

Voluntary Green Power Market Overview



**Renewable Energy
Markets 2010: Green
Power 101**

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Portland, Oregon

Outline

- History of the voluntary market
- Who offers products
- Status of the voluntary market
- Market drivers
- Pricing and trends
- Issues
 - Federal RPS interaction
 - GHG Accounting
 - Carbon policy interaction

History of Voluntary RE Market

- RE options emerged in anticipation of electric market restructuring in the 1990s; utilities wanted to offer choice.
- Ability for residential customers to choose suppliers was predicted to drive voluntary purchases.
- Today, about 50% of consumers have option to buy green power from utility or electricity supplier.
- Market is driven more by business and institutional customers.
- Some volatility in competitive market participation; changes over time result of price competition, market rule changes, (e.g., California, Connecticut, Pennsylvania)
- Utility offerings more steady, growth in 2000's, offerings trended toward usage options (from contribution programs)

Who Offers Green Power Options?

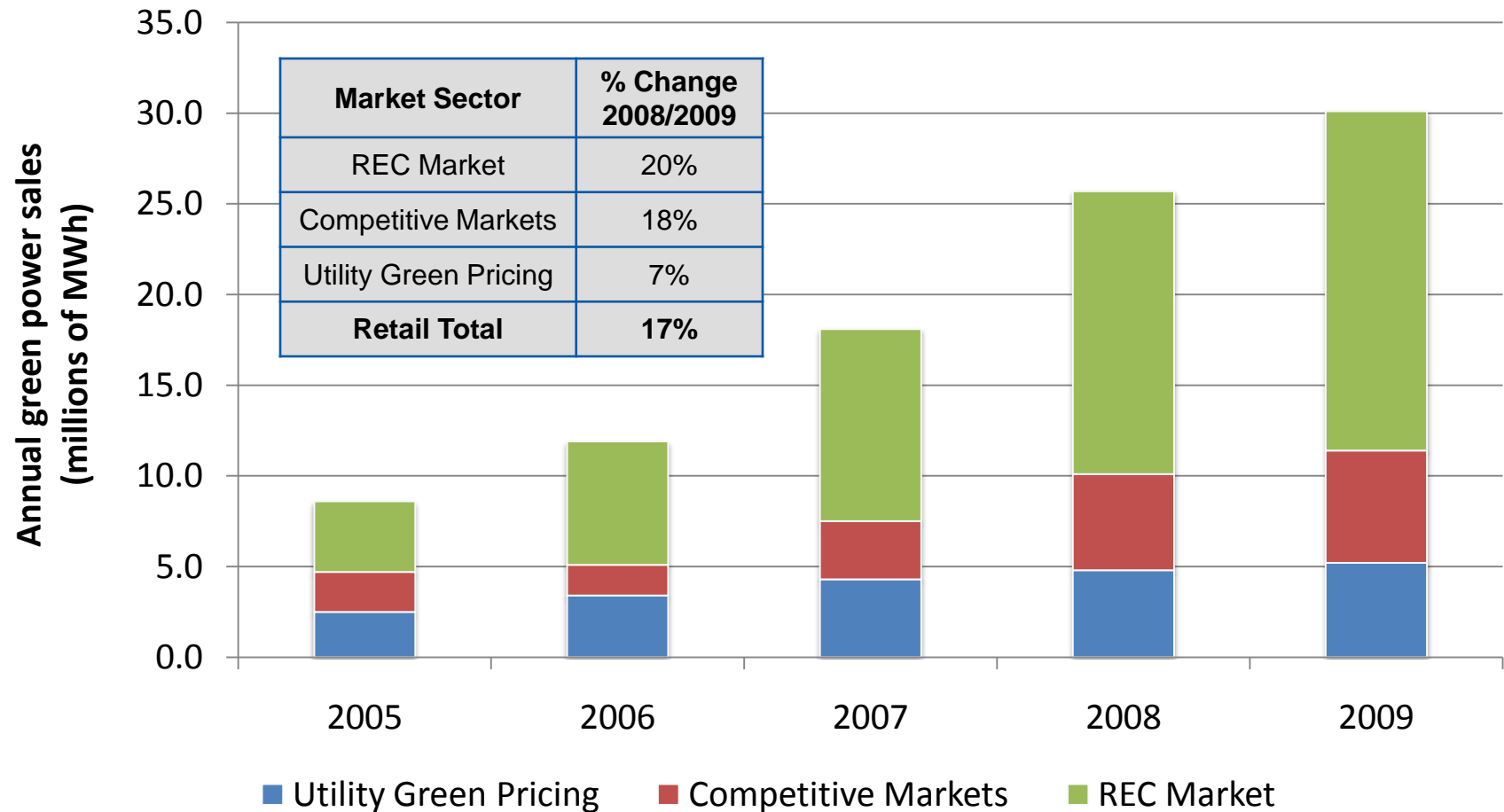
Utilities

- More than 850 utilities (including many small munis and coops) offer green power options; about 25% of utilities
- Sales and customers are dominated by a relatively small number of programs

Green Power Marketers

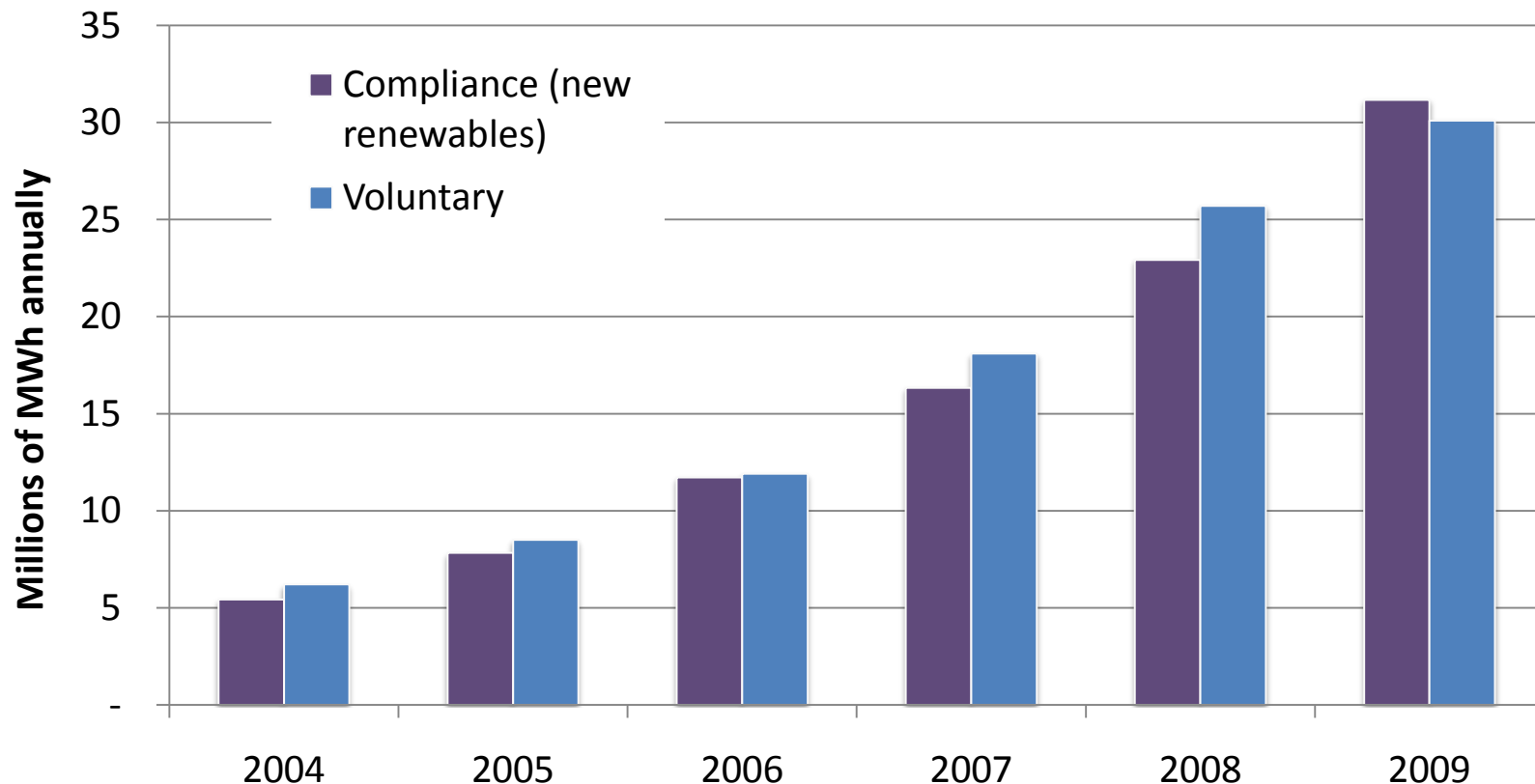
- Offer products in markets with retail competition where customers can switch to a green power offering
- In some restructured markets (i.e., Northeast), green option is offered through the distribution utility and marketers supply the green power (customer doesn't need to switch)
- Marketers also provide RECs to large commercial and institutional customers (e.g., govt, universities, and corporations)
- Marketers often team with utilities as well

