

## **Panel Discussion: Renewable Energy Development and Transmission Expansion – Who Benefits and Who Pays**

### **Opening Remarks**

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**EUCI Conference  
Chicago  
October 12, 2010**

# Increase in Transmission Investments under Way

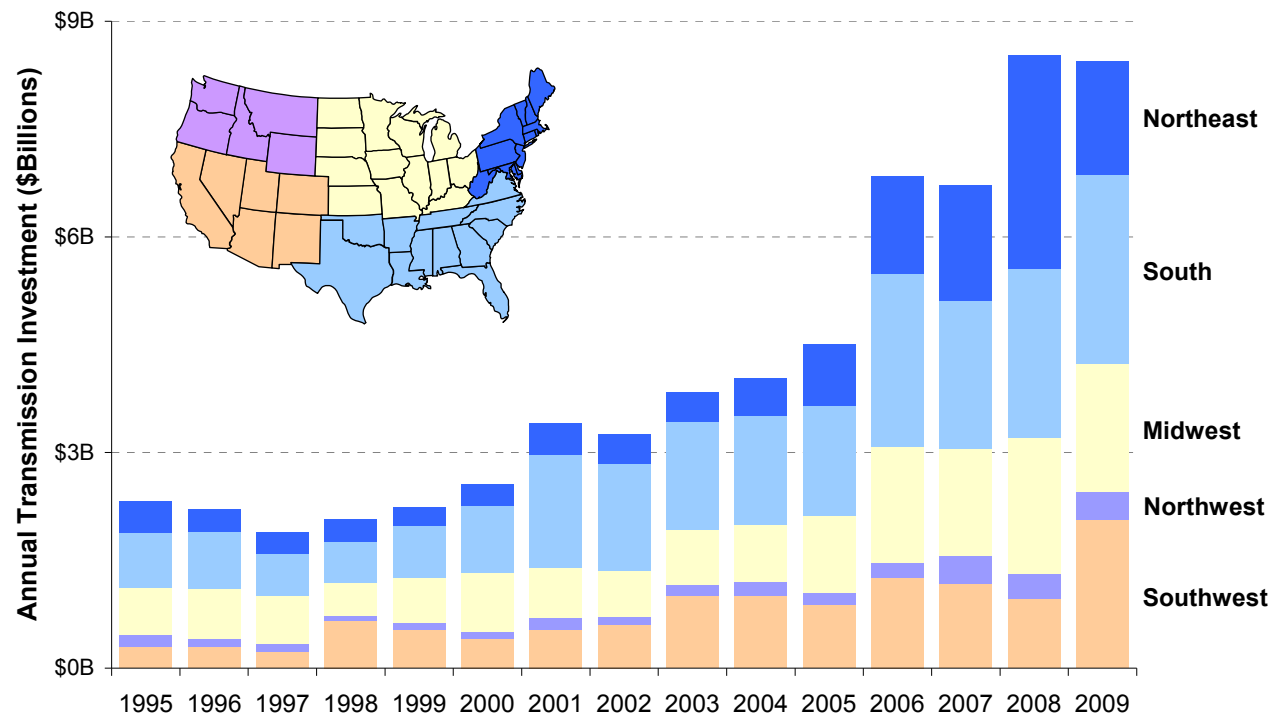
Transmission expansion under way for utility-specific and regional reliability investments:

- \$2b/year in 1990s
- \$8b/year in 2008-09

NERC predicts investment (in mostly reliability and generation interconnection projects) to **triple** from about 1,000 miles/yr in 2000-08 to 3,000 miles/yr for 2009-2017

