BIPARTISAN POLICY CENTER

Capitalizing on an Evolving Power Sector: Policies for a Modern and Reliable U.S. Electric Grid

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NASEO ENERGY POLICY OUTLOOK CONFERENCE
FEBRUARY 5, 2014

AGENDA

- Electric Grid Initiative Overview
- Context for this Work
- Report Recommendations
- Next Steps

About the Bipartisan Policy Center

The Bipartisan Policy Center (BPC) is a non-profit organization that was established in 2007 by former Senate Majority Leaders Howard Baker, Tom Daschle, Bob Dole and George Mitchell to develop and promote solutions that can attract public support and political momentum in order to achieve real progress. The BPC acts as an incubator for policy efforts that engage top political figures, advocates, academics and business leaders in the art of principled compromise.




- **The BPC Electric Grid Initiative was led by –**
  - **Rick Boucher**, Partner and Head of Government Strategies Group, Sidley Austin LLP; Former Chairman, House Subcommittee on Energy and Air Quality
  - **Allison Clements**, Director, Sustainable FERC Project, Natural Resources Defense Council
  - **Curt Hébert**, Partner, Brunini, Grantham, Grower & Hewes, PLLC; Former FERC Chairman under President George W. Bush
- **This year-long engagement also included a diverse group of participants from academia, utilities, non-governmental organizations, regional transmission organizations and others**

TASK FORCE PARTICIPANTS

Name	Affiliation
Kathleen Barrón	Senior Vice President, Federal Regulatory Affairs & Wholesale Market Policy, Exelon Corporation
Lisa Barton	Executive Vice President , AEP Transmission, American Electric Power
Terry Boston	President & CEO, PJM Interconnection
Mark Brownstein	Chief Counsel, Energy Program, Environmental Defense Fund
José Delgado	President & CEO, American Transmission Company (Retired)
John Jimison	Managing Director, Energy Future Coalition
Doug Larson	Executive Director, Western Interstate Energy Board
David Malkin	Director, Government Affairs and Policy, General Electric
Terry Morlan	Director, Power Planning, Northwest Power and Conservation Council (Retired)
Roby Roberts	Vice President, Communications and Government Affairs, EDP Renewables
Richard Schmalensee	Howard W. Johnson Professor of Economics and Management Emeritus, MIT; Co-Director MIT Center for Energy and Environmental Policy Research
Susan Story	President & CEO, Southern Company Services
Vickie VanZandt	President, VanZandt Electric Transmission Consulting, Inc.; former Senior VP for Transmission, Bonneville Power Administration
Raymond Wood	Head of U.S. Power and Renewables, Bank of America Merrill Lynch

Identify cost-effective policies that strengthen and modernize the grid and achieve the complementary goals of:

1. Improving system reliability and resiliency
2. Integrating clean energy technologies cost-effectively

- The task force identified a menu of 37 recommendations for Congress, federal agencies, states and RTOs / ISOs
- The recommendations are not a comprehensive set of policies, but rather highlight important areas that have potential for broad stakeholder support
- Consensus was reached on this package of recommendations, but unanimity was not reached on each individual recommendation.

The electric grid currently faces a number of challenges and changing dynamics including –

- Changing generation mix
  - Economics favoring gas over coal (shale gas, EPA regs)
  - Expected growth in variable energy resources (state RPSs)
- Pressures on existing transmission and distribution infrastructure
  - Congestion
  - Aging and often inefficient infrastructure
  - Need to enable cost-effective integration of advanced grid technologies
- Concerns about reliability and resilience
- Diversity in market and regulatory structures across states
- Changing policy environment
  - FERC Order No. 1000 – implications for transmission planning and cost allocation

- **The Initiative developed recommendations in four broad policy areas:**

  1. Encourage necessary transmission system expansion and distribution upgrades.
  2. Improve the coordination of electric grid planning across various regions and among disparate market structures.
  3. Enhance the flexibility of the grid through the integration of cost-effective advanced grid technologies and demand side resources.
  4. Improve the overall reliability of the electric system with improved data sharing and cost-effective reliability standards.

