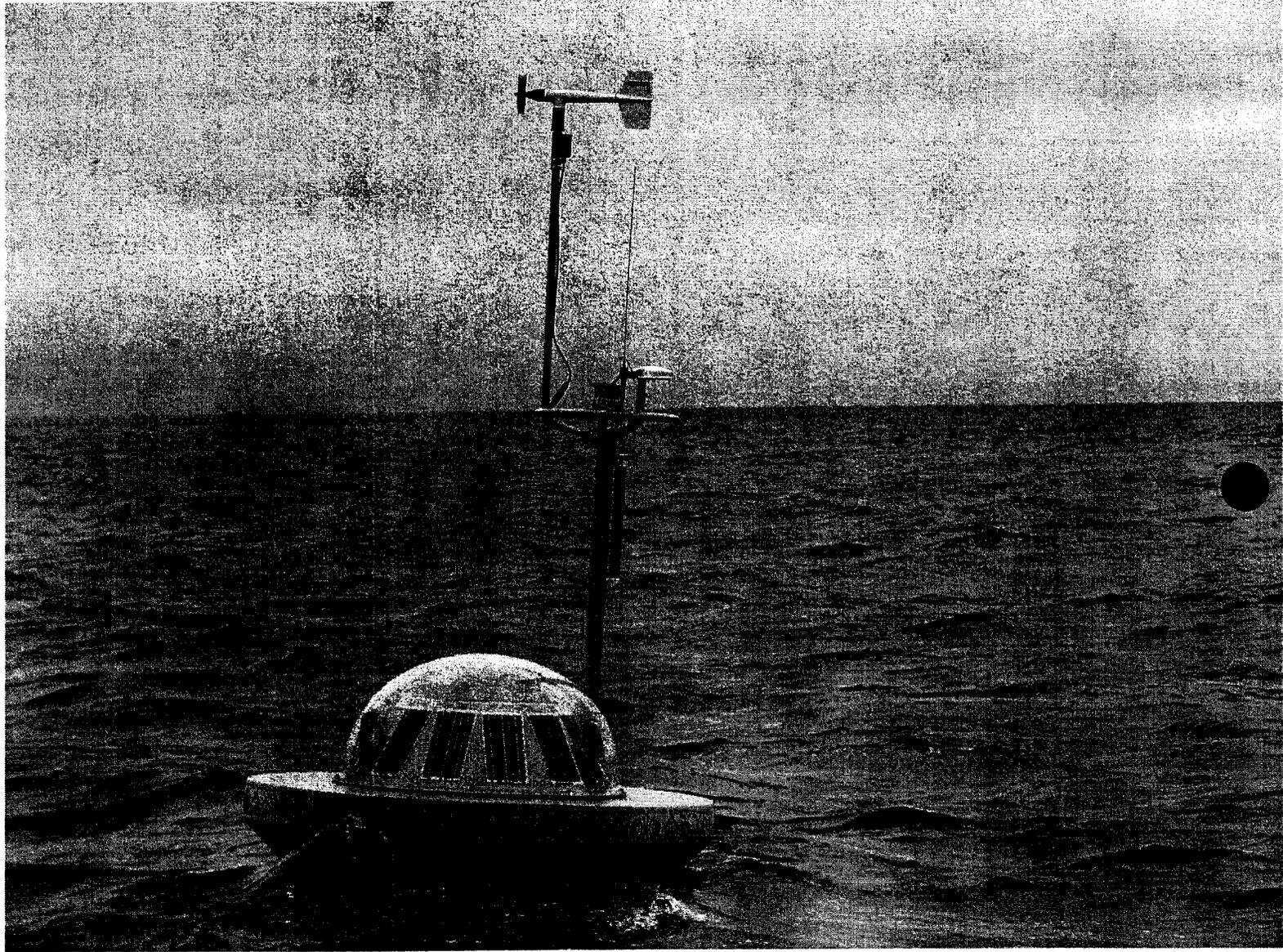
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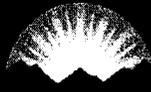


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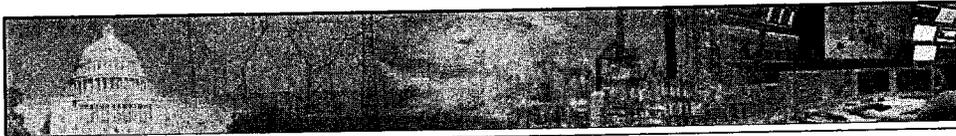
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Thank You.

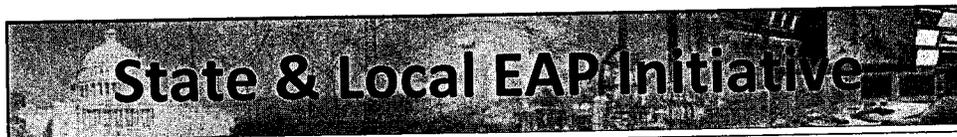
Questions?



Pacific NorthWest Economic Region/ National Conference of State Legislators
Legislative Energy Horizon Institute
April 8, 2010 · Washington, DC

ARRA State & Local Government Energy Assurance Planning & Implementation

Alice Lippert
Senior Technical Advisor
Office of Electricity Delivery and Energy Reliability



State & Local EAP Initiative

Overview

Grant Details

EAP Objectives & Metrics

Timeline

Implementation Strategy



April 8, 2010

Our ARRA Home Page

OFFICE OF ELECTRICITY DELIVERY & ENERGY RELIABILITY
You are here: DOE Home > OE Home > American Recovery & Reinvestment Act

OE Home
[About Us](#)
[Our Organization](#)
[OE Recovery Act](#)
[Our Work](#)
[Information Center](#)
[News Room & Events](#)
[Budget](#)
[Contact Us](#)
[Site Map](#)

QUICK REFERENCE

Electricity 101
VISIT WEBSITE VISIT WEBSITE

Smart Grid Partners
VISIT WEBSITE VISIT WEBSITE

Situation Reports
VISIT WEBSITE VISIT WEBSITE

Energy Assistance
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OE-417
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Integrative Grid
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Funding Opportunities
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E
Contributing to Our Nation's Recovery

AMERICAN RECOVERY & REINVESTMENT ACT

An Overview of the American Recovery and Reinvestment Act of 2009 (Recovery Act)

The American Recovery and Reinvestment Act of 2009 (Recovery Act) - which President Obama signed into law on February 17th, 2009 - is an unprecedented action to stimulate the economy. It includes measures to modernize our nation's energy and communication infrastructure and enhance energy independence. As President Obama stated, "The investment we're making today will create a newer, smarter electric grid that will allow for broader use of alternative energy."