**Additional regional upgrades now driven by state renewables requirements**

**Annual Transmission Investment of Investor-Owned Utilities by FERC Subregion**



**Source:** The Brattle Group based on FERC Form 1 data compiled by Global Energy Decisions, Inc., The Velocity Suite.

# \$180 Billion of Planned and Proposed Projects

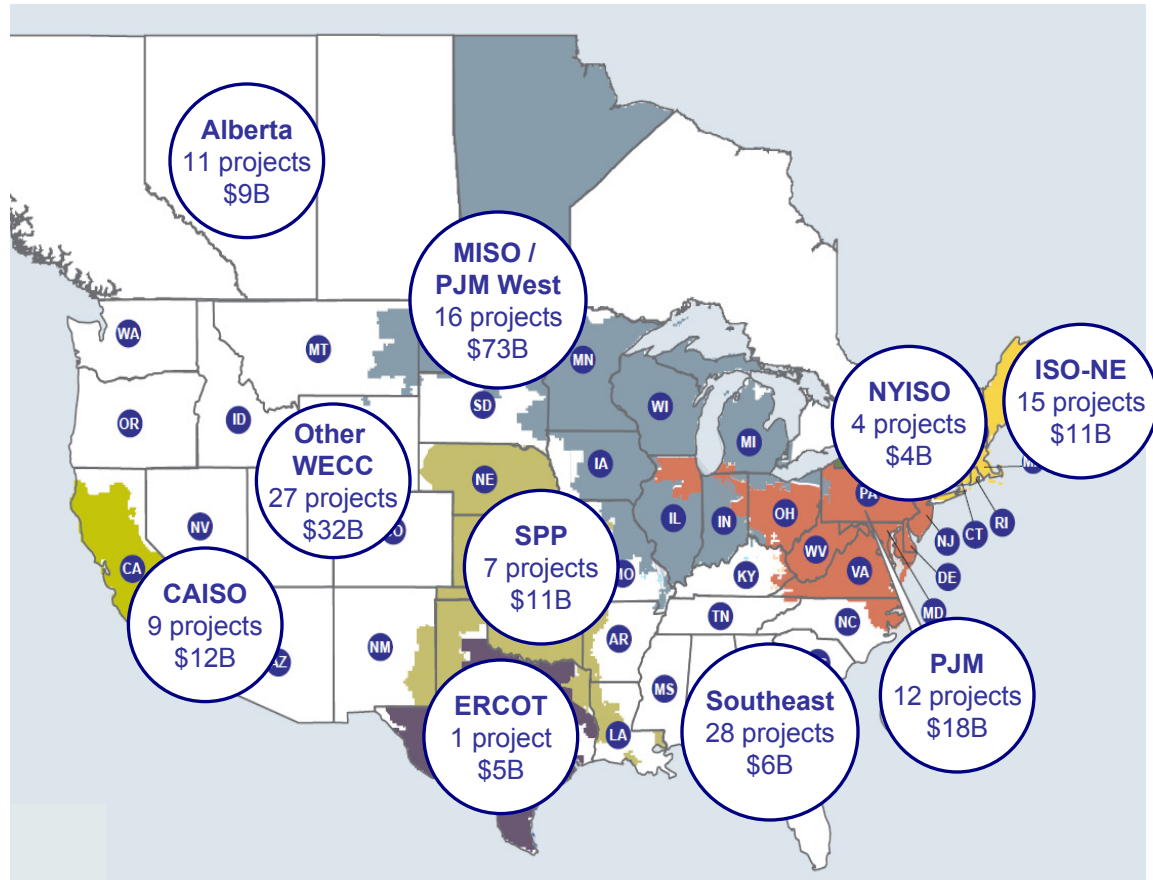
We identified approx. 130 mostly conceptual and often overlapping projects (>\$100 million each) for a total of over \$180 billion

Many of these regional projects will not get realized due to:

- ◆ Overlaps with competing projects
- ◆ Planning and cost allocation challenge
- ◆ High costs