U.S. Voluntary Green Power Sales



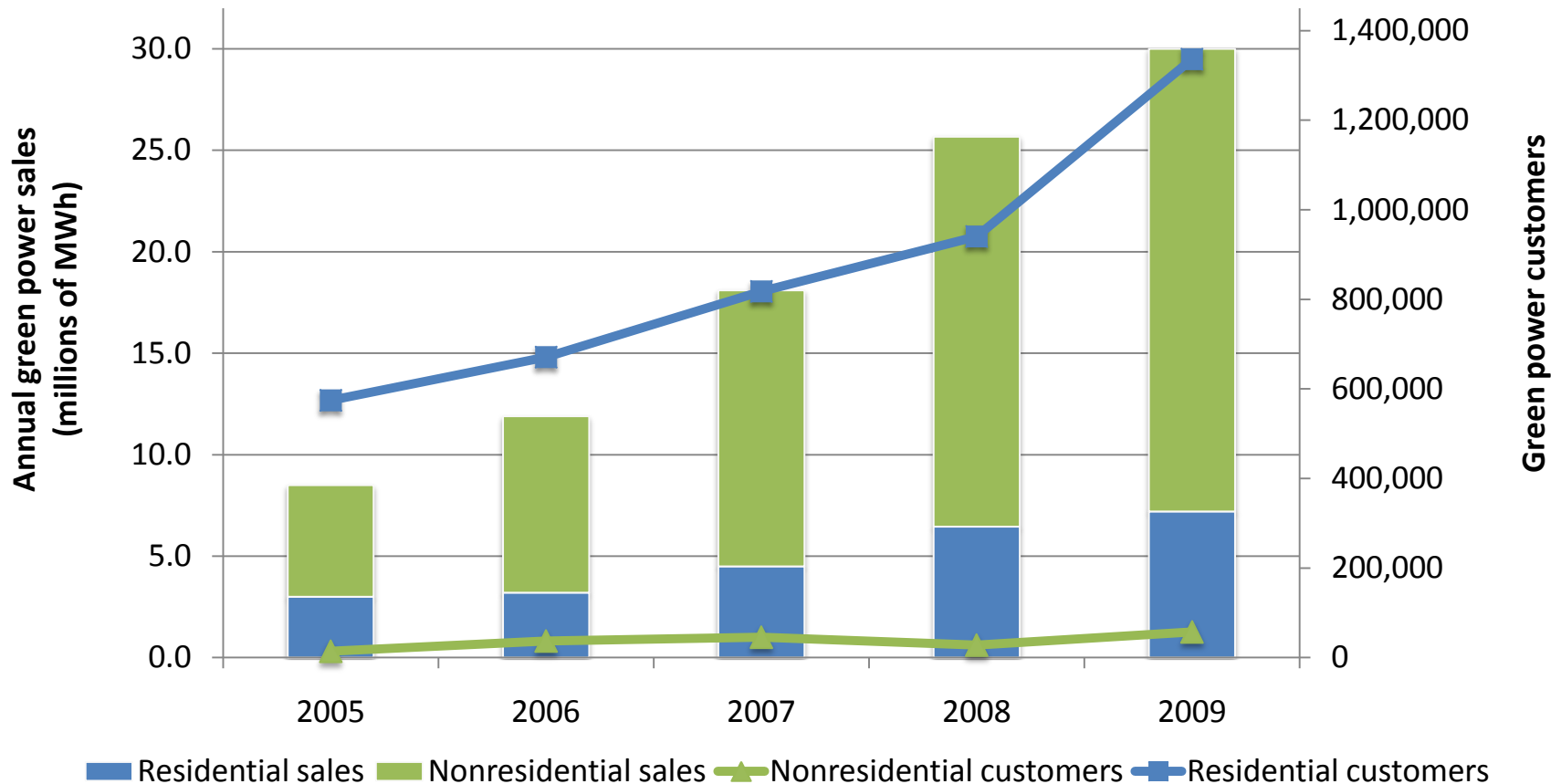
REC market sales continued to lead growth, though growth in all sectors was slower than last year.