- **Given the institutional and market diversity that exists across the U.S. power sector, not every recommendation is applicable in each region, state or market structure.**

- **Key challenges**
  - Transmission
    - Increasing need for high voltage, multi-state lines.
    - Lengthy, often inefficient siting processes, out-of-sync with timeframe for permitting and siting generation.
  - Distribution
    - Benefits from investments in advanced grid technologies may be difficult to quantify – utilities and state PUCs may delay potentially beneficial investments.
    - Likelihood of increasingly blurred lines between transmission and distribution as grid modernization continues.

- **Recommendations**

Transmission

- Congress should grant FERC limited backstop authority for high-voltage interstate lines.
- States should update siting statutes to ensure that they can consider full range of projects in their siting processes.
- FERC should clarify that regional transmission plans can include "right-sized" transmission projects if they enable the efficient use of scarce rights-of-way or serve location-constrained generation.

Distribution

- DOE should fund the collection and dissemination of state PUCs best practices on policies to encourage cost-effective distribution upgrades to integrate advanced grid technologies.
- DOE, FERC, state PUCs, and stakeholders improve consultation and coordination on analysis and investment decisions at the interface of transmission and distribution.

- **Key challenges**
  - Seams issues result from insufficient coordination between neighboring regions.
  - Need to coordinate regional transmission planning under Order No. 1000 with existing state energy planning processes.
- **Recommendations**
  - FERC should encourage neighboring regions to address seams issues in interregional coordination under Order No. 1000.
  - DOE should fund efforts to develop best practices for coordinating state energy planning processes with regional transmission processes.

- **Key challenges**
  - Traditional regulation may create disincentives for utilities to make innovative investments.
  - Most customers face inefficient price signals.
  - Advancing key technologies (storage, analytical tools for PMUs).
- **Recommendations**
  - NARUC/state PUCs should identify output-based distribution system performance metrics, and craft model incentive-based regulation.
  - Utilities and PUCs should offer dynamic pricing where it is not currently available, and enable customer sharing of usage information with third parties in privacy-protected format.
  - Market operators and regulators should permit capable demand response resources to participate in markets and auctions on equal footing to conventional generation.
  - DOE continue to conduct R&D to advance key technologies, and also provide analytical support (CBA, lessons-learned, etc.) to advance deployment.

- **Key challenges**
  - Improve reliability data.
  - Better evaluate reliability standards.
  - Increase real-time information-sharing
  - Create efficiently-sized balancing authorities.
- **Recommendations**
  - NARUC should encourage state uniformity for distribution-level reliability data.
  - NERC and FERC should increase the use of cost-benefit analysis in developing reliability standards.
  - NERC should require real-time sharing of PMU and other operational reliability data among utilities and market operators.
  - NERC and FERC should consider the costs (including costs of VER integration) and reliability impacts in approving new balancing authorities. FERC and WECC should consider whether western BAs are efficiently configured.

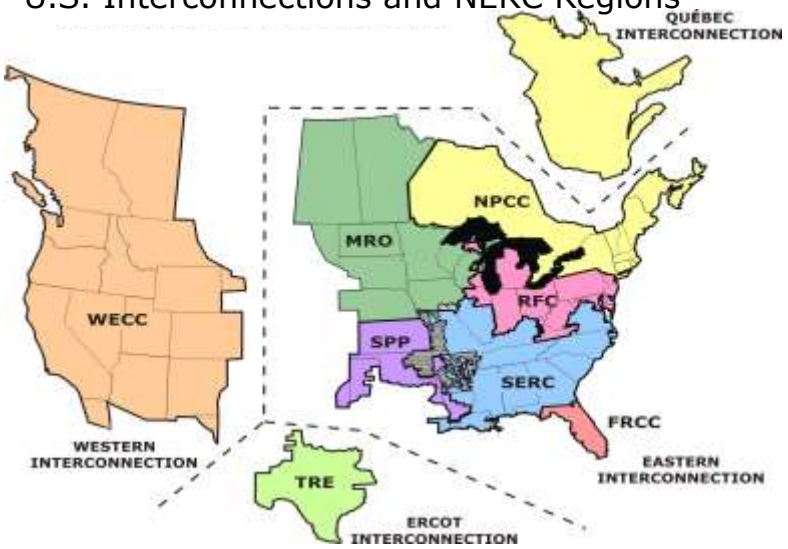
NEXT STEPS

- BPC and co-chairs have conducted outreach to Congress, federal agencies, RTOs/ISOs and state regulators to advance recommendations
- BPC will release report on electric grid cybersecurity on February 28th.
- Stay tuned for work on electric grid resilience.

