



Element Markets LLC

Geothermal Energy Utilization: REC Markets and Tax Credits

Presented by
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Overview of the Presentation

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



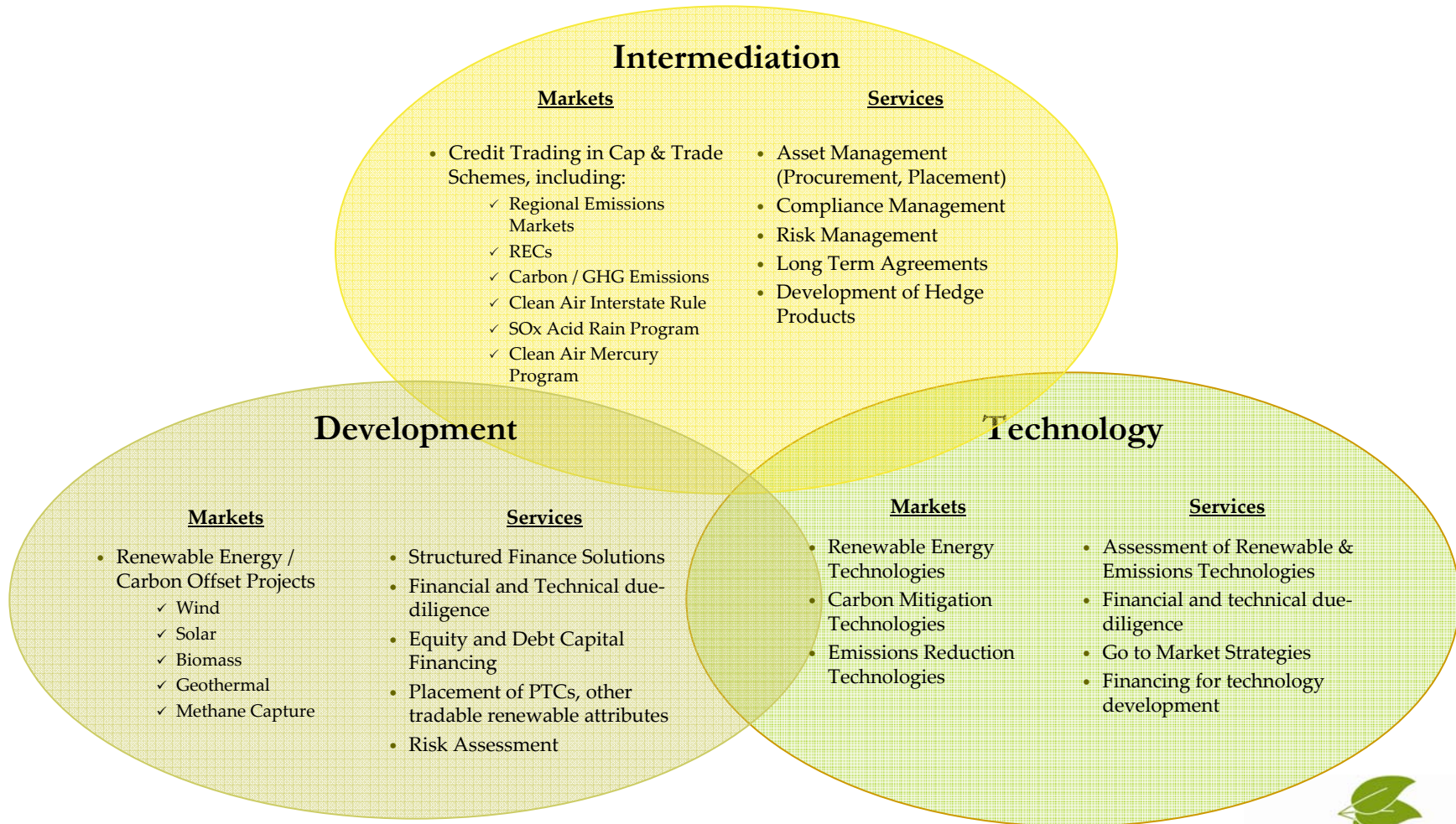
Who is Element Markets?

