



Innovation for Our Energy Future

Voluntary Market & Renewable Energy Certificate (REC) Overview



**CORE Sustainability
Breakfast**

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Outline

1. Background
2. Ways to purchase green power
3. Benefits of green power purchasing
4. REC overview
5. Voluntary market overview
6. Voluntary market forecast
7. Green power vs. carbon offsets

Background

Voluntary markets for renewables - “Green Power”

- Voluntary green power markets give consumers choices to purchase electricity sourced from renewables
- Consumers can purchase renewable energy equivalent to their electricity needs (in kWh)

Ways to Purchase Green Power

Purchase renewable energy through:

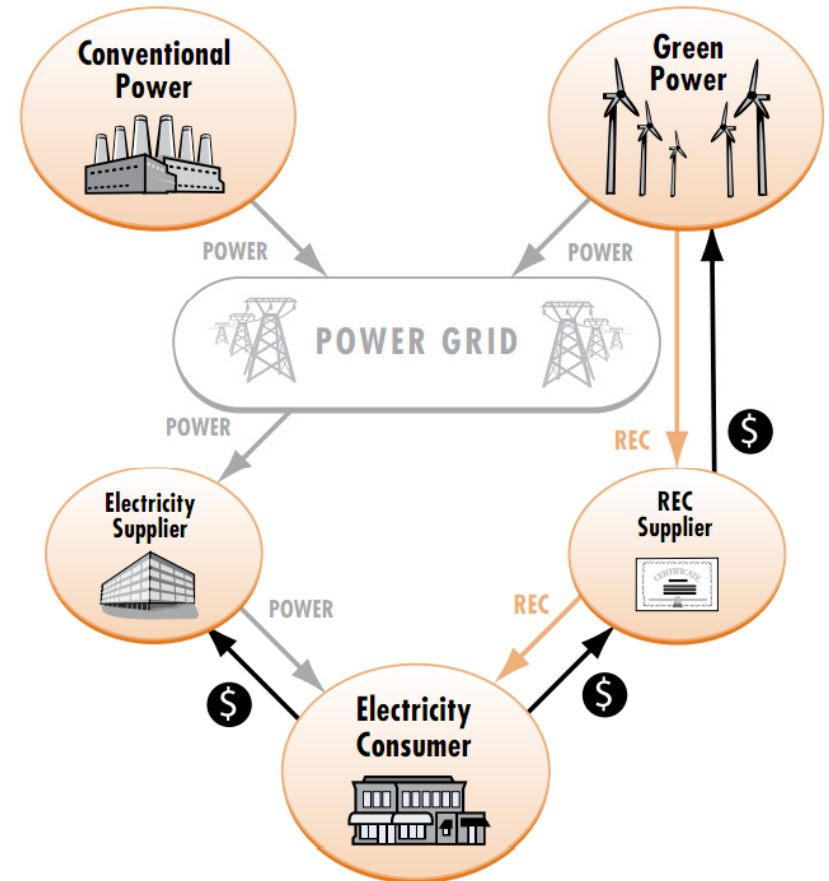
1. Renewable electricity products – utilities
 - Eg. Xcel's Windsorce program: \$2.16 per 100 kWh block
 - About 50% of consumers have option to buy green power directly from their utility/power supplier
2. Renewable energy certificates (RECs) sold separate from electricity (sold mostly to nonresidential customers)
 - All customers have option to buy RECs
 - Purchasers can work with a marketer to purchase a custom product from a particular resource (eg. solar PV), duration (eg. multiple years), or geographic area (state or region)
 - Nationally sourced RECs may be purchased from any type of Green-e eligible renewable facility nationally
 - List of Marketers available on DOE's Green Power Network:
<http://apps3.eere.energy.gov/greenpower/markets/certificates.shtml?page=4>

Benefits of Green Power Purchasing

- Products are widely available
- No upfront capital costs
- Flexible in that consumers can make monthly purchases or contributions without long-term commitment
- Provides an option for those who cannot install renewable systems onsite (lack of adequate roof space, shading, etc.)
- Purchasing is easier than developing onsite generation

