

Renewable Portfolio Standards

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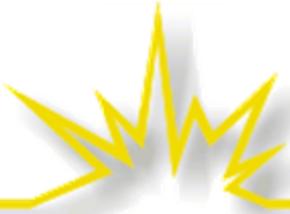
Presentation to Oregon State University Energy Economics Class

Feb. 22, 2010



The Regulatory Assistance Project

China ♦ EU ♦ India ♦ United States



About the Regulatory Assistance Project

- RAP is a nonprofit organization providing technical and educational assistance to government officials on energy and environmental issues. Senior RAP staff all have extensive utility regulatory experience.
- Funded by foundations and the US Department of Energy. We have worked in nearly every state and many nations throughout the world.
- RAP also provides educational assistance to stakeholders, utilities and advocates.
- RAP is committed to fostering regulatory policies for the electric industry that encourage economic efficiency, protect environmental quality, assure system reliability, and allocate system benefits fairly to all customers.



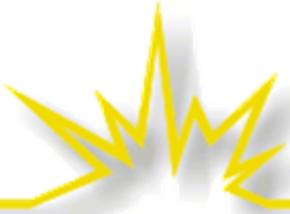
Outline

- What is a Renewable Portfolio Standard?
- RPS as public policy
- RPS parts and variations
- Oregon's requirements
- Federal proposals
- United Kingdom and China
- Feed-in tariffs, PURPA and net metering



What Are Renewable Portfolio Standards?

- Require retail electricity providers to generate or purchase a portion of their power from renewable sources
 - Energy-based (percentage of retail sales) or capacity-based (megawatt targets)
 - Typically backed with penalties
 - Most implemented through legislation; some through voter initiative or regulatory action
- In place in 29 states in US and District of Columbia, plus other countries
- More than 60% of non-hydro renewable additions since 1998 (16,500 MW) have been in states with active/impending compliance obligations.
(Source: Ryan Wiser, Lawrence Berkeley National Laboratory, November 2009)

