

Resource Adequacy, Reliability, and Price: Impacts of RPS and Carbon Limits, New Business Models and Incentives

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Ron Lehr

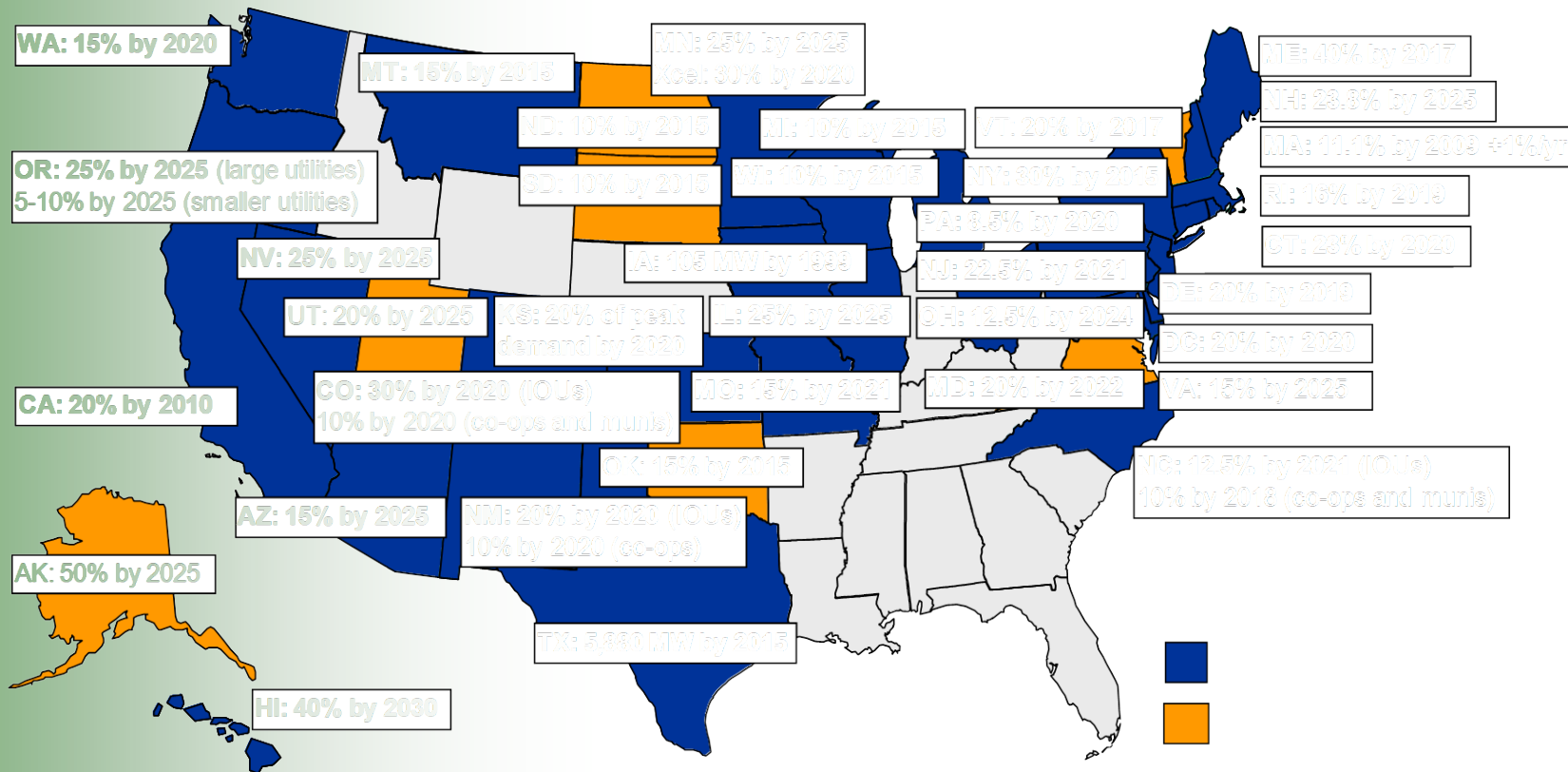
AWEA Western Transmission Representative