RECOVERY WHAT'S NEW

March 18, 2010 -- Department of Treasury and Department of Energy Announce Guidance for Taxability of Smart Grid Investment Grants [More >](#)

February 19, 2010 -- Secretary Chu Announces Over \$3 Million to Support Local Energy Assurance Planning Initiatives [More >](#)

February 4, 2010 -- Federal Register Notice soliciting comments for Smart Grid Investment Grant Program draft reporting guidance [More >](#)

December 18, 2009 -- Recovery Act Transmission Interconnection Selected Awardees [More >](#)

OE RECOVERY ACT PROJECTS
[Funding Opportunities](#)
[Frequently Asked Questions](#)

SMART GRID INVESTMENT GRANTS
[Smart Grid Investment Grant Subject Information](#)
[Smart Grid Investment Grant Award Announcement](#)

SMART GRID DEMO PROJECTS
[Smart Grid Demonstration Project Announcement](#)

STATE ELECTRICITY REGULATORS ASSISTANCE
[State Electricity Regulators](#)

Available at: http://www.oe.energy.gov/american_recovery_reinvestment_act.htm

April 8, 2010

5

State ARRA Projects

U.S. DEPARTMENT OF ENERGY

IN YOUR STATE

Alabama
 Alaska
 Arizona
 Arkansas
 California
 Colorado
 Connecticut
 Delaware
 Florida
 Georgia
 Hawaii
 Idaho
 Illinois
 Indiana

U.S. DEPARTMENT OF ENERGY

SELECT YOUR STATE

Washington

Washington's hydroelectric power industry is the largest in the Nation and generates more power each year than any other state's entire renewable program. Washington is also home to the Grand Coulee Dam, the largest concrete structure in the U.S. As home to DOE's National Lab, Washington also played a critical role during the Manhattan Project, winning World War II and the Cold War. Washington is also home to the Pacific Northwest National Laboratory, one of 10 Department of Energy national laboratories that support the DOE science mission.

Recovery Act Projects

The below spreadsheet gives the latest figures for each Recovery Act Project sponsored by the Department of Energy broken out by state/territory. They are updated on a weekly basis.

- [DOE Recovery Act Project Breakdown by State \(xls\)](#)

Note: Figures in Column E reflect funding amounts for announced award selections. Grants are required to meet certain Recovery Act milestones in spending funds. Figures in Column F reflect awards that have completed the negotiation process.

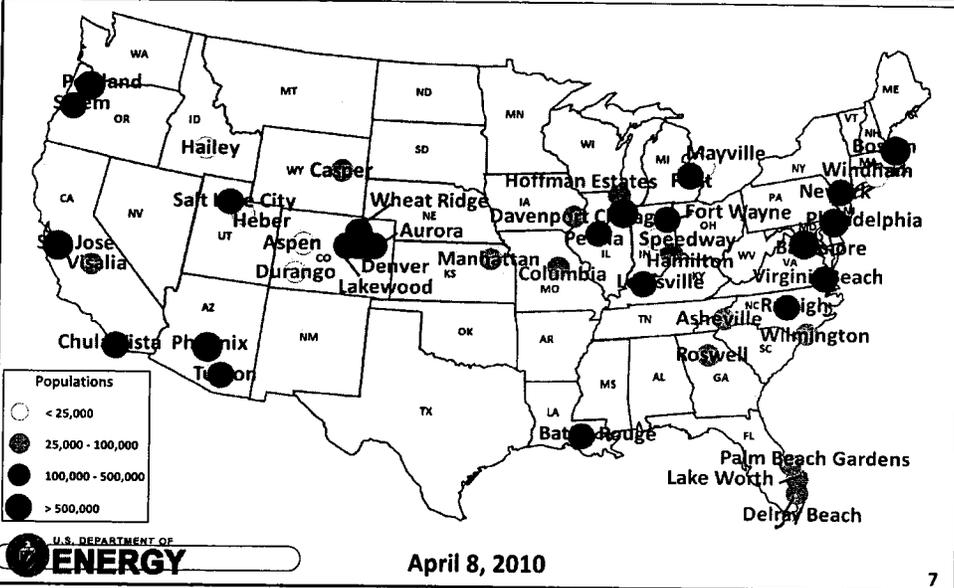
Available at www.energy.gov/

Select "In Your State" on left navigation

April 8, 2010

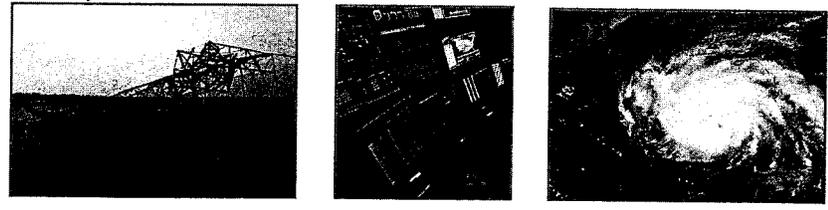
6

Local ARRA Grant Awards



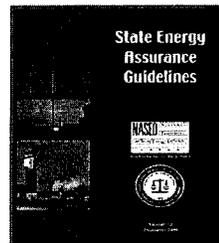
State & Local EAP Objectives

- Fund jobs to enable development and implementation of effective, energy assurance and resiliency plans;
- Develop in-house expertise on infrastructure interdependencies and related vulnerabilities, including areas for improvement to lessen the economic health and safety impacts of energy disruptions, cyber security, energy supply systems, energy data analysis, and communications;
- Develop and initiate a process or mechanism for tracking the duration, response, and restoration and recovery time of energy supply disruption events;



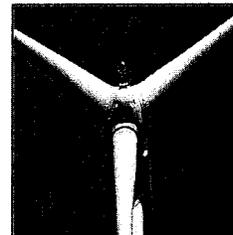
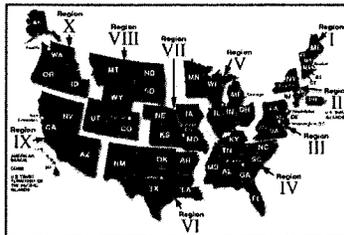
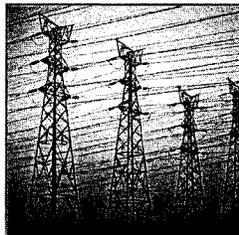
State & Local EAP Objectives

- Develop new, or refine existing plans, and incorporate these plans into broader emergency management and homeland security activities;
- Revise current policies, procedures, and practices to reflect the Energy Assurance Plans;
- Integrate new energy portfolios and new applications, such as Smart Grid technology, into energy assurance and emergency preparedness plans.



State & Local EAP Objectives

- Conduct energy emergency exercises to evaluate the effectiveness of the energy assurance plans;
- Train appropriate personnel on energy infrastructure and supply systems and the content and execution of energy assurance plans;
- Build organizational relationships and identify responsibilities within Local and State governments, the private sector, and the region that support public/private partnerships;

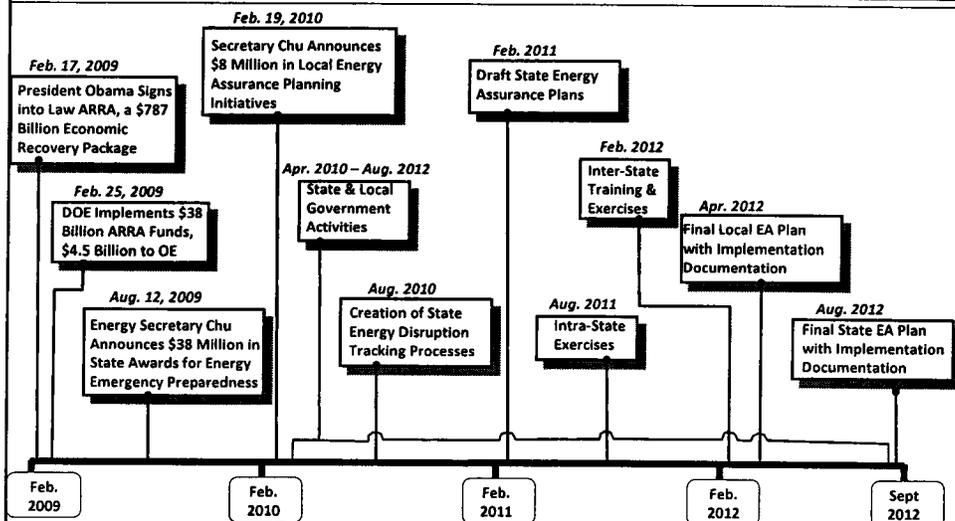


Metrics

ARRA grants distributed to State and Local governments will be measured and tracked using the following metrics:

- Energy Assurance Plans created or substantially revised;
- Jobs created or saved within State/local governments for Energy Assurance Planning and response capabilities;
- Energy Assurance training sessions, workshops and/or exercises conducted;
- People trained

State & Local EAP Timeline



Implementation Strategy

ARRA State & Local Government Energy Assurance Implementation Strategy, Tasks & Activities

Task 1. Gaining understanding of State and Local needs to meet ARRA requirements.

Task 2. Education and Training on energy assurance and resiliency and priority issues, and on how to develop new, or refine existing plans.

Task 3. Assistance in building collaborative partnerships to foster energy assurance.

Task 4. Provide tools, templates, and resource materials to help meet ARRA requirements.

Task 5. Document energy assurance lessons learned from exercises, incidents, and ARRA related activities, and promote/facilitate information sharing and coordination, exchanging energy assurance and resiliency best practices.

Task 6. Work with States and Localities to develop a uniform, comprehensive energy assurance and resilience approach.

Implementation Strategy: Task 1

Gaining understanding of State and Local needs to meet ARRA requirements.

Activity 1.1. Develop/conduct assessment of ARRA energy assurance guidance needs (topics for workshops, tools, templates, background papers, Web-based resources, etc.)

Activity 1.2. Create a State/Local Energy Assurance Planning mechanism for receiving inputs and providing feedback on requirements, tools and templates for usability, etc.

Activity 1.3. Hold quarterly conference calls with regional State grantees.

Activity 1.4. Hold quarterly conference calls with regional Local grantees.

Activity 1.5. Solicit, collect, and utilize information on State and Local needs gleaned from conferences and meetings that focus on energy issues.

Implementation Strategy: Task 2

Education and Training on energy assurance and resiliency and priority issues, and on how to develop new, or refine existing plans.

Activity 2.1. Conduct energy assurance workshops for combined State and Local grant recipients.

Activity 2.2. Conduct educational webinars on a variety of topics.

Activity 2.3. Produce background papers on priority energy assurance topics, e.g., energy infrastructure “primer,” interdependencies, cyber security and resilience, building public-private partnerships, etc.

Activity 2.4. Conduct regional Energy Assurance Seminars for State Legislators, for example, the Northeast, Southeast, Southwest, or Pacific Northwest.

Activity 2.5. Conduct a National Energy Assurance Conference with all State and local grant recipients and other interested jurisdictions and organizations to highlight Energy Assurance Program results.



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Implementation Strategy: Task 3

Assistance in building collaborative partnerships to foster energy assurance.

Activity 3.1. Produce brochure on “partnering for Energy Assurance and Resiliency” for private sector, and Local and State officials.

Activity 3.2. Conduct Educational Webinars.

Activity 3.3. Utilize DOE-sponsored EA Planning Program workshops and other activities to promote the value of multi-jurisdiction, cross-sector collaboration to support energy assurance planning and implementation, and in response and recovery from energy disruptions.

Activity 3.4. Produce and disseminate a quarterly EAP Newsletter.



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Implementation Strategy: Task 4

Provide tools, templates, and resource materials to help meet ARRA requirements.

Activity 4.1. Design a Web-based Energy Assurance Planning Resource with input from grant recipients to ensure the site is used by State and Local officials.

Activity 4.2. Produce a State and a Local Energy Assurance Plan template with criteria for what needs to be included.

Activity 4.3. Produce an energy infrastructure interdependencies template.

Activity 4.4. Produce a template/suggested criteria for collecting energy supply disruption information.

Activity 4.5. Produce a template for Energy Assurance Program Metrics.

Activity 4.6. Develop an automated version of Tabletop-in-a-box.

Activity 4.7. Collect information on Energy Assurance and Resiliency issues and activities.

Implementation Strategy: Task 5

Document energy assurance lessons learned from exercises, incidents, and ARRA-related activities, and promote/facilitate information sharing and coordination, exchanging energy assurance and resiliency best practices.

Activity 5.1. Develop and continuously updated a Lesson-Learned compendium

Activity 5.2. Develop and maintain resource on DOE Energy Assurance Program website that provides information on energy assurance and resiliency best practices and solutions .

Activity 5.3. Develop and distribute as appropriate list of ARRA grantees and other key points of contact for energy assurance coordination.

Implementation Strategy: Task 6

Work with States and Localities to develop a uniform, comprehensive energy assurance and resilience approach.

Energy Sector Vision: *The energy sector envisions a robust, resilient energy infrastructure in which continuity of business and services are maintained through secure and reliable information sharing, effective risk management programs, coordinated response capabilities, and trusted relationships between public and private security partners at all levels of industry and government.*

Upcoming Dates & Opportunities

Summer Energy Outlook Conference & Energy Data & Assurance Planning Workshop April, 20-21, 2010

Denver, Colorado

National Governors Association Annual Meeting, July 9-12, 2010

Boston, Massachusetts

NARUC Summer Committee Meetings, July 18 - July 21, 2010

Sacramento, California

NCSL Legislative Summit, July 25-28, 2010

Louisville, Kentucky

NASEO Annual Meeting, September 28-October 1, 2010

Boston, Massachusetts

NEMA Annual Conference October 2010

Little Rock, Arkansas

NARUC 122nd Annual Convention November 14 - November 17, 2010

Atlanta, Georgia



For public information visit:

<http://www.oe.energy.gov/organization.htm>

Alice Lippert

State and Local Government Energy Assurance Program

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April 8, 2010

Legislative Energy Horizon Institute

● Washington D.C.—April 7-8, 2010

FACULTY

Stacy Angel

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● Stacy Angel is a Program Manager with EPA's Climate Protection Partnership Division focusing on utility policies to advance clean energy and energy efficiency. She currently manages EPA's sponsorship of the National Action Plan for Energy Efficiency and provides technical assistance to state utility commissions. She also serves on the interagency Smart Grid Task Force. Prior to EPA, she worked at the Federal Energy Regulatory Commission and Pace Global Energy Services where she gained experience with electricity, natural gas and financial market oversight, as well as fuel due diligence for large independent power investments. She holds a B.S. in Integrated Science and Technology from James Madison University.