Compliance and Voluntary Market Size



- Both voluntary and compliance RE markets are growing rapidly
- Markets are complementary because RECs cannot be double counted – used for either compliance or voluntary markets
- Sometimes competition for resources, if RPS demand grows rapidly

Residential vs. Nonresidential Customers and Sales



About 1.4 million customers buy green power, most customers are residential, but green power sales (MWh) dominated by nonresidential

Leading Green Power Programs

Green Pricing Program Renewable Energy Sales (as of December 2009)

Rank	Utility	Resources Used	Sales (kWh/year)	Sales (aMW) ^a
1	Austin Energy	Wind, Landfill Gas	764,895,830	87.3
2	Portland General Electric ^b	Wind, Biomass, Geothermal	740,880,487	84.6
3	PacifiCorp ^{cde}	Wind, Biomass, Landfill Gas, Solar	578,744,080	66.1
4	Sacramento Municipal Utility District ^c	Wind, Hydro, Biomass, Solar	377,535,530	43.1
5	Xcel Energy ^{cf}	Wind, Solar	374,296,375	42.7

NREL publishes “Top 10” lists annually in five categories:

1. Total sales
2. Sales as a percentage of total retail electricity sales
3. Total participation
4. Customer participation rate
5. Lowest premium

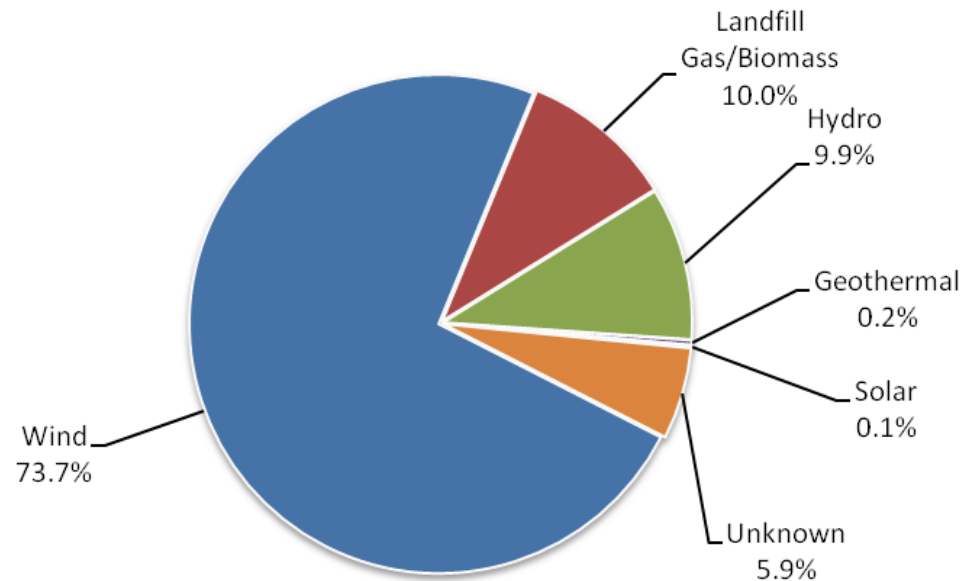
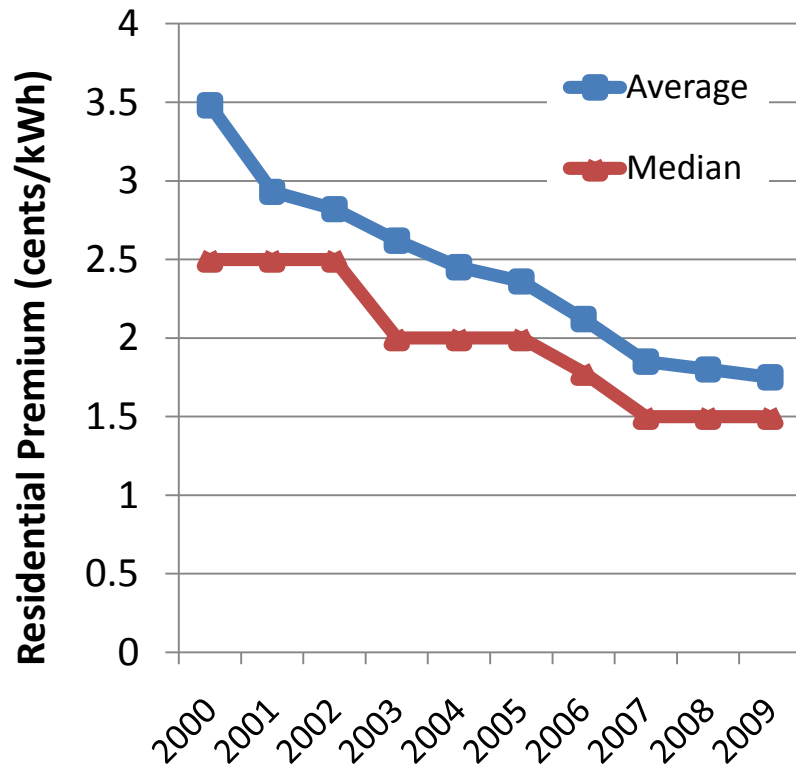
Full lists available at:

<http://greenpower.energy.gov>

Customer Participation Rate (as of December 2009)

Rank	Utility	Program(s)	Customer Participation Rate	Program Start Year
1	City of Palo Alto Utilities ^a	Palo Alto Green ^b	20.8%	2003
2	Portland General Electric ^c	Clean Wind, Green Source, Renewable Future	10.2%	2002
3	Madison Gas and Electric	Green Power Tomorrow	9.6%	1999
4	Sacramento Municipal Utility District	Greenergy ^b	8.5%	1997

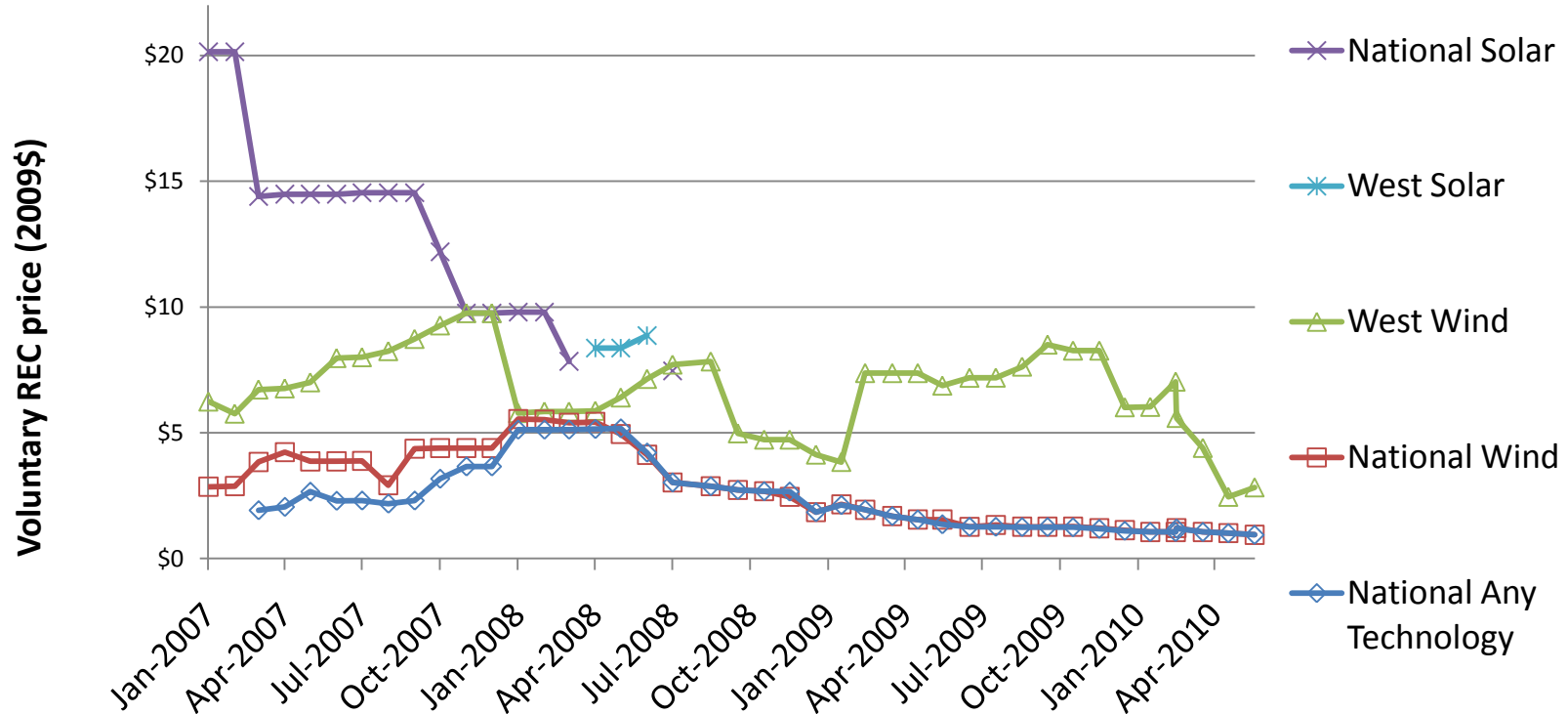
Resources and Premiums



Green power premiums continued to decrease in 2009 as a result of increasing competitiveness of renewables.