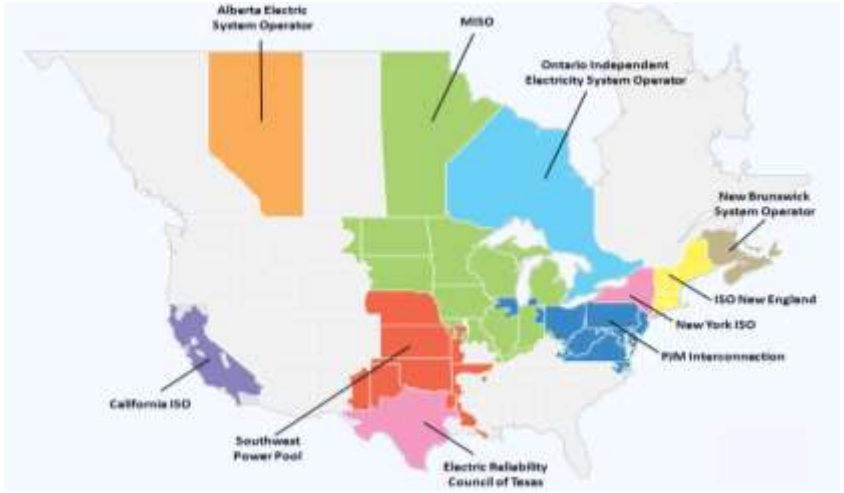
- **Goal**
  - Maintain state authority to protect consumers and environmental values, while ensuring that projects that provide broader regional or national benefits are not unduly impeded.
- **Key provisions**
  - HVDC and 765kV AC interstate lines eligible if:
    - State siting authority has denied the project without offering an alternative route,
    - Has not issued a decision within 18 months, or
    - Does not have authority to consider the line.
  - To be eligible, project must already be approved in at least one other state.
  - Before exercising authority, FERC must find that project is in the national interest.
  - States should be given ample opportunity for input in FERC proceedings (including recommending permit conditions).