**Large portion of these proposed projects are driven by large-scale renewables integration**

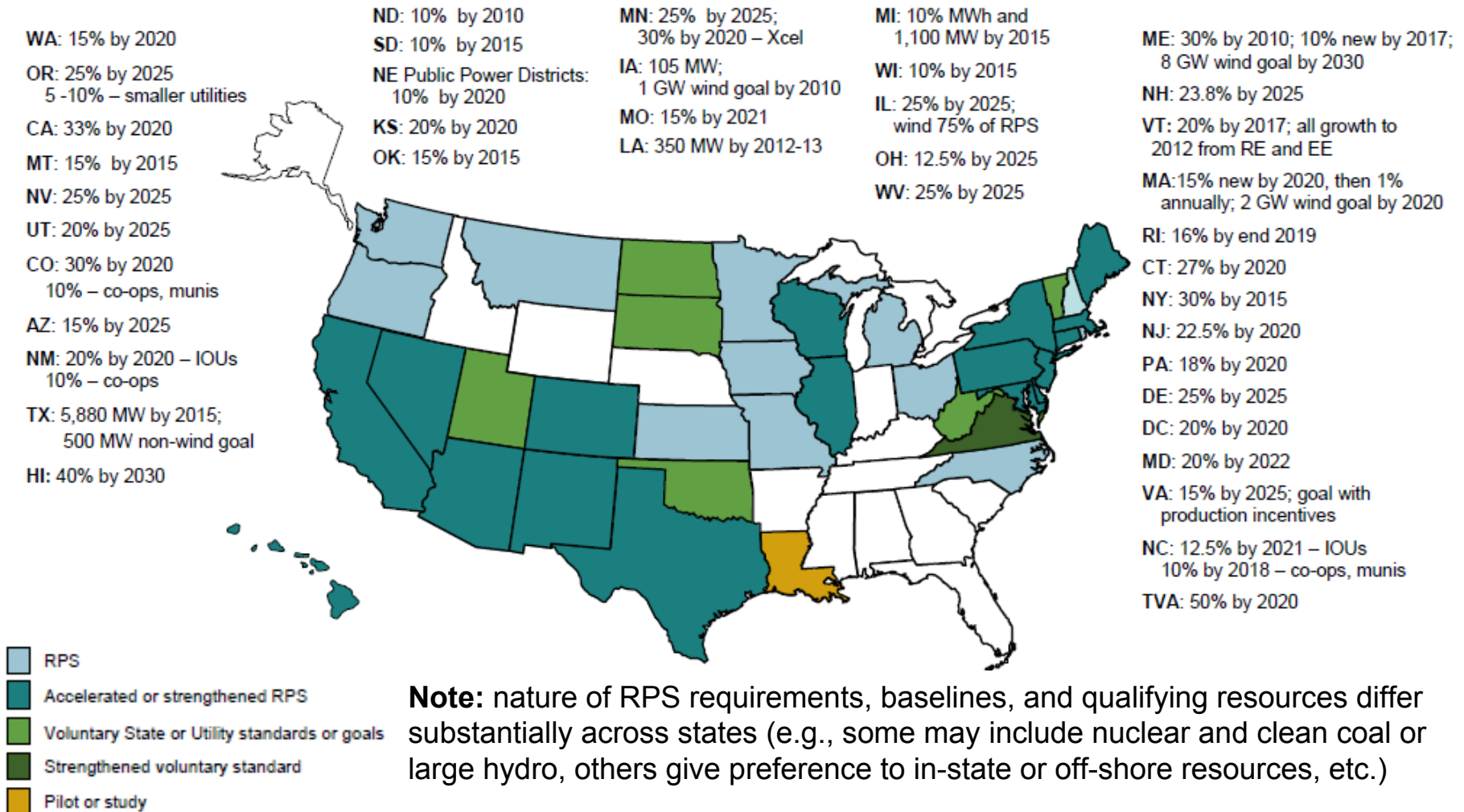
## \$180 Billion of Planned and Conceptual Transmission Projects as of 9/10



Source: Map from FERC. Project data collected by *The Brattle Group* from multiple sources and aggregated to the regional level.

# State Renewable Portfolio Standards and Goals

29 states and D.C. have an RPS; 7 States and 3 Power Authorities have Goals



**Note:** nature of RPS requirements, baselines, and qualifying resources differ substantially across states (e.g., some may include nuclear and clean coal or large hydro, others give preference to in-state or off-shore resources, etc.)

Source: Federal Energy Regulatory Commission, “Renewable Power & Energy Efficiency Market: Renewable Portfolio Standards,” as of August 11, 2010. Available at: [www.ferc.gov/oversight](http://www.ferc.gov/oversight)

# How Much Transmission for Renewables?

## NERC-identified planned/proposed projects through 2018:

\$50 billion ... estimated based on NERC circuit miles  
(1/3 each for reliability, conventional generation, and renewables)

## Of the \$180 billion of individual projects identified earlier:

\$30 billion ... in RTO-approved plans

\$80 billion ... additionally proposed (non-overlapping)