- ❑ Started in 2004 as an emission and renewable energy credit asset management company.
- ❑ Element Markets has four primary areas of focus
 - Renewable Energy Credits
 - Emission Credits
 - Renewable Project Development
 - New Technologies
- ❑ Element Markets employs a pool of analysts to provide market intelligence and organization of data.
- ❑ We work with investor-owned utilities, cooperatives, municipalities, project developers, industrial customers, institutions, and commercial accounts.
- ❑ Our commercial experience and market intelligence is unmatched.
- ❑ 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



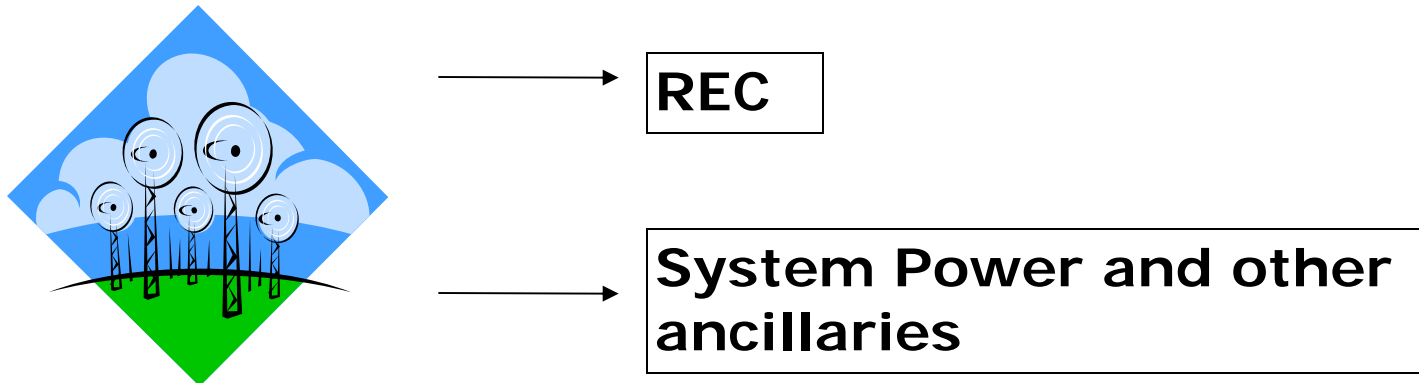
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Integrated Service Offerings



What is a REC?

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



- 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)
- RECs work on a broader time frame and geography compared to system energy
- One REC is equivalent to one MWhr of energy
- 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?