1 REGULATORY AND REGIONAL COMPLEXITIES

U.S. Interconnections and NERC Regions



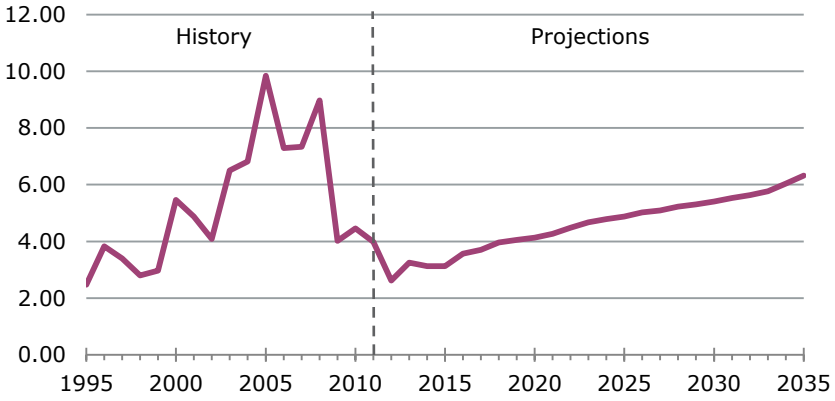
RTO and ISO Boundaries



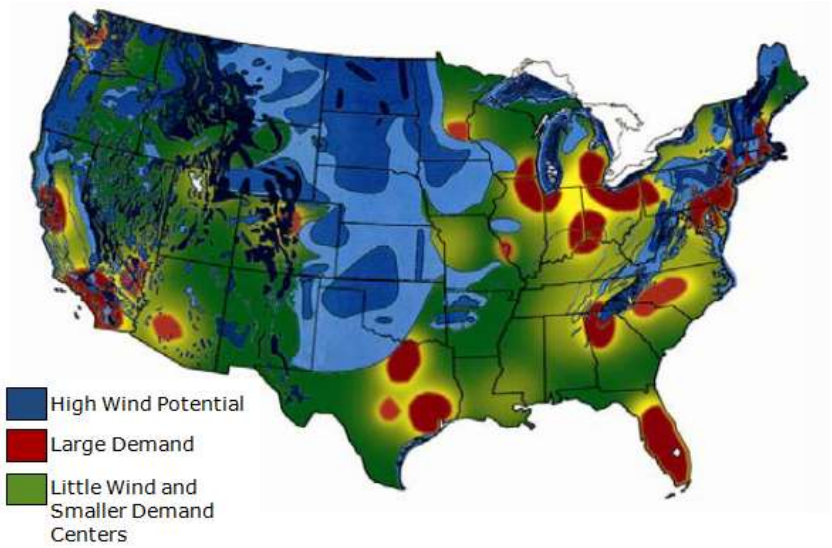
- The U.S. electric power sector is a complex system with many, diverse actors
  - Across the country, there is regional variation in market structure, policy priorities, and resource mix
  - There is a mix of state and federal policymakers including state public utility commissions, FERC, and others
- Coordination between the many institutions that govern or operate the U.S. grid will be essential to ensure that the necessary investments are made **in a cost-effective manner**
- The recent FERC Order No. 1000 altered the requirements for transmission planning and cost allocation with a focus on regional **transmission planning and interregional coordination**

2 ELECTRIC GENERATION FUEL MIX

Annual Average Henry Hub Natural Gas Spot Prices
Dollars per MMBTU (in 2011$)



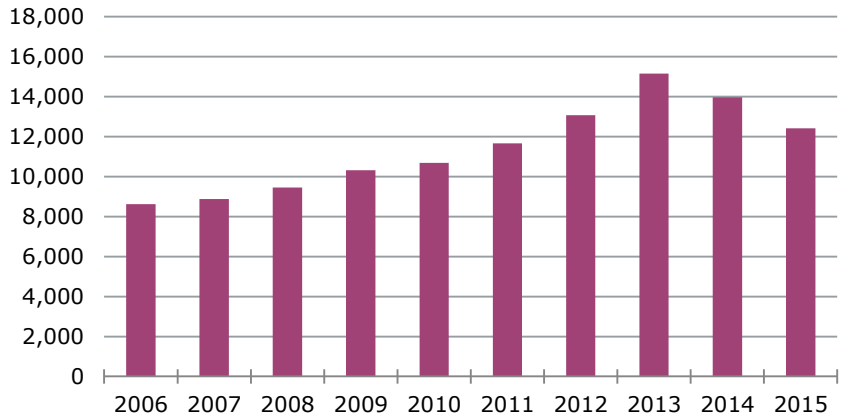
Wind Resources and Demand Centers



- As a result of economic trends and state and federal energy and environmental policies, renewables and natural gas are comprising an increasing share of the generation mix
  - State renewable portfolio standards and state and federal tax incentives have driven an increase in generation from renewables
  - Currently, 29 states and DC have renewable or alternative energy portfolio standards
  - Expanding domestic natural gas production from shale gas reserves has lowered prices, diminishing coal's cost advantage
  - In addition, recent EPA regulations are expected to increase or accelerate the retirement of some coal plants
- These renewables resources are variable, leading to challenges in integrating and operating, and also often located far from load centers, necessitating the construction of new transmission lines

3 TRANSMISSION INFRASTRUCTURE AND ADVANCED TECHNOLOGIES

Transmission Investment by Shareholder-Owned Utilities
Million Dollars (in 2011$)