Matt Clouse

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Matt

● Matt Clouse is Director of the U.S. Environmental Protection Agency's Green Power Partnership. Matt joined the EPA in late 2000 to begin developing the Green Power Partnership, which was launched in July 2001 and has over 650 partners including 310 organizations or facilities buying green power for 100% of their electricity usage, 83 government agencies, 70 colleges and universities, and 39 Fortune 500 companies. Matt's career in environmental and energy policy began in Oregon at an environmental lab and includes five years at the Oregon Department of Environmental Quality and two years at the University of Delaware where he led teams tasked with developing Delaware's climate change action plan and the state's energy plan. He holds a Master of Energy and Environmental Policy from the University of Delaware and a B.A. from College of Wooster.

Greg Dotson

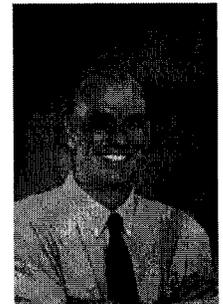
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**Greg**

Greg Dotson began working for Rep. Henry Waxman (D-Calif.) in 1996. Now, he heads the House Energy and Commerce chairman's energy and environment team focusing on climate change and the energy bill. He has counseled Waxman on matters such as the reauthorization of the Safe Drinking Water Act, the Food Quality Protection Act, the Energy Policy Act of 2005, the American Recovery and Reinvestment Act, and the pending American Clean Energy and Security Act. Greg received his B.A. from Virginia Tech and J.D. from University of Oregon.

William M. Ferretti

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**Will**

Dr. William Ferretti is a Vice President with Chicago Climate Exchange, the world's first and North America's only active, voluntary, legally binding integrated trading system to reduce emissions of all six greenhouse gases, with offset projects in North America and worldwide. His portfolio of responsibilities for CCX includes recruitment and liaising with governmental and public policy entities. Before joining CCX, Will was the Executive Director of GLOBE USA, a nonpartisan membership organization comprised of environmentally-minded senators and representatives from the U.S. Congress. Prior to joining GLOBE USA, he was Executive Director of the National Recycling Coalition. From 1988 to 1996 he served with the New York State Department of Economic Development, where he was founding director of the nation's first market development program for recycling. For their groundbreaking work, Will and the Department received one of the first Presidential Awards for Sustainable Development. Will received his Doctorate in resource economics from the State University of New York and Syracuse University, and a B.A. from the Pennsylvania State University.

Colin Hayes

Senior Staff

US Senate, Committee on Energy & Natural Resources
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Washington DC 20510
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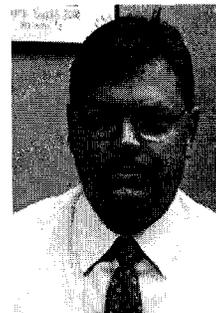
Colin Hayes is a Senior staff member of the Senate Energy Committee and the Climate Change Subcommittee. Previously Colin was Legislative Assistant at the Office of U.S. Senator Craig Thomas, Legislative Aide at the US Senate, Committee on Energy & Natural Resources and Executive Assistant at US Senate, Committee on Energy & Natural Resources. He received a B.S. in World Resource Systems Development from Hobart and William Smith Colleges.

Robin Junger

Deputy Minister

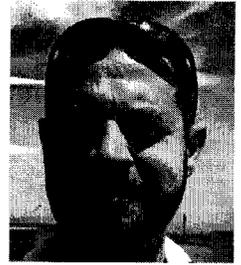
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250.744.2720

Robin Junger was recently appointed Deputy Minister of Energy and Clean Technology within the Office of the Premier. As a priority of the BC Government, Robin will coordinate and lead the work to meet the goal of making BC a Green Energy Powerhouse. Previously he had a private law practice where he worked in the areas of administrative, environmental and aboriginal law, and his clients included numerous provincial government agencies and Offices of the Legislature. Prior to this, Robin worked in the Intergovernmental Relations Branch of the Office of the Premier, the Legal Services Branch of the Ministry of Attorney General, the Ministry of Agriculture, Fisheries and Food and the Office of the Ombudsman. Robin holds a B.A. in Political Science from the University of Calgary, a LL.B. from the University of British Columbia and a LL.M. from Harvard Law School. He served as a Law Clerk to the BC Court of Appeal and has taught international law at the University of Victoria Faculty of Law.

**Robin**

Miles Keogh

Director, Grants and Research
National Association of Regulatory Utility Commissioners
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Washington DC 20005



Miles

Miles Keogh oversees NARUC's Grants and Research Department and manages its grant-funded energy, environmental, and security programs. He directs all aspects of NARUC's domestic research activities and serves as a liaison between State Commissions, the Department of Energy, Environmental Protection Agency, Department of Homeland Security, national labs, industry, and other key organizations. Miles also supports NARUC's Committees on Energy Resources and the Environment, on Electricity, Gas, and Critical Infrastructure Protection, as well as the Subcommittee on Clean Coal and the Ad Hoc Committee on Utility Market Access. He serves on the U.S. Electricity Delivery Working Group, the National Wind Coordinating Collaborative's Steering Committee, the Intelligrid Advisory Group, and the Executive Committee of the National Council on Electricity Policy. He received a B.S. in International Relations from Georgetown University and a M.A. in Environmental Management from the University of Cape Town, South Africa.

Dina Kruger

Director, Climate Change Division
U.S. Environmental Protection Agency
401 M ST SW
Washington DC 20460



Dina

Dina Kruger is Director of the Climate Change Division at the U.S. Environmental Protection Agency where she is responsible for a wide range of programs and analyses dealing with climate change policy, economics, mitigation technologies, science and impacts, and communication. She is currently managing the development of an EPA rule-making on the mandatory reporting of greenhouse gases. She also manages preparation of the U.S. National Inventory of Greenhouse Gases and Sinks, which is submitted annually to the UN Framework Convention on Climate Change, and has served as an elected member of the Intergovernmental Panel on Climate Change's Task Force Bureau on Greenhouse Gas Inventories since 1998. She holds a B.A. from the University of Washington, and received an M.A. from the Energy and Resources Group at the University of California, Berkeley.

Marc LePage

Special Advisor, Climate Change & Energy
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**Marc**

Marc LePage is a Special Advisor for the Canadian Embassy's Climate Change & Energy Committee. He has been with the Consulate General of Canada since 2005, when he was appointed Consul General of Canada with accreditation for northern California, Nevada, Hawaii, and Guam. Formerly with Genome Canada, Marc brings extensive experience in the pharmaceutical industry, biotechnology, and venture capital. He joined the Trade Commissioner Service of the Department of Industry, Trade, and Commerce in 1980 and has served abroad in Stockholm, Havana, and at San Diego, California. In 1994, Marc moved to the Medical Research Council of Canada (now the Canadian Institutes of Health Research) to serve as Director of Business Development. Upon its launch in July of 2000, he joined Genome Canada as Executive Vice-President of Corporate Development, the capacity in which he has served to date. Marc earned a B.A. in Political Science from Université de Moncton.

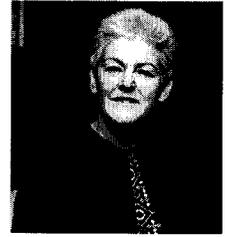
Alice Lippert

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Alice Lippert is the Senior Technical Advisor for the U.S. Department of Energy. Her focus is on energy infrastructure and markets, and emergency response and security. She is a senior oil and gas analyst and has assisted with state and local government energy assurance planning. Alice previously worked for the U.S. Department of Energy as a Senior Energy Infrastructure Analyst. She received a M.S. degree in Consumer Economics from University of Wisconsin-Madison.

