



REC Presentation to



January 26, 2005

Fresno, CA

About Evolution Markets

- Evolution Markets LLC was founded in 2000
- Offices in New York – San Francisco – London – Prague – Bratislava

➤ Markets

- SO₂ Emissions Allowances
- NO_x Emissions Allowances
- OTC Coal Markets
- Emissions Reduction Credits
- GHG Reductions
- Houston/Galveston NO_x Allowances
- RECLAIM (Los Angeles NO_x & SO_x)
- Discrete Emissions Reductions
- Renewable Energy Credits
- Weather Derivatives
- Natural Gas & Power

➤ Services

- Introductory Brokerage Services
- Structured Transactions
- Expert Advisory Services

Evolution Markets LLC: *Market Leader*

- Highest Volume Emissions Broker
- Highest Volume U.S. REC Broker
 - More than \$6.5 billion in brokered environmental transactions

Environmental
Finance

**Voted “Best Broker:
REC (US)”**

RISK MANAGEMENT • TRADING • FINANCE

energy risk

**Named “House of the Year:
Weather/Emissions”**

Point Carbon
Carbon Price Forecasting

**Voted “Best GHG
Broker”**

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RECs 101

- **Why RECs?**
- **What are RECs?**
- **RECs - O - Rama**
- **Additional terminology**

RECs 101: What are RECs?

- RECs represent the environmental, social, and other benefits of renewable energy generation
- By acknowledging a second commodity (in addition to the energy itself), it allows project developers to realize a second revenue stream and a second market for their product
- The additional revenue from RECs directly and indirectly supports the renewable energy market

RECs 101: RECs - O - Rama...

“Renewable Energy
Credits” (RECs)

“Renewable Energy
Certificates” (RECs)

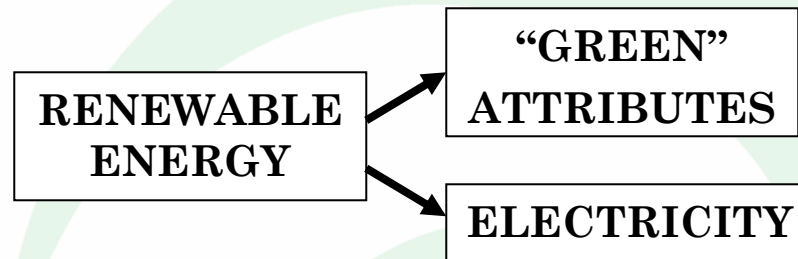
“Green Tags”

“Tradable Renewable
Certificates” (TRCs)

“Renewable Energy
Attributes”

...they're all the same thing!

RECs 101: Additional terminology



- “Unbundled RECs” – RECs traded separately from the underlying electricity
- “Bundled Power” – Grid power plus RECs
- “Green Energy” – Electricity generated from a renewable generation facility that includes the REC.


Transactions 101



Transactions 101: How do RECs trade?

- One REC represents the attributes associated with one megawatt hour (MWh) of energy from a renewable source.
- RECs are assigned a “vintage” based on the year in which they were generated.
- RECs are quoted by resource type and/or the market eligibility.
- Examples:
 - “5,000 vintage 2005 California wind RECs”
 - “10,000 vintage 2006 Massachusetts-eligible RECs”

Transactions 101: Key contractual terms

- Product (resource type, region, eligibility)
- Price
- Quantity
- Vintage/Term
- Delivery
- Payment
- Credit
- Certification (i.e. Green-e) 