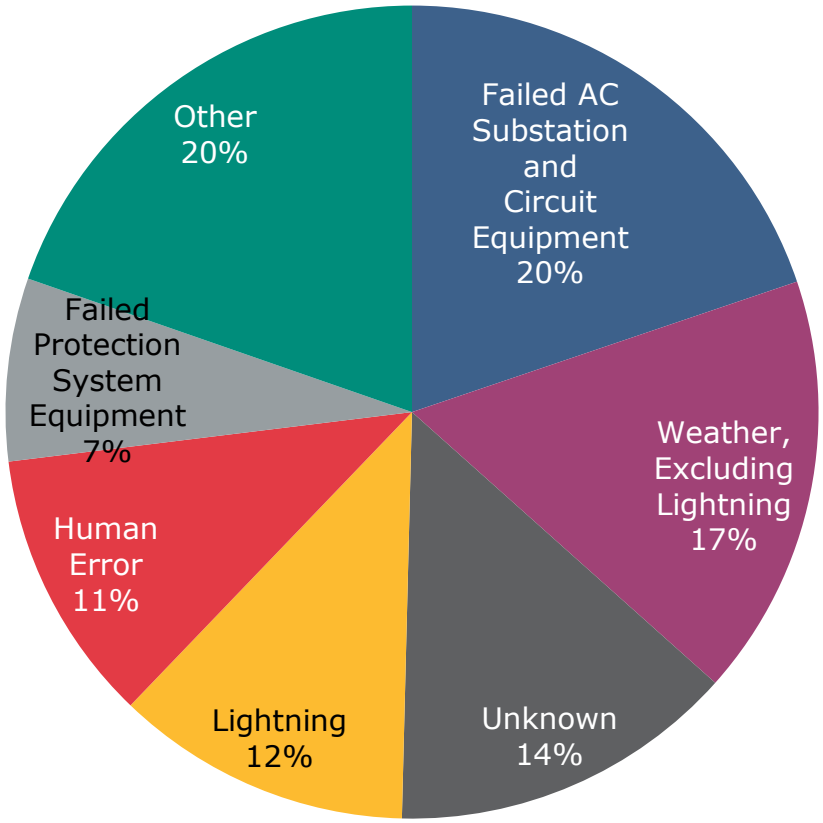
Categories of Smart Grid System

Categories	Definition	Example Technologies
Integrated Communications	High-speed, fully integrated, two-way communication technologies that make the grid dynamic and interactive	• Wireless Communications Technologies • Home Area Networks
Advanced Components	Advanced components that play an active role in determining the electrical behavior of the grid	• Smart Switches, Cables, Transformers • Storage Devices • Grid-friendly, Smart Appliances
Advanced Control Methods	New methods and algorithms that monitor power system components, enabling rapid diagnosis and timely, appropriate response to any event	• Substation & Distribution Automation (Real-time Control / Monitoring) • Fault Locator Systems
Sensing & Measurement	Technologies that enhance power system measurements and enable the transformation of data into information	• Advanced Metering Infrastructure • Phasor Measurement Units • Dynamic Line-Rating Devices
Improved Interfaces & Decision Support	Interfaces that enable more accurate and timely human decision-making at all grid levels, including the consumer level, and more advanced operator training	• Software Tools to Analyze Electricity System Health • Distribution System Modeling Software

- The changing generation fuel mix creates a variety of transmission needs including localized lines and long-distance connections
  - Specifically, adequate transmission investment enables new generation resources to come online, supports reliability, and minimizes generation costs
- Advanced or smart grid technologies also provide opportunities for enhancing system flexibility, responsiveness, and reliability
  - In some cases, these **technologies enable resources that** can serve as cost-effective alternatives to new transmission investment
  - These technologies face barriers including uncertain benefits, high initial costs, technological hurdles and some public opposition

4 GRID RELIABILITY EVENTS

Number of Sustained Outage Occurrences
By Cause Code (AC Circuit)



- After blackouts in the southwest and other regions, and widespread outages as a result of hurricanes Sandy and Katrina, the public has an increased interest in grid reliability
  - A 2006 LBNL study estimated the annual cost of power disturbances, excluding power quality incidents, at $79 billion
  - Most outages occur on distribution systems rather than on the bulk power system, particularly during the course of weather related events
- States retain jurisdiction over distribution systems, but NERC is responsible for the reliability of the bulk power system through the development of reliability standards
- An ongoing challenge in terms of assessing the reliability of grid is the need for consistent and complete publicly available data on outages and their causes