Gina McCarthy

Assistant Administrator, Air and Radiation
U.S. Environmental Protection Agency
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202.564.7404



Gina

Gina McCarthy is the Chief Administrative Officer of the Office of Air and Radiation where she is the leading advocate for win-win strategies to confront climate change and strengthen our green economy. Prior to her confirmation, she served as the Commissioner of the Connecticut Department of Environmental Protection. In her 25 year career, she has worked at both the state and local levels on critical environmental issues, helped coordinate policies on economic growth, energy, transportation and the environment, and has extensive experience with the Regional Greenhouse Gas Initiative, the nation's first market-based, greenhouse cap-and-trade system.

Michael McGarey

Director, State Outreach
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Michael McGarey is the Director of Nuclear Energy Institute's State Outreach programs. He implements NEI state and community outreach political strategies and serves as a liaison to state and local governments. Prior to his position at NEI, Michael was a federal liaison at the office of the Governor of Ohio, and a legislative assistant at the office of Congressman Bob McEwen. He received a B.A. degree in Journalism from The Ohio State University.

Maureen McNamara

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Philip Moeller

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Philip

Commissioner Philip D. Moeller was nominated by President Bush, and sworn into office in 2006 for a term expiring June 30, 2010. From 1997 through 2000, Philip served as an energy policy advisor to U.S. Senator Slade Gorton (R-Washington) where he worked on electricity policy, electric system reliability, hydropower, energy efficiency, nuclear waste, energy and water appropriations and other energy legislation. Prior to joining Senator Gorton's staff, he served as the Staff Coordinator for the Washington State Senate Committee on Energy, Utilities and Telecommunications, where he was responsible for a wide range of policy areas that included energy, telecommunications, conservation, water, and nuclear waste. Before becoming a Commissioner, Philip headed the Washington, D.C., office of Alliant Energy Corporation and worked in the Washington office of Calpine Corporation. Philip received a B.A. in Political Science from Stanford University.

David R. Nevius

Senior Vice President
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David

David R. Nevius is Senior Vice President of the North American Electric Reliability Corporation (NERC), located in Princeton, New Jersey. Since joining NERC in 1977, David has been involved in all aspects of NERC's reliability activities including efforts to transition into an industry self-regulatory organization. He currently provides support to the NERC president in the areas of strategy, regional and stakeholder relations, and special projects. Mr. Nevius also serves as secretary to the NERC Member Representatives Committee, which provides policy-level guidance to the independent board. In addition, he has responsibility for leading efforts to implement the actions identified in NERC's July 20, 2009 Three-Year Electric Reliability Organization Performance Assessment Report for improvement of ERO operations, activities, oversight, and procedures in each of its principal program areas. David also serves as a member of the U.S. Department of Energy Electricity Advisory Committee. He holds a B.S. in Electrical Engineering and a M.S. in Engineering Management from Drexel University. He is a registered professional engineer in the state of New Jersey.

Paula L. Scalingi

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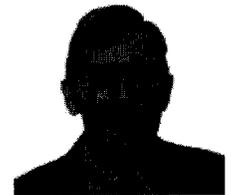


Paula

Paula L. Scalingi is the Director of the Pacific Northwest Center for Regional Disaster Resilience, Vice Chair of The Infrastructure Security Partnership (TISP), President of The Scalingi Group, LLC, and Co-director of the Stony Brook University Forum on Global Security. Since October 2001, she has helped private and public sector organizations create and develop regional initiatives focused on infrastructure interdependencies and disaster resilience. She has developed such initiatives in the Pacific Northwest and Northeast; the states of Iowa and Maryland; San Diego, New Orleans, and Chicago regions, and for the 2002 Salt Lake City Winter Olympics. For TISP, she was the principal architect and drafter of the Guide to Develop an Action Plan for Regional Disaster Resilience. Paula formerly was founder and director of the U.S. Department of Energy's Office of Critical Infrastructure Protection. She also served in the U.S. Arms Control and Disarmament Agency, the Central Intelligence Agency, and on the staff of the House Permanent Select Committee on Intelligence. Paula has a Ph.D. from Florida State University.

John Schnagl

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John

John Schnagl serves as Director Transmission Adequacy with the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability in Washington, DC. Prior to taking this position, he worked for 22 years with the Federal Energy Regulatory Commission where he advised the Commission on proposed hydroelectric projects, natural gas pipelines, and electric transmission as well as the adequacy of the nation's energy infrastructure. His federal career started in Omaha, Nebraska with the Corps of Engineers. He has a B.S. from the University of California at Davis and an M.S. from the University of Nebraska, Lincoln.

Honourable Naomi Yamamoto

Minister of State for Intergovernmental Relations
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Naomi

Naomi Yamamoto was elected as MLA for North Vancouver-Lonsdale in the 2009 general provincial election. She has been the president and owner of Tora Design Group in North Vancouver for 21 years, and for the past two years she has been with the North Vancouver Chamber of Commerce as president and general manager. Recently, she served on the board of the North Shore Credit Union and the Vancouver Coastal Health Authority, and was president of the Gordon and Marion Smith Foundation. In 1994, Naomi served as chair of the BC Chamber of Commerce. She completed a six-year term on the board of Capilano College, with the last three years as chair. In 2005, she was appointed as an inaugural member of the Premier's Small Business Roundtable.

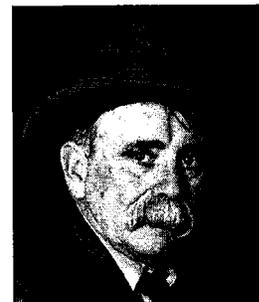
Legislative Energy Horizon Institute

Participants

Rep. Duane Ankney

Montana House of Representatives, District 43
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Colstrip MT 59323
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Duane Ankney is serving his second term in the Montana House of Representatives. Duane was raised on the Nez Perce reservation at Lapwai, Idaho, served in the U.S. Navy from 1964-69 flying aircraft, and moved to Montana in 1969 where he spent 25 years working in the coal mine. The constituents of his 3,400 square mile district are mainly railroaders, miners, power plant workers, farmers and ranchers.



Duane

Rep. Brian Cronin

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Brian Cronin was elected to the Idaho House of Representatives in 2008, representing District 19, which includes downtown Boise. Brian owns two businesses: a PR/marketing firm and a preschool. Prior to his election to the Legislature, he served as the Chairman of the Ada County Democrats. He is a board member of the Idaho Human Rights Education Center and Boise State Radio. He has also served on the Small Business Success Center and the Ada County Highway District Neighborhood Advisory Council boards. A former high school teacher, Brian holds an Ed.M. from Harvard University and a B.A. from Haverford College.



Brian

MLA Michael Chisholm

Member of Legislative Assembly for Cut Knife-Turtleford
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Respected in his community as an accountant and financial advisor, a successful farmer himself, and a selfless contributor to his community, Michael Chisholm was elected to the Cut Knife – Turtleford Constituency for the first time in 2003. Michael is a member of the Government Caucus Standing Policy Committee on Intergovernmental Affairs and Justice; and a member of the Legislative Standing Committee on Intergovernmental Affairs and Justice as well as the Public Accounts Committee. He has been serving on the Pacific Northwest Economic Region (PNWER) Finance and Audit Committee and in November 2008 was elected 4th Vice President.



