



Geothermal Energy Utilization: REC Markets and Tax Credits

Presented by
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Overview of the Presentation

- i About Element Markets
- i What is a Renewable Energy Credit (REC)?
- i REC markets
- i Carbon credits
- i Tax Credits and other subsidies



Who is Element Markets?

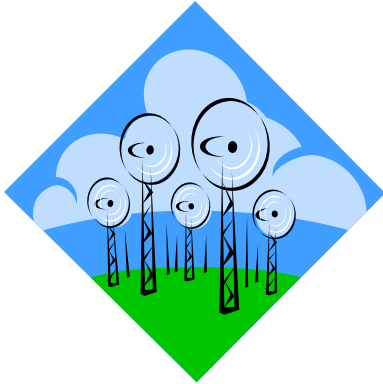
- i Started in 2004 as an emission and renewable energy credit asset management company.
- i Element Markets has four primary areas of focus
 - › Renewable Energy Credits
 - › Emission Credits
 - › Renewable Project Development
 - › New Technologies
- i Element Markets employs a pool of analysts to provide market intelligence and organization of data.
- i We work with investor-owned utilities, cooperatives, municipalities, project developers, industrial customers, institutions, and commercial accounts.
- i Our commercial experience and market intelligence is unmatched.
- i Wholesale market maker for RECs
 - › Unique segment in the REC business
 - › We purchase RECs from existing and new developments on a spot as well as a long-term (e.g. 10 years) basis





What is a REC?

- i A renewable generator produces two products when it creates electricity:



- i A REC is a marketing right that allows the owner to virtually overlay it on its system energy to create Renewable Energy (a.k.a. Green Energy)
- i RECs work on a broader time frame and geography compared to system energy
- i One REC is equivalent to one MWhr of energy
- i REC markets began around 1998



How RECs differ from commodity electricity?

	<u>ELECTRICITY</u>	<u>REC</u>
<u>Time to Consume</u>	Instantaneous	Allocated after the fact
<u>Geography</u>	Must be delivered to a sink	Delivery can be as small as a state or as large as nationally
<u>Online Date</u>	N/A	Can make a difference
<u>Shelf-Life</u>	None	Anywhere from one to five years
<u>Standards</u>	Well-established standards (FERC, NERC, etc.)	Green-e is the recognized standard in voluntary markets, but it is not mandatory; states set their own standards
<u>Resources Allowed</u>	All	Wind, PV Solar, Geothermal, Landfill Gas and other forms of methane capture; in limited cases, certain types of biomass (including wood waste and black liquor), MSW, hydro



What resources qualify?

i Undisputed

- › Wind
- › PV Solar
- › Landfill gas
- › Geothermal
- › Methane capture from animal and organic waste
- › Wood waste
 - i Must involve sustainable forestry practices
 - i Some areas impose emission requirements

i Not so clear

- › “Black liquor”
- › Municipal solid waste
- › Waste coal
- › Waste heat
- › Low-impact hydro
- › Small hydro (< 5 MW)
- › Solar thermal
- › Biodiesel
- › Fuel cells



Types of REC Markets

i VOLUNTARY

- › Demand driven by end users and marketers
- › Rules are not clearly defined
- › One uniform standard (Green-e)
- › Little regulation
- › Almost no liquidity
- › Purpose: To drive the development of new renewables
- › Size: Over 10.0 million MWhrs in 2006
- › Average spot price > \$1.75/REC

i MANDATORY (RPS)

- › Demand driven by statute or regulation
- › Rules are clearly defined by statute
- › Standards vary from state to state
- › Highly regulated
- › Slightly better liquidity
- › Purpose: To drive the development of new renewables
- › Size: Over 20 million MWhrs in 2006
- › Average spot price ~ \$3.50/REC







Tracking Systems

- i Ones that apply to target states
 - › Texas, administered by ERCOT
 - › WREGIS, administered by WECC
- i Benefits
 - › Certificates are issued by an independent third party
 - › Allows account holders to transfer or retire certificates
 - › Reduces the risk of
 - i Double claiming
 - i Double counting
 - i Double selling



Carbon Markets

- i Markets in the US are strictly voluntary
 - › Chicago Climate Exchange is only exchange in the US
 - › Bilateral voluntary market is significantly larger
 - › No clear standards exist to determine what technology constitutes a carbon offset
- i In voluntary REC markets, marketers usually claim their renewable purchases in terms of carbon reduced
- i Most of the Northeast states have joined the Regional Greenhouse Gas Initiative (RGGI)
- i California passed AB32 earlier this year
 - › Several Western states and some provinces in Canada have verbally committed to joining California's initiative
- i Neither of these programs will be in place prior to 2009
- i Neither of these programs are currently contemplating the recognition of renewable generation as a source of carbon offsets
- i Mandatory programs in Europe do not recognize renewable generation as carbon offsets
- i Will there be a national carbon market in our future? If so, will it be cap and trade, or a carbon tax?



Sources of Funding

- i Production Tax Credit
 - › Currently valid for new geothermal facilities brought online through 12/31/08
 - › \$10/MWh produced for the first ten years of commercial operation
 - › The owner must have the tax appetite
 - › The electricity must be sold to an “unrelated person”
 - › Another benefit: The plant can be depreciated over five years
- i Clean Renewable Energy Bonds
 - › Available to public power entities
 - › No interest on the bonds, and instead the lenders can claim tax credits
 - › \$800 million was available in 2006, and there were 709 applicants
 - › Another \$400 million is available in 2007
- i Local grants, tax incentives, and other subsidies



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