About Western Grid Group

- 200 years state regulatory experience
 - Former chairmen, staff of 8 western PSCs
- 50 years experience as wind, solar, geothermal, hydroelectric power developers
- Non-profit NGO; works with Governors, utilities, regulators, agencies, advocates
- Formed 2003 to develop policies to accelerate transition to sustainable electricity, win transmission access for clean resources

State Renewable Energy Standards

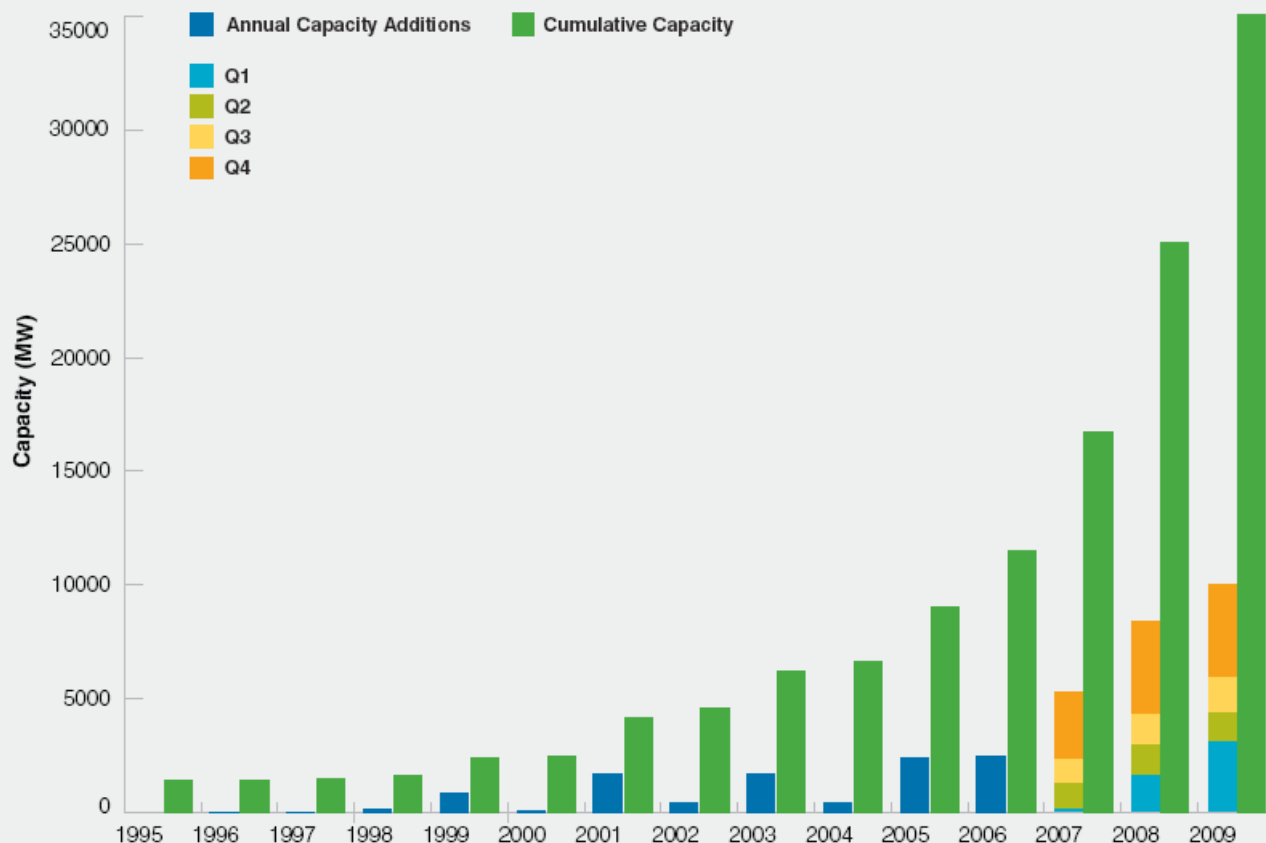


- KS established mandatory RPS in 2009; total now 29 states and D.C.
- State renewable funds, tax incentives, utility resource planning, voluntary green power, carbon concerns played a role in 2009