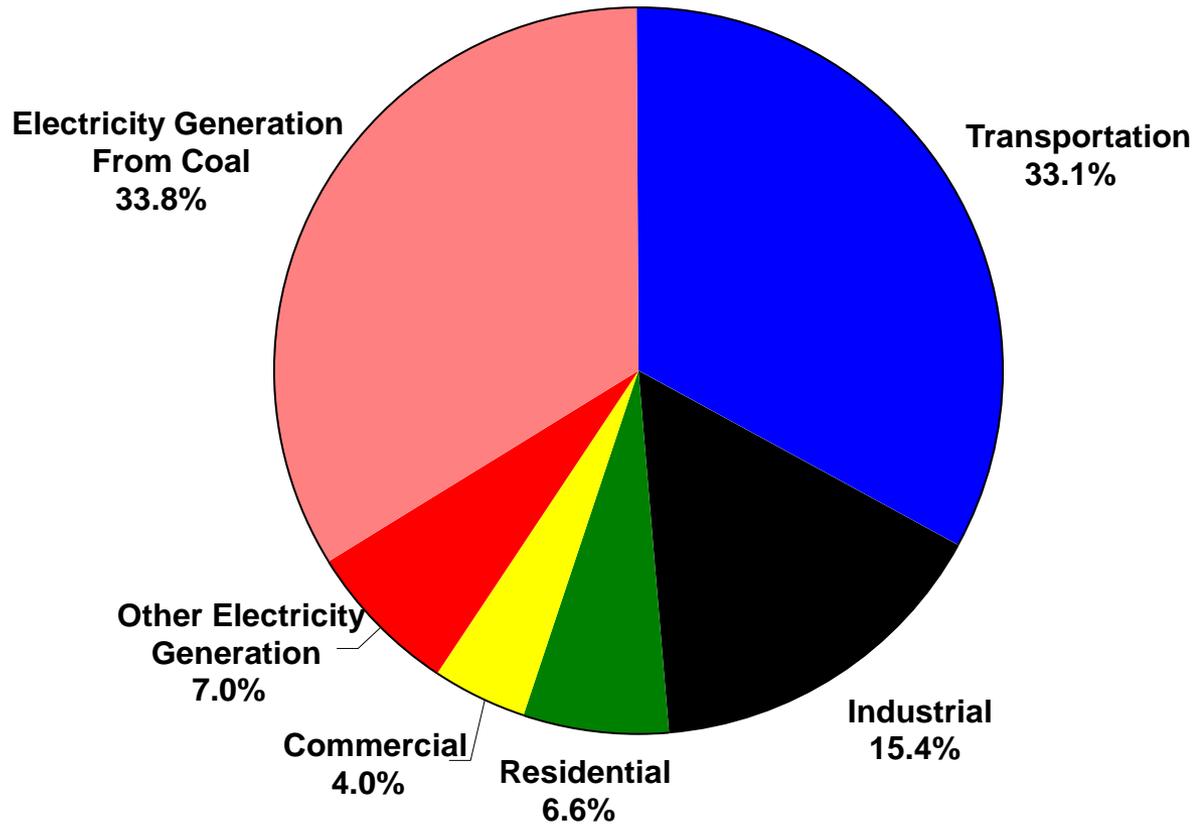


RPS as Public Policy

- Reduce dependence on fossil fuels
 - National security, economic stability, sustainability
- Diversify electricity supply
- Boost economic development
 - In-state projects (jobs)
 - Manufacturing/assembly of components – Because RPS requirements drive projects, they are a factor in locating manufacturing facilities (as are labor costs, tax incentives, resource availability, etc.).
- Reduce emissions of greenhouse gases
 - But put energy efficiency first on your list

Sources of US Energy-Related CO₂ Emissions: 2004

*Power
sector
accounts
for 40%*



Source: EPA 2006

Western RPS and Carbon Policies

➤ Nine Western states with an RPS

➤ Carbon limits in three states

- Emission performance standards in CA, OR and WA
- Carbon cap and trade law in CA

➤ Seven states and four Canadian provinces engaged in Western Climate Initiative

- By 2015, program expected to apply to 90% of their GHG emissions
- But AZ just backed out of cap and trade portion
- GHG emissions reductions: 15% below 2005 levels by 2020 and, over long term, significantly lower risk of dangerous threats to climate





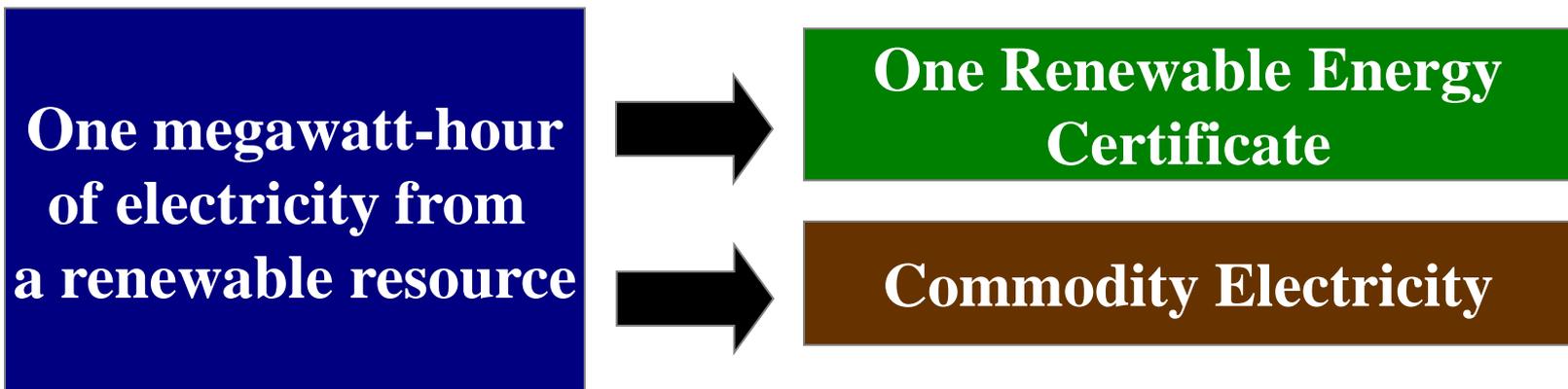
Eligible Fuels

- Wind is dominating – Focus is on improving flexibility in the electric system to accommodate its variable generating output (e.g., gas generators, virtual consolidation of Balancing Areas)
- Biomass – Exceptions may include incinerated waste (e.g., municipal solid waste), spent (black) pulping liquor, some types of forestry waste
- Geothermal – Good baseload resource, but dry hole risk during development
- Ocean sources – Making headway mostly abroad
- Solar – Trend toward RPS “carve-outs,” feed-in tariffs
- Hydro – Large hydro often excluded from eligibility



Tradable Renewable Energy Certificates

- To facilitate compliance, most states allow renewable energy certificates (RECs) procured separately (“unbundled”) from the associated electricity to satisfy at least a portion of the renewable resource obligation





Tradable Renewable Energy Certificates (cont.)