□ Undisputed

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

□ 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

□ 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

□ 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



A Few Notes About REC Markets

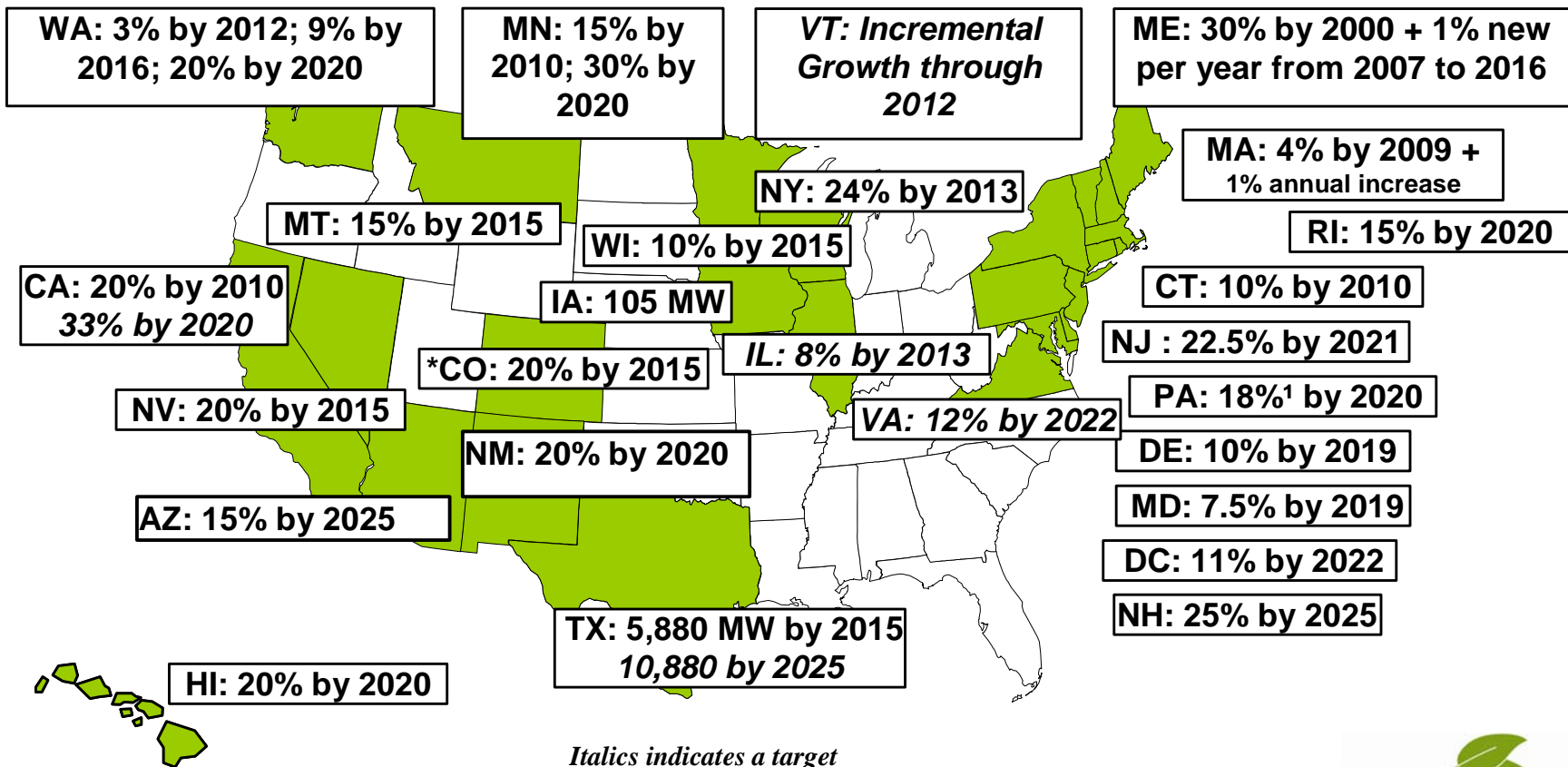
- ❑ Markets are very illiquid
 - Wide Bid/Offer Spread
 - This is typically a compliance purchase only and is not a hedged commodity
 - Few speculators in REC markets, so the market lacks liquidity
 - Compared to electricity, REC prices are relatively low
 - 2-3 trades in a week for a market is considered active
- ❑ Buyers are varied and can be hard to find
 - In voluntary markets, purchasers include aggregators, corporations, institutions, governmental entities
 - Motivations for buying are also varied (e.g. reduce carbon footprint, support renewables, energy independence)
- ❑ Price discovery is very difficult to achieve
- ❑ Contracts, especially for voluntary REC markets, can be cumbersome and risky
- ❑ Demand in the voluntary markets has increased at least 40% per year for each of the last 3 years
- ❑ Will there be a federal RPS in our future?



States with a Renewable Portfolio Standard (RPS) or Goals

Renewable Portfolio Standards

(as of May 31, 2007)



Tracking Systems

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



Carbon Markets

- 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
- In voluntary REC markets, marketers usually claim their renewable purchases in terms of carbon reduced
- Most of the Northeast states have joined the Regional Greenhouse Gas Initiative (RGGI)
- California passed AB32 earlier this year
 - Several Western states and some provinces in Canada have verbally committed to joining California's initiative
- Neither of these programs will be in place prior to 2009
- Neither of these programs are currently contemplating the recognition of renewable generation as a source of carbon offsets
- Mandatory programs in Europe do not recognize renewable generation as carbon offsets
- 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

- 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
- 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
- Local grants, tax incentives, and other subsidies



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