“Intermittent” Resources

- “Intermittent” implies on or off
 - renewable resources rarely appear or disappear suddenly, conventional resources can disappear suddenly
- “variable” suggests weather changes that drive renewables output:
 - “variable weather”
 - Addressed by additional system flexibility
- “uncertainty”—addressed by forecasting, improved scheduling

Additional Wind in U.S. Electric Supply



Year	Annual Capacity Additions (MW)	Cumulative Capacity (MW)
Through end 1995		1416
1996	1	1417
1997	17	1434
1998	140	1574
1999	819	2394
2000	67	2460
2001	1691	4151
2002	412	4563
2003	1670	6233
2004	397	6629
2005	2385	9014
2006	2462	11476
2007	5258	16725
2008	8366	25076
2009	10010	35086

Installation figures for years 2006 - 2009 (annual and cumulative) include capacity for installed turbines under 100 kW, whereas earlier years may not. The small wind report tracks sales of wind turbines 100-kW and below. The utility scale wind power projects database tracks turbine installations 100-kW and above. 100-kW turbine sales were subtracted from the small wind report total to avoid double counting. Data has changed slightly from the 2008 Wind Industry Report due to small decommissionings, changes in how the data was reported and other changes provided by companies.

“Reliability Concerns”

- European experience
 - Ireland at 40% instantaneous wind penetration, with pumped storage plant out, no reliability issues
 - Spanish wind integration centers
- Utility Wind Integration Group www.uwig.org
- IEEE PES, Wind Power Technical Committee
 - “Power and Energy” Vol. 2, No. 6 Nov/Dec 2009
- NREL and DOE—Western Wind and Solar Integration Study (“WW&SIS”), Eastern Wind Integration and Transmission Study (“EWITS”)
- NERC Integration of Variable Generation Task Force (“IGVTF”)
- WECC Variable Generation Subcommittee (“VGS”)

DOE 20 Percent Wind Study*

- Technically Feasible, but not under BAU
- Policy, Market, Operational changes:
 - More flexible generation and load technologies
 - Improved forecasting tools
 - Improved grid codes and wind plant models
 - Aggregate wind plant output over larger regions
 - Improve balancing area cooperation, reserve sharing
 - Real time load response markets
 - Market rules, tariffs more weather driven generator aligned
 - Better use of physically (not contractually) available transmission
 - Eliminate pancaked transmission rates

*--www1.eere.energy.gov/windandhydro/pdfs/41869.pdf

“If coal plants are shut down. . .”

- “AS coal plants are shut down. . .”
- Xcel Colorado supported HB10-1345, the “Clean Air, Clean Jobs Act” Ozone rules
 - 903 MW of old coal plants retired early
 - 229 MW previously retired early
 - Eight years, most any plant retires early
 - Replacement: natural gas, “low emitting resources:” wind, efficiency, solar
- **Key Issues:** coal versus gas; value of diversity; air quality; economics, accounting and financial issues; interplay with resource planning and bidding for new generation resources; incentives and make or buy; and transmission constraints and planning

“What policies?”