- Enable more efficient markets – greater liquidity and reduced transaction costs
- A study for the Western Electric Industry Leaders Group on transmission needed to meet RPS and carbon requirements in the Western Interconnection estimated that procuring west-wide resources through certificate trading – instead of building transmission to remote resources – could save \$351 million in 2020.
 - See http://weilgroup.org/E3_WEIL_Complete_Study_2008_082508.pdf
- But tradable RECs raise concerns about “dump energy”
 - What if California utilities use RECs from Oregon wind projects to comply with their RPS obligations, but don’t buy underlying energy – which is then sold as undifferentiated energy at market prices?
 - Could leave integration issues here



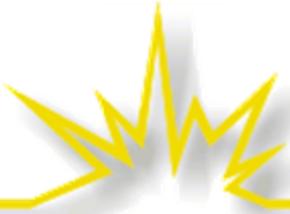
Tracking Certificates

➤ Western Renewable Energy Generation Information System database is designed to issue, register and track all RECs in the Western Interconnection



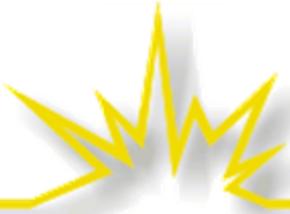
- Protects against multiple-counting and selling
- Provides infrastructure for REC trading*
- Verifies compliance with renewable portfolio standards and green power claims
- Uses independent, verifiable and reliable data

*WREGIS is not a trading platform.



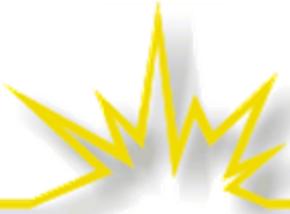
Comparing Standards in the US

- Requirements differ from state to state
 - Targets and timeframes
 - Capacity (MW) or energy (MWh, % of sales) based
 - Eligible fuels and technologies
 - Date generator (or incremental generation) began operation
 - Required levels or credit multipliers for certain resources such as solar
 - Whether customer-sited (distributed) resources are eligible
 - Whether generation must be generated within – or delivered to – the state
 - Whether the obligation is imposed (and imposed equally) on all suppliers
 - Banking of RECs for future year compliance
 - Penalties and flexibility mechanisms
 - Cost caps
 - Funding support
 - Whether energy efficiency can be used to meet part of requirement



Oregon's Renewable Portfolio Standard (HB 838, 2007)

The RPS applies to	Percent of Oregon's Total Retail Electric Sales	Affected Utilities (and ESSs)	Applicable Targets in Year			
			2011	2015	2020	2025
Large Utilities	Three percent or more	Portland General Electric, PacifiCorp, Eugene Water & Electric Board	5%	15%	20%	25%
Smaller Utilities	At least one and a half percent but less than three percent	Central Lincoln PUD, Idaho Power, McMinnville W&L, Clatskanie PUD, Springfield Utility Board, Umatilla Electric Cooperative	No Interim Targets			10%
Smallest Utilities	Below one and a half percent	All other utilities (31 consumer-owned utilities)				5%
Electricity Service Suppliers (ESSs)	Any sales in Oregon	Any Electricity Service Supplier (ESS)	An aggregate target for the ESS is determined by assuming each of the ESS's customers is instead being served by the utility that would otherwise be serving the customer.			



Oregon's Renewable Portfolio Standard (cont.)

- Small utilities can trigger application of targets that otherwise apply only to large utilities
 - Buy into new coal plant or sign new contract for coal plant
 - Annex investor-owned utility territory without utility's permission
- HB 3039 (2009) added a solar “tier”
 - At least 20 MW of solar photovoltaics in state by 1/1/20
 - Installations must be between 500 kW and 5 MW
 - 2-to-1 REC multiplier for these systems before 1/1/16



Oregon's Renewable Portfolio Standard (cont.)

- Eligible resources are wind, geothermal, biomass, solar, wave, tidal, ocean thermal, some hydro, and hydrogen from any of these sources.
 - Hydro is limited to efficiency improvements at existing facilities and a limited amount of low-impact facilities.
 - Generating plants that began operation after 1/1/95 are eligible. Exceptions apply for hydro efficiency improvements, low-impact hydro, and incremental efficiency or capacity upgrades for other eligible facilities.



Oregon's Renewable Portfolio Standard (cont.)

- Flexible compliance mechanisms
 - Build or buy power from an eligible facility (or continue generating at facility with an eligible on-line date) and retire associated RECs. Facility must be in *U.S. portion* of Western Interconnection.
 - Buy “unbundled” (tradable) RECs for up to 20% of obligation from anywhere in Western Interconnection, not just US portion
 - Make “alternative compliance payment” for shortfall, to be used for future renewable resource projects, conservation or power plant upgrades
 - Unlimited banking of RECs (early actions count)



Oregon's Renewable Portfolio Standard (cont.)