Michael

Senator Jerome Delvin

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Senator Jerome Delvin was a House of Representatives member from 1994 to 2004, when he was Senate appointed May 12, 2004, and elected November 2004 and November 2006. Jerome is currently the Deputy Republican Whip. He is a Ranking Republican Member, Higher Education Committee; Member: Consumer Protection and Housing Committee; Water, Energy and Telecommunications Committee; Transportation Committee; Board of Trustees, Life Sciences Discovery Fund Authority; Ex-Officio Member, Washington State Gambling Commission; Climate Advisory Team; Joint Legislative Committee on Economic Development & International Relations; Committee on Education of Students in High Demand Fields; Electric Transmission Corridors Task Force. Prior to politics, Jerome was a Richland Police Officer from 1979-2007 and formerly a military police officer and an officer in the Hanford Patrol. He has received many awards, including Association of Washington Business 2007 "Cornerstone" award.



Jerome

Rep. Robyn Driscoll

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Robyn Driscoll was elected and served her first term in the Montana State Legislature House of Representatives in 2005. She has been on the Federal Relations, Energy and Telecommunications Committee every session (including the position of Vice-Chair during the 2009 session) and has also served on the Energy Interim Committee in between every session.



Robyn

Rep. Deborah H. Eddy

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Deborah Eddy is serving her second term in the Washington State Legislature, where she sits on the Transportation and Technology, Energy and Communication committees. She has extensive public policy experience, having served as a council member and mayor (Kirkland, WA), as executive director of a nonprofit brokering agreement among Puget Sound cities on issues ranging from land use to utility rates, and as a fellow at the Cascadia Center in Seattle, studying regional transportation issues. She is particularly interested in encouraging more distributed energy generation.



Deb

Rep. Anna Fairclough

Alaska House of Representatives, District 17
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Anna Fairclough served on the Anchorage Assembly for eight years as Chair and Vice Chair prior to being elected to the Alaska State House of Representatives in 2006 and 2008. She represents District 17; the "heart" of Eagle River and is a member of the House Finance Committee. Anna serves as the Chair of the Alaska Renewable Energy Task Force and is a member of the Women in Government Energy Task Force. In the private sector she serves as the Development Director for Hospice of Anchorage.



Anna

MLA Kyle Fawcett (PC)

Member of the Legislative Assembly for Calgary-North Hill
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Kyle Fawcett was elected to his first term as a Member of the Legislative Assembly for Calgary-North Hill on March 3, 2008. In addition to his regular duties as MLA, Kyle currently serves as a member of the Special Standing Committee on Members' Services and on the standing committees on Public Accounts and Health. He has also served on the Standing Committee on Private Bills. Prior to serving as a Member of the Legislative Assembly of Alberta, he provided research consultant services in support of both private industry and nonprofit projects. He holds a bachelor of arts degree in political science and economics from the University of Calgary.

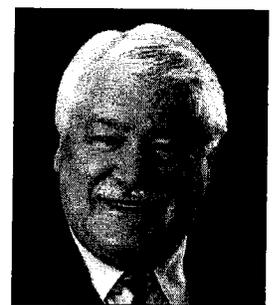


Kyle

Rep. Stephen Hartgen

Idaho House of Representatives, District 23
1681 Wildflower LN
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Stephen Hartgen is a first-term Idaho legislator, serving on the Environment, Energy & Technology Committee. Previously, he was publisher and editor of The Times-News in Twin Falls for more than 20 years, and a business consultant before his election. He works with Idaho businesses, groups and individuals and has managed media issues of more than a half-dozen political campaigns. In the 2009 Legislative Session, Stephen assisted House leadership on media relations and issues positioning. His business clients have included the 425-megawatt China Mountain Wind Project of Nevada Power and Renewable Energy Systems of America, as well as other business interests in energy development, water resources, agribusiness, health care and outdoor recreation.



Stephen

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At 31 years, Janéa was elected the youngest female State Senator in Washington history after serving 3 terms as her district's State Representative. Her legislative district boasts a diverse inventory of energy production including hydropower, solar, wind, biofuels, natural gas, and others. She serves her community as a board member of the Crossroads Resource Center, a resource for families and parents, and through other civic and church organizations. Janéa is the ranking Republican on the Senate Labor, Commerce and Consumer Protection Committee. She also serves on the Senate Early Learning and K-12 Education Committee and the Environment, Water & Energy Committee. She was named the 2005 and 2006 Legislator of the Year by the Washington State Farm Bureau, an unprecedented back-to-back honor.

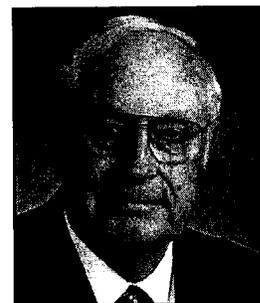


Janéa

Senator Jim Honeyford

Washington State Senate, District 15
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360.786.7684
honeyford.jim@leg.wa.gov

Senator Jim Honeyford is the Republican Deputy Floor Leader 2009-10, and was the Republican Caucus Chair from 2005-06, Majority Caucus Chair in 2004, and Republican Whip from 2001-02. He joined the House of Representatives in 1994 and the Senate in 1998. Jim's current committees include the Joint Legislative Committee on Water Supply During Drought and the Joint Legislative-Executive Columbia River Partnership. He received the 2007 Association of Washington Business "Cornerstone" award, among others. He was a farmer, a policeman for the City of Ellensburg from 1960-66, and a teacher, coach and librarian at the Sunnyside School District from 1966-1995.



Jim

Rep. Jim Jacks

Washington State House of Representatives, District 49
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360.786.7924
jacks.jim@leg.wa.gov

For the past ten years, Jim Jacks' career has focused on public service and problem-solving. He was the citizen advocate for the City of Vancouver, and Governor Chris Gregoire's representative in southwestern Washington. Jim also established the Clark County Juvenile Court's Victim-Offender Mediation program. He currently works in business development for the engineering, surveying and planning firm of MacKay & Sposito.

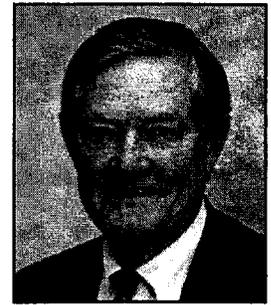


Jim

Senator Cliff Larsen

Montana State Senate, District 50
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406.728.1601
cliff@larsenusa.com

Cliff Larsen has over 30 years of experience in founding and operating employee benefit organizations serving both the public and private sectors of employment. He has served as President and CEO of a number of businesses from coast to coast specializing in managing health and mental health employee benefits. Cliff has taught at Boise State University (his alma mater) and The University of Oregon in the field of social welfare. In addition to serving as Montana State Senator from Missoula, he is active as a director on a number of boards both private and public and consults to business on employee benefit issues. Cliff lives on a ranch near Missoula raising horses and cattle.