How RECs Work

- Originally created for RPS compliance flexibility and compliance tracking
- Create more liquid markets for attributes
- Eliminate problems with intermittency and load matching
- Can be sold across geographic boundaries
- Not subject to transmission constraints



Note: Figure 4 is not intended to represent a comprehensive view of all the possible ways a REC can be traded and used.
Source: Guide to Purchasing Green Power,
http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf

Green-e Energy Certification

- Established in 1997
- Developed Green-e National Standard
 - Requirements for product content (eligible RE etc.) and disclosure
- Certifies that renewable energy is:
 - **not double counted** – energy *cannot* count towards a state's RPS
 - **from new projects** (currently post Jan 1, 1997, moving to rolling 15-year schedule)
 - **verified** – Green-e verifies seller claims twice a year; energy is accounted for and tracked through an annual audit



Green-e

Verified, **Certified**
Renewable Energy
and Greenhouse Gas
Emission Reductions

http://www.green-e.org/getcert_re_stan.shtml#standard

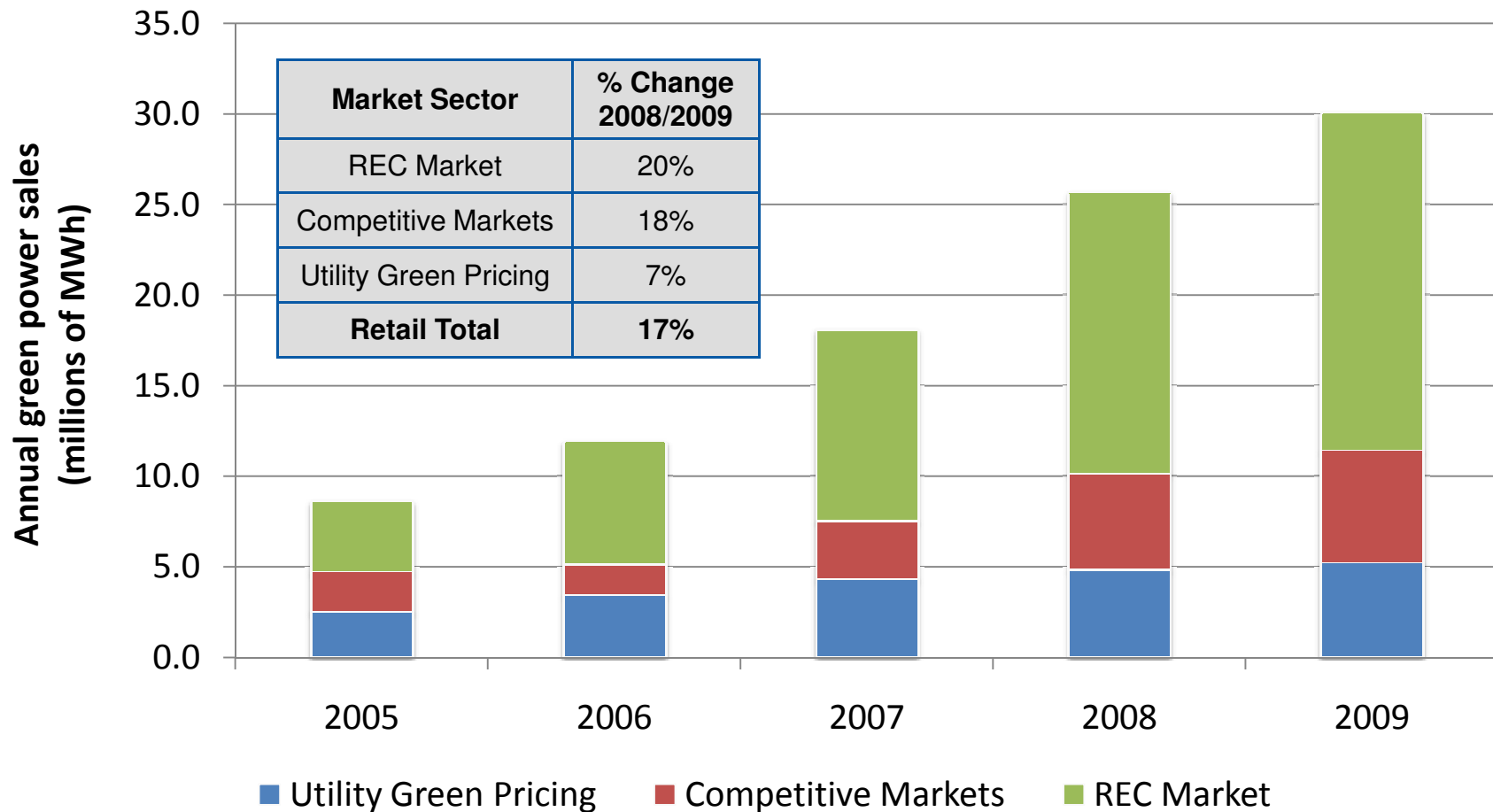
Why REC Purchases?