- Cost cap – Can't increase utility's annual revenue requirement by more than 4%, compared to case without qualifying renewable resources
 - Incremental costs = Levelized cost of qualifying electricity - Levelized cost of an equivalent amount of electricity that is not qualifying electricity
 - Short-term renewable resource contracts (<5 years)
 - Compare with published wholesale power prices
 - Long-term renewable resource contracts or owned-facilities - Compare with proxy plant – a natural gas-fired, combined-cycle combustion turbine



Federal RPS

➤ Two main RPS bills in Congress

- House: HR 2454 (Waxman-Markey)
 - 20% by 2020 renewable energy target (25% to 40% energy efficiency compliance option)
 - Alternative compliance payment: \$25/MWh + inflation
- Senate: S 1462 (Bingaman)
 - 15% by 2021 renewable energy target (26.67% energy efficiency compliance option)
 - Alternative compliance payment: 2.1¢/kWh + inflation
 - 4% cap on rate impact
- Both *exclude from the baseline* large-scale hydro, new nuclear, and generating plants with carbon capture and sequestration
- Both exempt small utilities



Federal RPS (cont.)

➤ Federal/state RPS interactions

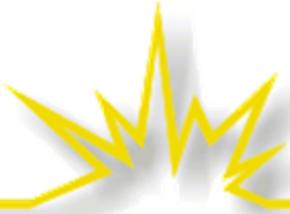
- Neither federal bill would diminish the authority of a state to adopt or enforce any law or regulation regarding renewable energy
 - Waxman-Markey specifically allows states to adopt requirements that are more stringent than federal requirements
 - Federal RECs would be entirely separate from state RECs. Federal RECs would have no purpose other than compliance with the federal requirement. Federal RECs would have liquid markets because they can be used nationwide, but state RECs would still be bound by individual state definitions and eligibility.
- To avoid “double counting,” one federal certificate should be retired for each non-federal certificate used to comply with a state RPS.
- REC tracking systems – New federal system or use existing regional systems?
- Alternative compliance payments – Will *states* be able to direct funds to encourage renewable energy development?



United Kingdom

- Liberalized market – “Renewables Obligation” is on licensed electricity suppliers
- Renewables obligation is 9.7% for 2009/10
- Rises to 15.4% by 2015/16
- Suppliers meet the obligation by acquiring Renewables Obligation Certificates or paying a buy-out price equivalent to £37.19/MWh* in 2009/10 (rising each year with the retail price index), or a combination of the two

*2/22/10: 1 £ = 1.5491 US\$



China

- Established renewable energy goal & mandatory market share policy
- 2005 Renewable Energy Law required grid companies to buy all certified renewable energy within their service areas
- In September 2007, the government announced a 15% by 2020 target. By 2008, China was on track to surpass that goal.
- Goal is now a floor, establishing the minimum amount of renewable resources in the planning process, which in turn drives investment approval and the licensing process
- In June 2009, the vice chairman of the National Development and Reform Commission, the nation's central policy-making body, suggested that 20% by 2020 may be a reasonable target.
- In 2009, China installed about 13,000 MW of wind, compared with just under 10,000 MW in US (Source: AWEA, *Wind Energy Weekly*, 2/3/10)



Feed-in Tariffs

- Also called Advanced Renewable Tariffs, they're designed to encourage small, diverse renewable resources by a variety of entities
- Guarantee the right to interconnect and a buyer for the electricity
- Rates based on *renewable project costs*, not utility's avoided resource
 - Return on investment typically included in rates
 - Rates may vary by technology, geographic location and project size
- Feed-in laws in Vermont (H.446) and Oregon (HB 3039)
 - Oregon tariffs in place April 1st for solar PV for PGE and Pacific Power
 - Offered by a few utilities elsewhere in the US
- Also in Spain, Ontario, Italy, Germany, China and many other places
- US Federal Power Act poses legal issues – “Net metering” and RFP solutions for now
- Market-based pricing – an auction or RFP – targeting small-scale renewable resources may provide similar benefits at lower cost to ratepayers



PURPA and Net Metering

- Federal “PURPA” requires (non-exempt) utilities to buy all energy and capacity offered by Qualifying Facilities – renewable resources up to 80 MW and cogenerators of any size
 - States have broad discretion to set facility size eligible for standard avoided-cost rates and standard contract terms
 - Oregon revamped its policies to provide Qualifying Facilities up to 20 MW with fixed pricing for 15 years, plus an additional 5 years with some portion of pricing based on then-current market conditions.
- Net metering allows customers to generate power on-site from eligible resources (solar, wind, etc.) and “run their meter backwards.”
 - In Oregon, PGE and Pacific Power customers can install systems up to 2 MW and get kilowatt-hour credits against their utility bills. Excess energy credits can be carried forward to future months until the end of the billing year.



Parting Thoughts

- RPSs are a major driver in renewable resource development in US
- Trend is toward increasing standards already in place
- Tax incentives, siting and transmission also important
 - Federal production tax credit is 2.1 cents/kWh; alternative 30% investment tax credit
 - 2009 Recovery Act provides funding for Interconnection-wide transmission planning, including significant state and stakeholder participation
 - Designed to support multi-state transmission lines to bring needed renewable and other energy sources to loads
 - But will not solve issues related to facility and transmission siting or cost allocation for interstate transmission lines



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