Cliff

Senator Lynda M. Lovejoy

New Mexico State Senate, District 22
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Crownpoint NM 87313
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lynda.lovejoy@nmlegis.gov

Lynda Lovejoy is a State Senator representing District 22 (portions of five counties) in northwest New Mexico. She was appointed by Governor Bill Richardson to the Senate in January 2007 as a result of a vacancy. During the recent NM state election in June 2008, she ran as one of four candidates to regain her seat and won her senate race. Lovejoy served two four-year terms in office on the NM Public Regulation Commission from January 1999 to 2006. There she served as Commission chairperson for House Government & Urban Affairs Committee. She holds a BS in public administration and is a graduate student pursuing an MBA.



Lynda

MLA Richard Marz

Member of Legislative Assembly for Olds-Didsbury-Three Hills
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Richard Marz was elected to his fourth term as a Member of the Legislative Assembly on March 3, 2008. In addition to his role as an MLA, Richard serves as a member of the standing committee on Legislative Offices, the Select Special Chief Electoral Officer Search Committee and the Standing Committee on Economy. During his third term he was elected Deputy Speaker and Chair of Committees (2004-2008). Since he was first elected in 1997, Richard has served on the over a dozen committees. In 1980 he was elected councillor for the municipal district of Kneehill, eventually serving as deputy reeve and finally reeve. He worked in the oil patch prior to joining the Calgary police force in 1969.

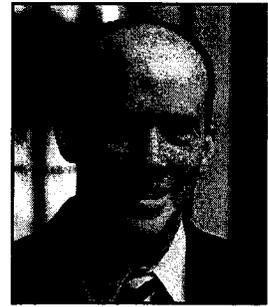


Richard

Senator Curt McKenzie

Idaho State Senate, District 12
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cmckenzi@senate.idaho.gov

Curt McKenzie is a four-term Idaho State Senator; Chairman of the Senate State Affairs Committee, and co-chairman of: Environmental Common Sense Task Force; Energy, Environment, and Technology Interim Committee, where he established the first written state energy policy in twenty-five years; Public Transportation and Air Quality Interim Committee; and is on the Governor's Task Force to amend and revise Idaho's Alcohol Beverage Control statutes. He remains a partner at Augustine & McKenzie LLP.



Curt

MLA Tim McMillan

Member of Legislative Assembly for Lloydminster
4910B -49 ST
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Tim McMillan was elected in November 2007, and is also currently the Chair of the Caucus' Standing Policy Committee on Crowns and Central Agencies, the Chair of Legislature's Standing Committee on Crowns and Central Agencies, as well a member of the Private Bills House Committee and member of the Legislation and Regulation Review (Caucus) Committee. Tim is a Microsoft Certified Systems Engineer and spent a year contracting as an IT professional in London, England. Tim has also operated an Oilfield Service Company and has run a 300 head cattle ranch. His extensive travels have taken him from hiking to the Mount Everest Base Camp to diving on the Great Barrier Reef in Australia.



Tim

MLA Diana McQueen

Member of Legislative Assembly for Drayton Valley-Calmar
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Diana McQueen was elected to the Legislative Assembly in 2008. On March 12, 2008, she was appointed parliamentary assistant to the Minister of Environment where she leads on the Waste and Air files. Diana's prior experience includes working for Amoco Canada, managing a retail business and providing board development instruction with the provincial Board Development Program. Diana has served as school board trustee/chair, Drayton Valley mayor, and Vice President of the Alberta Urban Municipalities Association. Currently, Diana is a member of the Standing Committees on Resources and the Environment and Private Bills, the Cabinet Policy Committee on Resources and the Environment and the Forest Industry Sustainability Committee.



Diana

MLA Leonard Mitzel

Member of Legislative Assembly for Cypress-Medicine Hat
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Len Mitzel was elected to his second term as a Member of the Legislative Assembly of Alberta in 2008. In addition to his regular duties as an MLA, Len currently serves as chair of both the Legislative Offices Committee and the Select Special Chief Electoral Officer Search Committee and as a member of the Privileges and Elections, Standing Orders and Printing Committee. On April 14, 2008, Len was elected to the position of Deputy Chair of Committees by acclamation. Since being elected to the Alberta Legislature, he has served on numerous committees and councils. Len has been given awards including The Canada 125th Anniversary Medal for Volunteerism, The Queen's Anniversary Medal for Volunteerism, The Alberta 100th Anniversary Medal, The Earl Flynn Award for Tourism for South East Alberta, and The TIALTA Award for Small Tourism Attractions.



Len

Rep. Mark Neuman

Alaska House of Representatives, District 15
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Mark Neuman moved to Alaska from Rice Lake, WI, in 1981. Mark was first elected to the House of Representatives in 2004, and is serving his third term. His district is physically larger than a number of states within the continental US, and two-thirds of his district cannot be reached by road. During his tenure in the legislature, Mark has served as the Chair of the House Committee on Economic Development, Trade & Tourism; Vice-Chair of Labor & Commerce; Vice-Chair of Transportation, and is presently the Co-Chair of Natural Resources with oversight of Energy Issues. Mark also owns a custom wood furniture business in Big Lake Alaska.

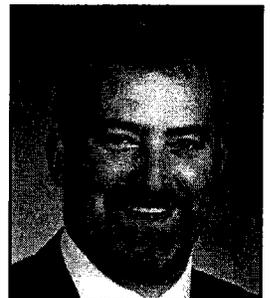


Mark

Senator Kevin Ranker

Washington State Senate, District 40
904 6th ST
Anacortes WA 98221
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Ranker:Kevin@leg.wa.gov

Kevin Ranker brings 15 years experience in community development and public policy in the private and public sectors to the Legislature. Kevin has worked at the local, regional and international level developing and advancing coastal and ocean policy, community development strategies and conservation initiatives. His most recent public service has been as San Juan County Council member from 2004-08. Prior experience includes working as a program officer for the Pacific Region for The Ocean Foundation and as a board member of the Puget Sound Partnership and a member of the Washington State Shoreline Hearings Board. Previously, Kevin counseled at-risk high school and middle school students. He serves as Vice Chair of the Agriculture & Rural Economic Development Committee, Vice Chair of Natural Resources, Ocean & Recreation Committee and is a member of the Environment, Water & Energy and Transportation Committees.

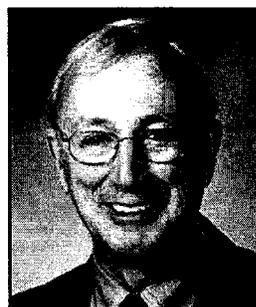


Kevin

Senator Phil Rockefeller

Washington State Senate, District 23
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rockefeller.phil@leg.wa.gov

Phil Rockefeller has represented Washington's 23rd Legislative District since 1999, first as a member of the State House of Representatives, and as State Senator since 2005. He currently Chairs the Senate Environment, Water, & Energy Committee. Phil is a graduate of Yale University and Harvard Law School and is a member of the Washington State Bar. Prior to his election, he served as education advisor to Washington Governor John Spellman and as Regional Administrator of the U.S. Department of Education Office of Student Financial Assistance.



Phil

Rep. Shelly Short

Washington House of Representatives, District 7
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Republic WA 99166
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A life-long Washingtonian, Shelly Short is serving her first term representing the 7th District which includes Ferry, Lincoln, Pend Oreille and Stevens counties and parts of Okanogan and Spokane counties. Shelly was chosen by her colleagues as ranking member on the House Ecology and Parks Committee. She also sits on the General Government and Appropriations, Local Government and Housing, and the Audit Review and Oversight committees. Shelly has spent the past 14 years as a key staffer for state and federal officials. She has served as a precinct committee officer and past district leader for the Stevens County Republican Committee.