- **Single transaction**
- Can buy from **most cost-effective renewable facilities**
- **Lower cost** than purchasing through utility programs
- **All RECs are not the same**; cost can vary by location of generator, type of renewable (wind vs. solar), volume purchased, length of contract term, whether renewable energy is RPS eligible (competition)

RECs and New Project Development

1. Enter into long-term contracts with projects
2. Contribute funds for project development
3. Purchase strategically to drive new renewables
4. Take an equity position in new projects (offsite)
5. Own or host onsite projects

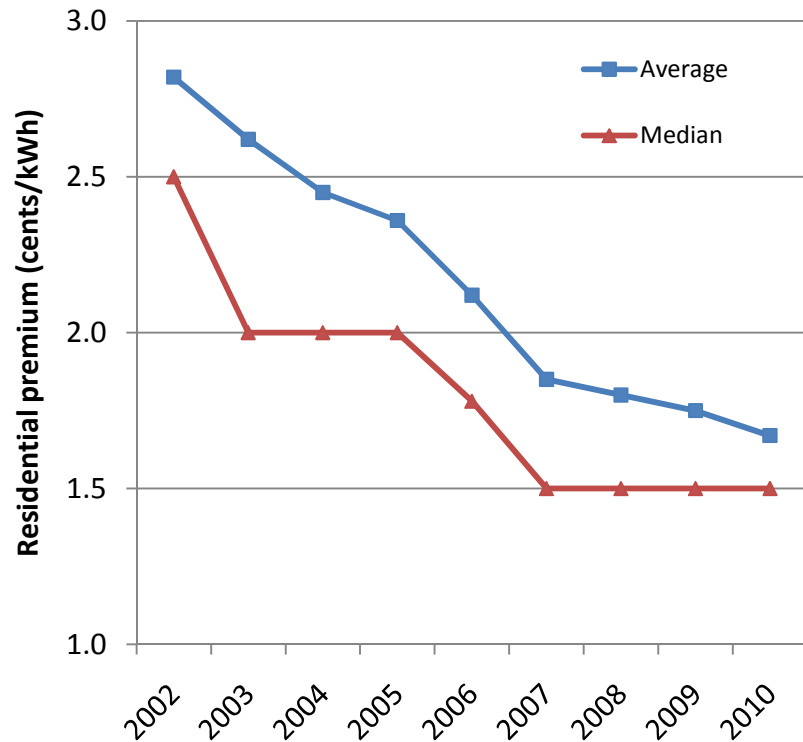
U.S. Voluntary Green Power Sales



2010 preliminary figures from Green-e show increase of ~28% from 2009. EPA's Green Power partners increased sales by 2% in 2010.