- Regulators: “least cost integration” “max use of existing grid” “share costs to create joint benefits” “transition to clean energy” “performance, shared savings and shared benefits, incentives” “rules rather than adjudication”
- Operators: “reliability” “adequacy” “forecasting, scheduling, access to balancing services and markets”
- System Planners: “diversity” “risks” “portfolios” “PWRR”
- Officers: “business models—smart integrator, energy services utility, portfolio allocation manager” “performance incentives”

Business Models, Incentives: Menu of Supply Side Options

- Current Incentive in Rate Base, Rate of Return Regulation: invest equity, earn a return, profit from “spin the meter”
 - Run 40 year old coal plants
- Keep RBROR accounting basis, rate cases that set authorized rates of return
- Consumer advocates will object to paying utilities more than authorized returns
- Consumers might benefit from faster transition to cleaner energy

Key Considerations

New Utility Business Models

“Energy Services Utility”

“Smart Integrator Utility”

Q: Should regulators be certified?

Wall Street -- accountability for utility managers requires risks to be understood

Add performance standards, options for incentives at bulk power level

DSM -- decoupling, incentives well described

Add Second Performance Review

- With RBROR incentive in place:
 - Performance review applies for further justification, or change in authorized return
 - Example: 10 percent authorized, use performance categories to justify the 10 percent return
 - Incentives never exceed 10 percent
 - OR
 - Example: 10 percent authorized, 8 to 12 percent performance potential
 - Incentives could reduce returns to 8 percent, or increase them to 12 percent
 - Performance Incentives scalable, depend on local circumstances, local decisions

Five Performance Categories

1. Diversity, renewable performance or energy standards, fuel switching, co-generation
 2. Make or buy
 - ownership split between IPPs and utilities
 3. Reduce pollution, carbon emissions; reduce exposure to future regulation
 4. DSM, demand responsive loads, distributed generation
 5. Transmission, built in advance of need
- Q: Add Market and Operational changes?

Renewable Energy Standards

- RES sets performance goals
- Minimum percentages by certain dates
- Example:
 - 10 percent authorized, 2 percent subject to RES performance regulation
 - If minima met, RES 2 percent doesn't change
 - If minima exceeded, incentive ROR applies
 - If minima not met, symmetric penalty
 - Incentive or penalty: 20 basis points +/-

Make or Buy

- Set target percentage, or range, for utility ownership: 50-50 target or 60-40 range
- Transition targets or ranges possible
- Example
 - Target: utility moves from 100 percent ownership to 80 percent by date certain
 - Meets or exceeds target: incentives
 - Fails to meet target: penalty
- Could assume 10 percent competitive gains to justify sharing benefits between consumers, shareholders

Pollution Reductions

- Set performance goals for pollution, carbon emissions reductions
- Set symmetrical incentive and penalty structure around required reductions
- Null or no impact area could be set around minimum requirements (minimum plus or minus 10 percent) - no incentive or penalty
- Exceed minimums, gain incentive
- Miss required levels, pay penalty

Demand Side Incentives

- Well described in literature and practice
 - Decoupling
 - Shared savings
 - Energy services charge*
 - Percentage of investment
 - True up to actual performance
 - CA measurement and verification standards
- Look to DSM incentives for analogies to inform supply side incentive options
- Include distributed generation targets
- Smart grid efficiency, reliability targets

* utility funds project, costs recovered on a schedule based on savings with no bill or rate impact until bill

reduction after project costs are recovered

Transmission Incentives

- Planning defines required transmission build out
- Phased in investments over time
- Incentives to accelerate planned phases
- Penalties where phases are late or missing
- Other related considerations:
 - Least cost integration of variable generation resources
 - Progress toward improved regional markets
 - CWIP, rate riders are in use
 - Agreed cost allocations, cost recovery procedures also help
 - Percentage targets for independent developers are possible

Regulatory Dockets with Incentives

- Oregon PUC #98-191 (UE 94-Phase II) Pacificorp Alternative Form of Regulation
 - AFOR, 50% of costs saved less than IRP estimates, funded by SBC
- Colorado PUC Incentives Docket No. 08I-113EG
- Oregon PUC UM-1276 – make or buy
- Nevada – renewables incentives
- Oklahoma – wind plant “sweetner”