## Estimated US-wide incremental transmission needed to integrate renewables through 2025:

- ♦ To satisfy existing state-level RPS requirements

\$40-70 billion

- ♦ For higher of existing state and 20% federal RPS

\$80-130 billion

# Challenge: Benefits to Whom and When?

## The benefits of regional transmission projects are:

|  |  |
|--|--|
| <ul style="list-style-type: none"><li>▪ <b>Broad in scope</b></li></ul>                                  | <ul style="list-style-type: none"><li>▪ Renewables integration and environmental benefits</li><li>▪ Economic development from G&amp;T investments</li><li>▪ Increased reliability and operational flexibility</li><li>▪ Reduced congestion, dispatch costs, and losses</li><li>▪ Lower capacity needs and generation costs</li><li>▪ Increased competition and market liquidity</li><li>▪ Insurance and risk mitigation benefits</li><li>▪ Fuel diversification and fuel market benefits</li></ul> |
| <ul style="list-style-type: none"><li>▪ <b>Wide-spread geographically</b></li></ul>                      | <ul style="list-style-type: none"><li>▪ Multiple transmissions service areas</li><li>▪ <b><u>Multiple states</u></b> or regions</li></ul>  |
| <ul style="list-style-type: none"><li>▪ <b>Diverse in their effects on market participants</b></li></ul> | <ul style="list-style-type: none"><li>▪ <b><u>Customers, generators, transmission owners</u></b> in regulated and/or deregulated markets</li><li>▪ Individual market participants may capture one set of benefits but not others</li></ul>   |
| <ul style="list-style-type: none"><li>▪ <b>Occur and change over long periods of time</b></li></ul>      | <ul style="list-style-type: none"><li>▪ Several decades</li><li>▪ Changing with system conditions and future generation and transmission additions</li><li>▪ Individual market participants may capture different types of benefits at different times</li></ul>   |

# Additional Reading

*"Comments of Johannes Pfeifenberger, Peter Fox-Penner and Delphine Hou,"* in response to FERC's Notice of Proposed Rulemaking on Transmission Planning and Cost Allocation (Docket RM10-23-000).

Pfeifenberger, Hou *"Transmission Planning and Cost Benefit Analysis,"* EUCI Web Conference, September 22, 2010

Fox-Penner, Pfeifenberger, Hou, *"For Grid Expansion, Think 'Subregionally',"* *The Energy Daily*, June 8, 2010.

Fox-Penner, *"Smart Power: Climate Change, the Smart Grid, and the Future of Electric Utilities,"* Island Press, 2010.

Pfeifenberger, Chang, Hou, Madjarov, *"Job and Economic Benefits of Transmission and Wind Generation Investments in the SPP Region,"* *The Brattle Group, Inc.*, March 2010.

*"Comments of Peter Fox-Penner, Johannes Pfeifenberger, and Delphine Hou,"* in response to FERC's Notice of Request for Comments on Transmission Planning and Cost Allocation (Docket AD09-8).

Pfeifenberger, Fox-Penner, Hou, *"Transmission Investment Needs and Cost Allocation: New Challenges and Models,"* The Brattle Group, Inc., presented to FERC Staff, Washington, DC, December 1, 2009.

Fox-Penner, Pfeifenberger, *"The Anchor-Tenant Model – And Some of the Chickens and Eggs,"* The Electricity Journal Guest Editorial, Volume 22, Issue 6, July 2009.

Pfeifenberger, *"Assessing the Benefits of Transmission Investments,"* presented at the Working Group for Investment in Reliable and Economic Electric Systems (WIRES) meeting, Washington, DC, February 14, 2008.

Pfeifenberger, Direct Testimony on behalf of American Transmission Company re: Transmission Cost-Benefit Analysis Before the Public Service Commission of Wisconsin, Docket 137-CE-149, January 17, 2008.

Pfeifenberger, Newell, *"Evaluating the Economic Benefits of Transmission Investments,"* EUCI's Cost-Effective Transmission Technology Conference, Nashville, TN, May 3, 2007.

Pfeifenberger, Testimony on behalf of Southern California Edison Company re: economic impacts of the proposed Devers-Palo Verde No. 2 transmission line, before the Arizona Power Plant and Transmission Line Siting Committee, Docket No. L-00000A-06-0295-00130, Case No. 130, September and October, 2006.

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*The Brattle Group* provides consulting and expert testimony in economics, finance, and regulation to corporations, law firms, and governmental agencies around the world.

We combine in-depth industry experience, rigorous analyses, and principled techniques to help clients answer complex economic and financial questions in litigation and regulation, develop strategies for changing markets, and make critical business decisions.

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- Retail Access and Restructuring
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- Mergers and Acquisitions
- Transmission

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