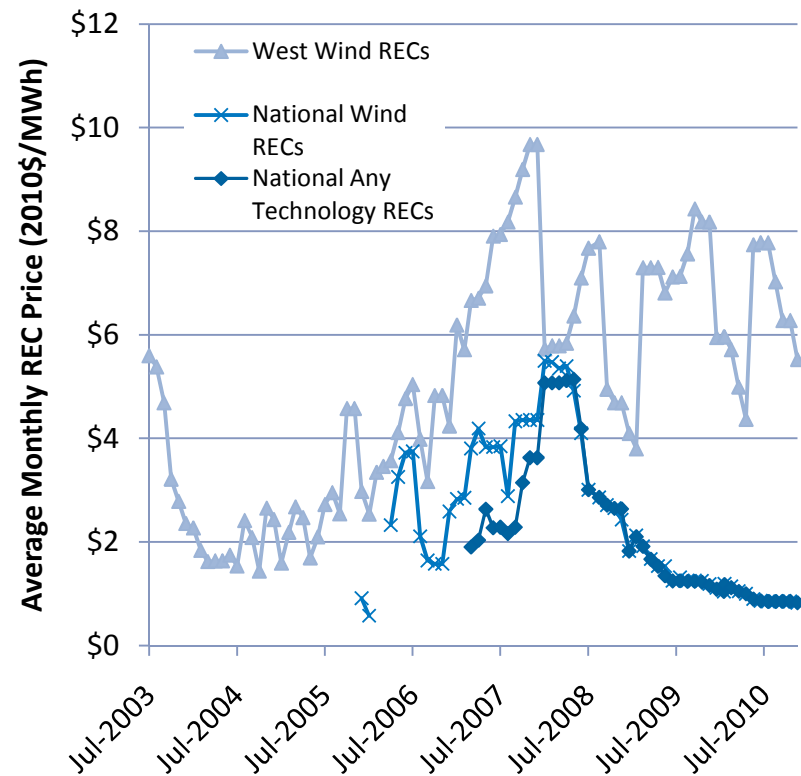
Green Power Premiums

Utility green pricing program average and median residential price premium



Source: Bird and Sumner, 2010

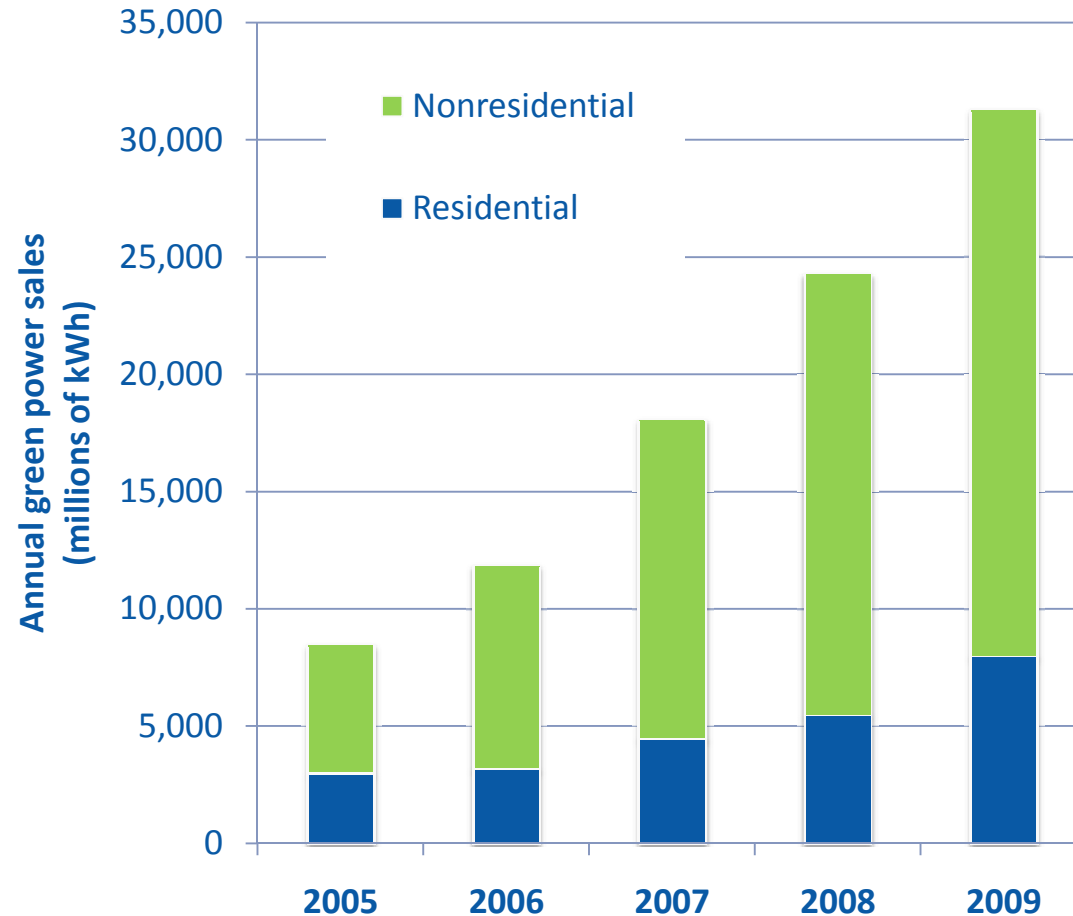
Voluntary REC market average monthly price premium