Wind remained the dominant resource supplying the voluntary market.

Voluntary Market REC Prices



Sources: Evolution Markets and Spectron. Plotted values are the last trade (if available) or the mid-point of Bid and Offer prices, for the current or nearest compliance year.

Voluntary REC prices generally lower than compliance RECs, vary regionally and influenced by compliance market prices

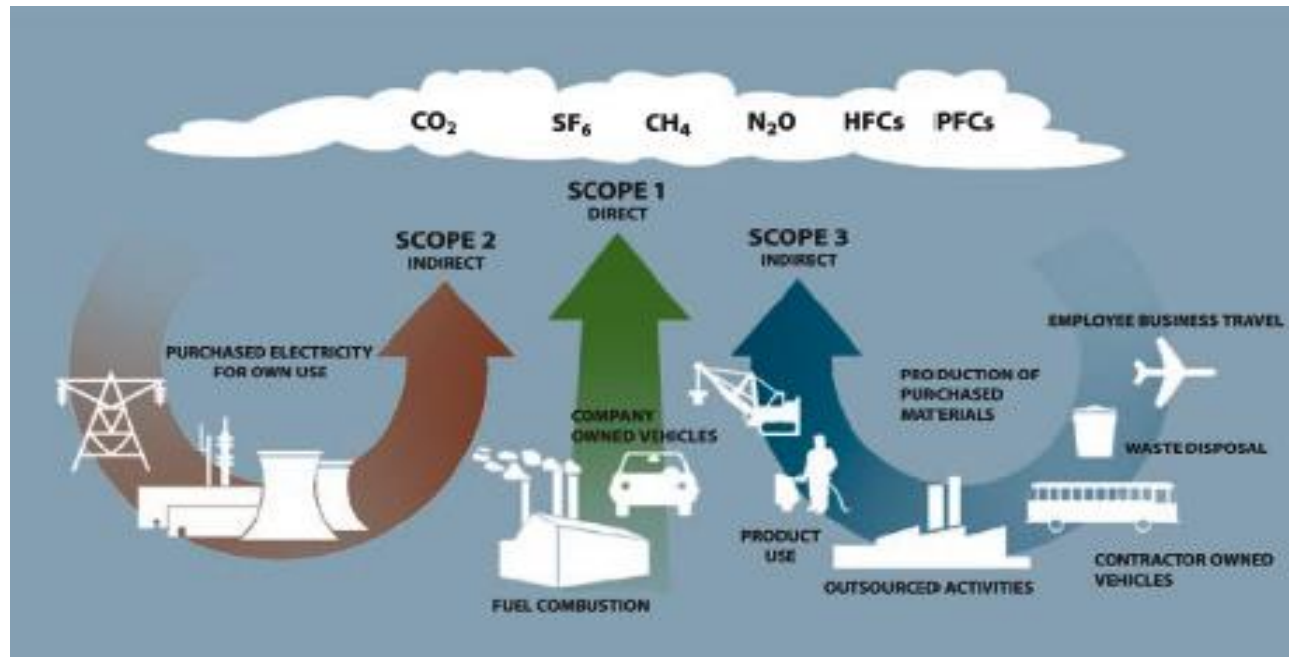
Issues for Future Market

1. What impact would a federal RPS have on the voluntary market?
2. How is green power used in GHG accounting?
3. How will a carbon cap interact with the voluntary market?