Shelly

Senator Bert Stedman

Alaska House of Representatives, District A
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907.225.8088
sen.bert.stedman@legis.state.ak.us

Bert Stedman is a fourth generation Alaskan from Sitka. Raised in southeast Alaska, he spent several years working in the commercial fishing and construction industries. With a degree in business administration from University of Oregon, Bert has operated an investment services firm since 1986. He has served on the Sitka Planning Commission and Assembly. Bert was appointed to the Alaska State Legislature in 2003. He serves as Co-Chairman of the Senate Finance Committee and is a member of the Senate Energy and Resources Committee.



Bert

Gene Therriault

Senior Policy Advisor, In-state Energy, Office of the Governor
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Fairbanks AK 99701
907.488.0857
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Gene Therriault was elected to the Alaska State Senate in 2001. He was the Senate President from 2003-04. Gene has been Henry Toll Fellow Alumnus, Chair of the Administrative Regulation Review Joint Committee, Chair of the Legislative Council Joint Committee, and Chair of the State Affairs Committee, among others. Before becoming a senator, Gene was legislative assistant to Rep. Mike Miller, and a partner at Hector's Welding Inc., T.H.E. Company, and T.H.E. Farms.



Gene

MLA Len Webber

Member of Legislative Assembly for Calgary-Foothills
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calgary.foothills@assembly.ab.ca

Len Webber was elected to his second term as a Member of the Legislative Assembly of Alberta for the constituency of Calgary-Foothills, and was appointed as the Parliamentary Assistant for Energy. In 2008. Len currently serves as a member of the Legislative Offices Committee, the Select Special Chief Electoral Officer Search Committee and the Standing Committee on Resources and Environment. During his service as a Member Len has also served as deputy government whip and on numerous boards and committees. Before becoming an MLA, Len was the vice-president and director of Webber Academy, a nonprofit university preparatory private school in Calgary. He is the recipient of the Alberta Centennial Medal for his contributions to the province of Alberta.

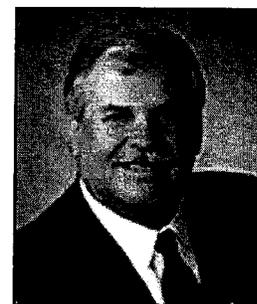


Len

MLA Randy Weekes

Member of Legislative Assembly for Biggar
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106 – 3rd AVE W
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Randy Weekes was elected in 1999 and re-elected in 2003 and 2007. During his terms in opposition, Randy served as the critic for the Environment, Labour, and Highways and Transportation. He also served as deputy critic for Immigration, and for Information Services Corporation, and was vice-chair of the Legislature's Economy Committee and served on the Standing Policy Committee for Public Resource Management, the Legislative Committee on Agriculture, the Legislative Committee on Continuing Select and Non-controversial Bills, and on the Caucus Management Committee. Randy was also Deputy House Leader. After the Saskatchewan Party formed the government in November of 2007, Premier Brad Wall asked Randy to serve as Government Whip. He is currently a member of the caucus and the legislature's Standing Policy Committee on Crowns and Central Agencies. He has served as chairman of the Biggar Knights of Columbus Trade and Craft Show and as a provincial director of Saskatchewan Knights of Columbus. He is past chairman of the Saskatchewan Feeder Co-op Association and a past member of the Board of Directors of the Saskatchewan Cattle Feeders Association. Randy has been farming and ranching with his family near Biggar, where he was born, since 1976.

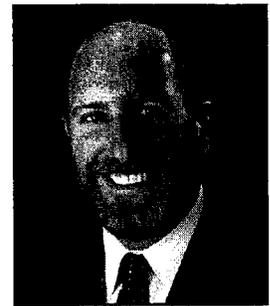


Randy

Senator Elliot Werk

Idaho State Senate, District 17
6810 Randolph DR
Boise ID 83709
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elliotwerk@gmail.com

Elliot Werk is in his fourth term in the Idaho State Senate. He currently serves on the Transportation, Resources and Environment, and Local Government and Taxation committees. He is the co-chair of the Joint Legislative Oversight committee, and also serves on the Millennium Fund and Energy, Environment, and Technology interim committees. Elliot has focused on legislation associated with energy and energy efficiency, child day care standards, consumer protection, eliminating the tax on food, mental health and substance abuse, ethics and transparency in government, and the impacts of climate change on Idaho's economy.



Elliot

MLA Nadine Wilson

Member of Legislative Assembly for Saskatchewan Rivers
RR #5, Site 16, Box 4
Prince Albert, SK S6V 5R3
306.763.0615
saskatchewanrivers@sasktel.net

Originally from Paddockwood, Nadine Wilson studied Social Service Work in Saskatoon prior to becoming a corrections worker. Nadine was one of the first women to work as a corrections worker in the Men's Provincial Correctional Center in Prince Albert. Over the years, Nadine has been elected or appointed to a number of organizations and boards. She had been twice elected for two terms as reeve for the Rural Municipality of Paddockwood and also served as past president for the North Central Rural Municipality Association. Nadine has spent more than a decade involved with 4-H clubs and seven years as a local school trustee. She was first elected as the MLA for Saskatchewan Rivers in the 2007 provincial election. She is currently a member of the caucus' Standing Policy Committee on the Economy, the Commonwealth Parliamentary Association Committee, and the Private Bills House Committee. She was also elected as Deputy caucus Chairperson



Nadine

Rep. Matt Wingard

Oregon House of Representatives, District 26
900 Court ST NE
Salem OR 97301
503.986.1426
rep.mattwingard@state.or.us

Matt Wingard has run his own public relations consulting firm in Wilsonville for the past six years. Prior to that, he spent five years in Central Washington as a television reporter, and with the office of Congressman Doc Hastings before returning to Oregon in 2001. He helped to start new, innovative public schools in Oregon and has worked on a variety of other public policy projects. Matt is a member of both the Wilsonville and Sherwood Chambers of Commerce. He has also served on the Clackamas County Economic Development Commission and the Portfolio Options Committee of the Oregon Public Utility Commission.

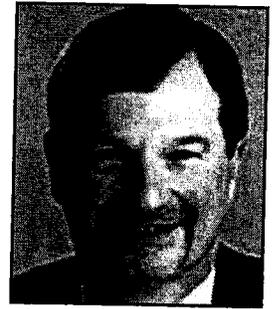


Matt

Rep. Brad Witt

Oregon House of Representatives, District 31
900 Court ST NE, H-374
Salem OR 97301
503.986.1431
rep.bradwitt@state.or.us

Brad Witt represents Oregon's House District 31, stretching 90 miles along the Columbia River from Sauvie Island to Astoria. He has been a sawmill worker, union representative in the seafood, grocery and forest industries, and was elected Secretary-Treasurer of the Oregon AFL-CIO for 14 years. Prior to entering the State Legislature, Brad served on the State Boards of Forestry, Watershed Enhancement, Workforce Enhancement, Workers' Compensation and Forest Resources Institute. He also served as co-chair of the bi-state Lower Columbia River Estuary Partnership. Brad is currently serving his third term in the Oregon Legislature.



Brad