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.

Green Power Market Customers

- About 1.4 million customers buy green power
- REC sales to non-residential customers (i.e. Whole Foods) dominate the market; although RECs initially conceived of as residential market



Top 10 U.S. Green Power Purchasers

(as of April 6, 2011)

Company & Rank	Annual Green Power Usage (kWh)	GP % of Total Electricity Use*	Green Power Resources
1. Intel Corporation	2,502,052,000	88%	Solar, Wind
2. Kohl's Department Stores	1,418,065,000	100%	Biomass, Small-hydro, Solar, Wind
3. Whole Foods Market	817,657,623	100%	Solar, Wind
4. Commonwealth of Pennsylvania	500,000,000	50%	Various
5. City of Houston, TX	438,000,000	34%	Wind
6. Starbucks	421,921,000	52%	Wind
7. Johnson & Johnson	416,510,688	39%	Biomass, Solar, Wind
8. Staples	341,524,408	52%	Biogas, Solar, Wind
9. City of Dallas, TX	302,880,000	40%	Wind
10. HSBC North America	300,000,000	112%	Wind

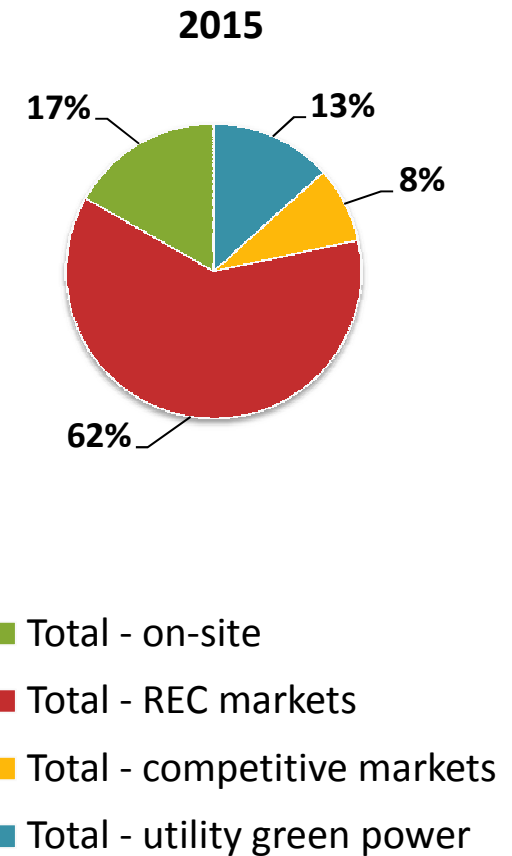
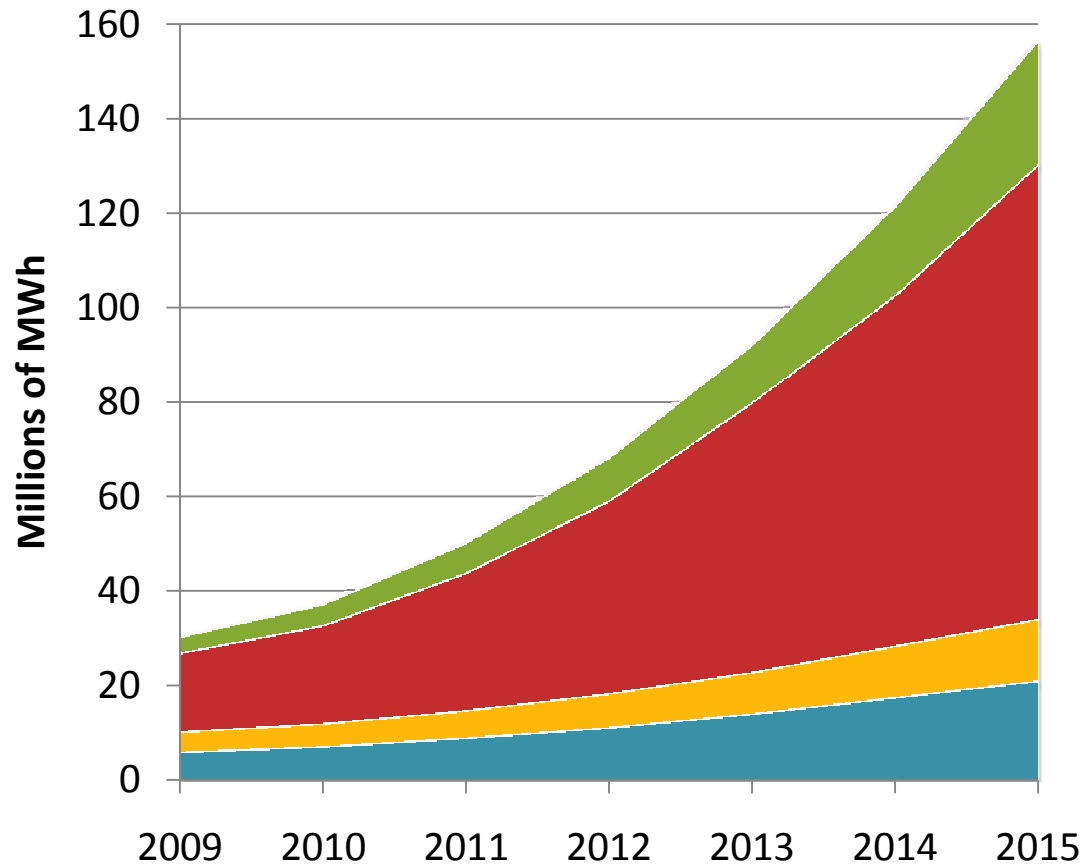
*Reflects the amount of green power as a percentage of total electricity use. Partners choosing to purchase green power in an amount exceeding 100 percent of their U.S. organization-wide electricity use are listed as such.

Source: EPA Green Power Partnership National Top 50, <http://www.epa.gov/greenpower/toplists/top50.htm>