Federal RPS and the Voluntary RE Market

1. Market complexity; another tradable REC
 - A federal RES would lead to a federal REC in addition to existing state RECs. To make voluntary purchase claims, would both federal REC and state RECs need to be retired?
2. Ownership of RECs when existing contracts are silent or unclear:
 - Many pre-existing contracts may not specifically address ownership of potential future federal RECs, although the intention of the voluntary purchaser may have been to acquire all of the renewable energy attributes. Federal RPS bills don't mention attributes.

GHG Accounting - Background



Source: WRI and WBCSD (2004)

Scope 1 -- direct emissions – those directly emitted and under the control of the reporting entity (e.g., vehicles and on-site power generation facilities)

Scope 2 -- indirect emissions – those that are not directly emitted or under the control of the reporting entity (e.g., electricity purchased from a utility)

Green power purchases applied to Scope 2 emissions (purchased electricity)

Green Power vs. GHG Offsets

Green power (and RECs) not same as GHG offsets

- Green power sold in kWh or MWh; offsets in tons CO₂e
- Green power purchased to match electricity usage; GHG offsets often purchased for other emissions (transport etc.)
- Renewable energy typically plays in one market or other; generally considered double counting if sold in both
- Offsets must pass “additionality” screen to ensure they are additional to business as usual

In U.S., renewables are sold as offsets, but smaller volumes than green power market

- More than 25 U.S. marketers selling GHG offsets sourced in part from renewables
- Retail price range has been from \$5-\$40/ton
- Pre-cap market for renewables as offsets – once GHG caps are instituted in U.S., renewables may not have claim to avoided emission reduction to be able to provide “offset”

Carbon Caps and Voluntary Market Set Asides

- Depending on how carbon caps are designed, voluntary renewables might not be able to claim that GHG reductions occur.
- Voluntary market set asides retire allowances on behalf of renewable energy purchasers, ensuring GHG reductions.
 - 10 of 11 states in Regional Greenhouse Gas Initiative (RGGI) have adopted set asides; proposed in Western Climate Initiative
 - States can choose to set-aside allowances equivalent to the amount of voluntary renewables that are purchased.
 - Allows voluntary renewables to continue to make a GHG reduction claim.

Questions

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Brief History of RECs

RECs represent the environmental attributes (e.g. reduced air pollutant or greenhouse gas emissions, water savings, resource diversity) of renewable electricity, which can be sold separately from the commodity electricity

- 1996 first mention of separating attributes in CA Renewable Portfolio Standard (RPS) design discussions
- 1997 discussed in New England in design of environmental disclosure (electricity labels)
- June 1999 Texas RPS legislation includes REC trading concept
- Today, most RPS policies allow for the use of RECs
 - Generally states do not allow RECs to count for RPS compliance if sold into voluntary market (except WI and AZ)
- Many businesses & government agencies make voluntary purchases of RECs to meet environmental goals

Top 20 U.S. Green Power Purchasers

(as of July 6, 2010)

Rank	Company	Annual Green Power Usage (kWh)
1	Intel Corporation	1,433,200,000
2	Kohl's Department Stores	1,367,376,000
3	Whole Foods Market	817,657,623
4	City of Houston, TX	438,000,000
5	Dell Inc.	431,058,000
6	Johnson & Johnson	416,510,688
7	Cisco Systems, Inc.	400,996,000
8	Commonwealth of Pennsylvania	400,000,000
9	U.S. Air Force	339,660,392
10	City of Dallas, TX	333,659,840
11	HSBC North America	300,000,000
12	Wal-Mart Stores, Inc. / California and Texas Facilities	263,533,433
13	U.S. Environmental Protection Agency	262,262,425
14	District of Columbia	237,000,000
15	TD Bank, N.A.	240,333,272
16	Starbucks	237,000,000
17	BNY Mellon	229,500,000
18	City of Chicago, IL	215,000,000
19	BD	200,631,536
20	University of Pennsylvania	200,000,000

Source: <http://www.epa.gov/grnpower/toplists/top50.htm>

- Nonresidential purchases dominate market; $\frac{3}{4}$ of all sales