Nonresidential purchases dominate market; ~75% of all sales

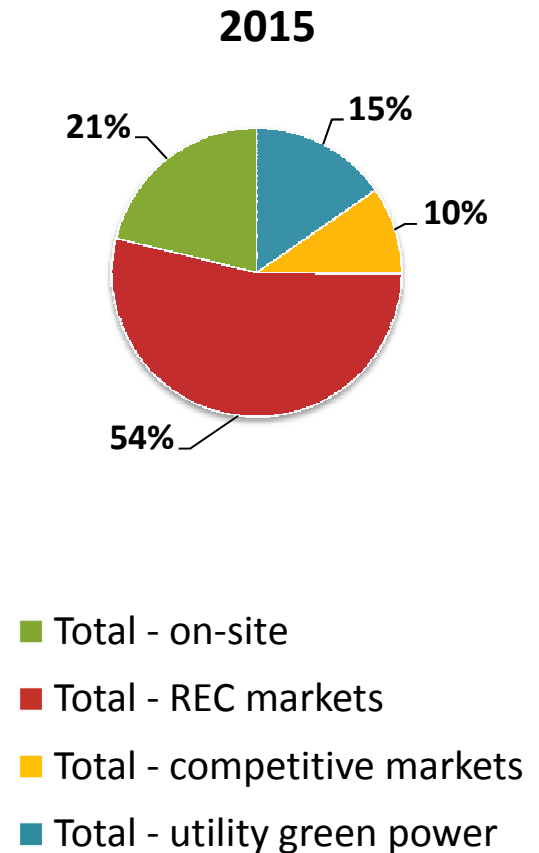
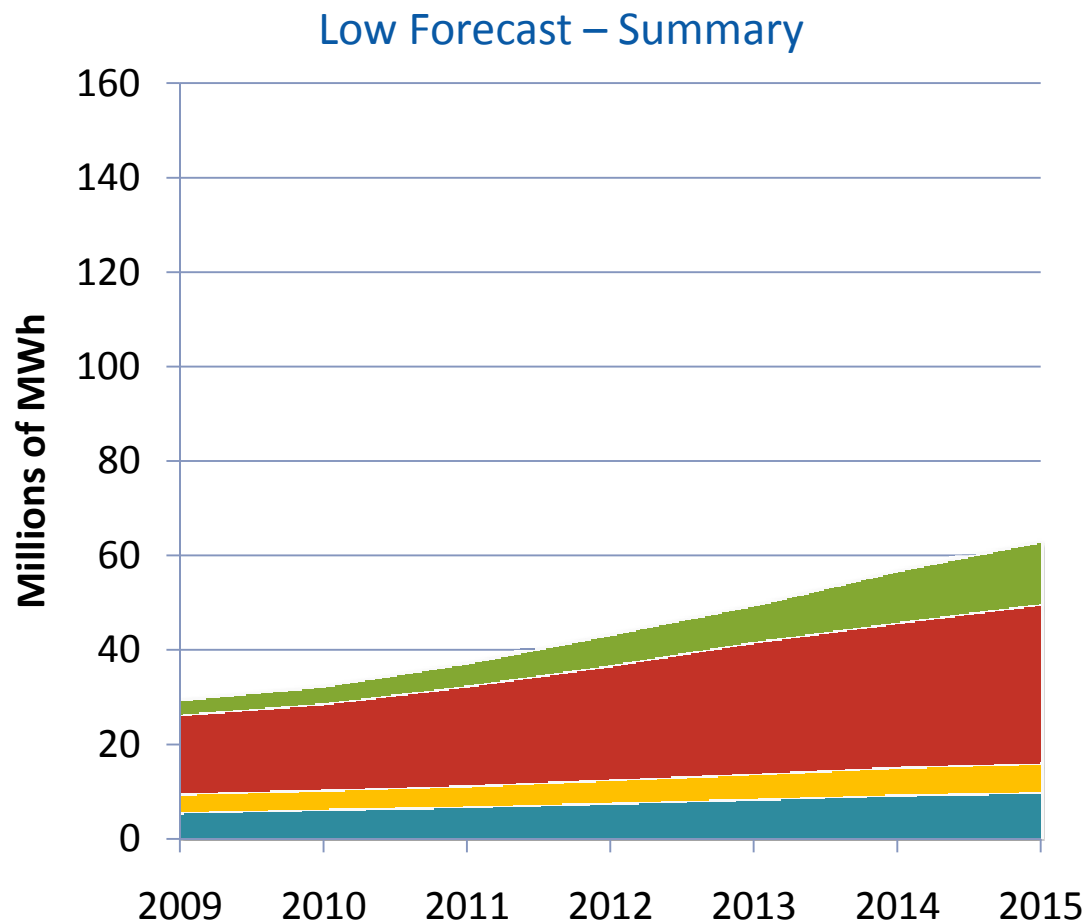
Voluntary Green Power Market Forecast through 2015

High Forecast - Summary



Source: Bird, L., E. Holt, J. Sumner, and C. Kreycik, 2010. *Voluntary Green Power Market Forecast through 2015*, NREL/TP-6A2-48158. Golden, CO: National Renewable Energy Laboratory, May. <http://apps3.eere.energy.gov/greenpower/pdfs/48158.pdf>

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In U.S.: 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
- 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”

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

Resources

DOE's Green Power Network

www.greenpower.energy.gov



EPA's Green Power Partnership

www.epa.gov/greenpower



Guide to Purchasing Green Power

http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf

Questions

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