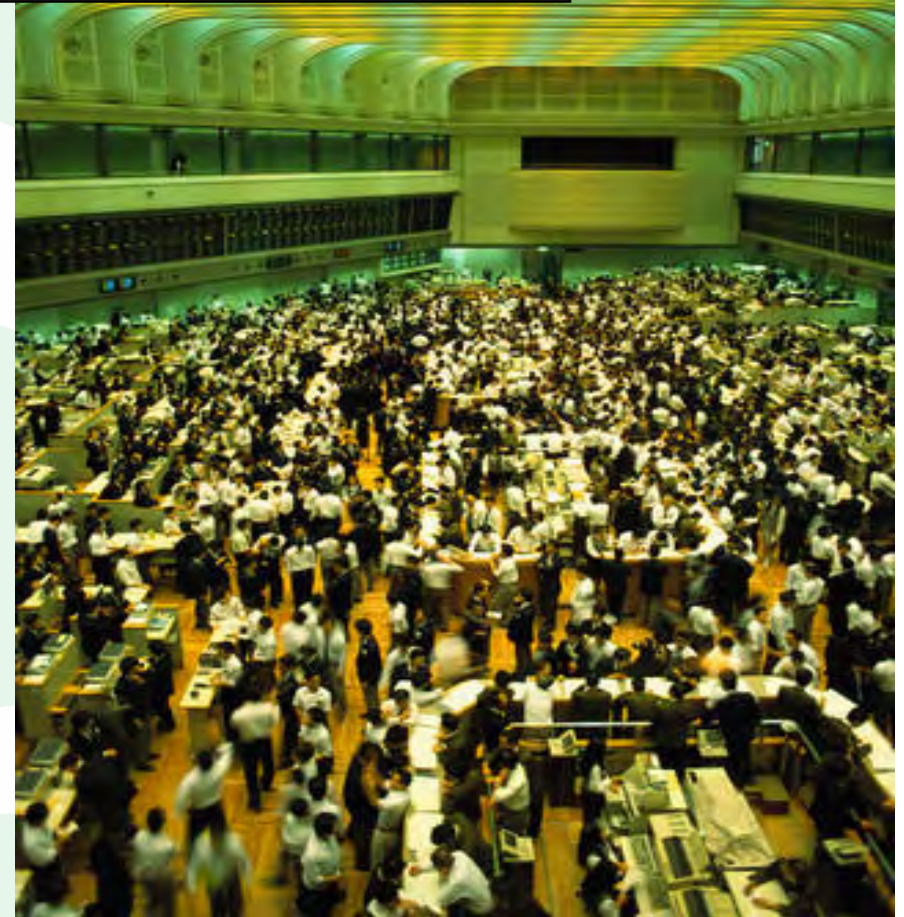
Markets and Market Participants



- Market participants
- Voluntary market basics
- Voluntary market pricing
- Renewable portfolio standards (RPS)
- Compliance market basics
- Compliance market pricing

Market Participants

- Developers/Generators
- “Green Marketers”, power marketers
- Traders and Brokers
- Utilities/Municipalities
- Corporations/Institutions
- Banks/Funds



Voluntary Market: Basics

- **Driven by environmental disclosure, consumer demand, corporate commitments**
- The most salient feature of the voluntary market is that it is dramatically oversupplied → prices are very low compared to the compliance markets.
- Voluntary buyers - generally less concerned about geographic location, but often have a preference for a specific resource type – usually wind.
- In 2004, total sales in the voluntary markets (Green-e sales as well as utility green pricing programs) were approximately 4 million MWh
- = roughly 450MW of around-the-clock generation.

Voluntary Market: Pricing

price discretion based
on resource type:

Solar: \$30 - \$200



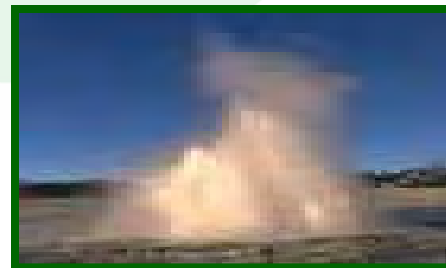
Biomass/Low-impact Hydro: \$1 - \$3

Wind: \$1.5 - \$20



Landfill Gas: \$1 - \$3

Geothermal: \$1-\$10



Voluntary Market: Buyers

● Green pricing programs

(Leaders by volume of sales Dec.2004)

- Austin Energy
- Portland General Electric
- PacifiCorp
- SMUD
- Xcel Energy
- Los Angeles Dept. of Power & Water
- OG&E Electric Services
- Puget Sound Energy
- We Energies

1,322,365MWh's = Approx.
150MW Baseload Green

● Corporate buyers

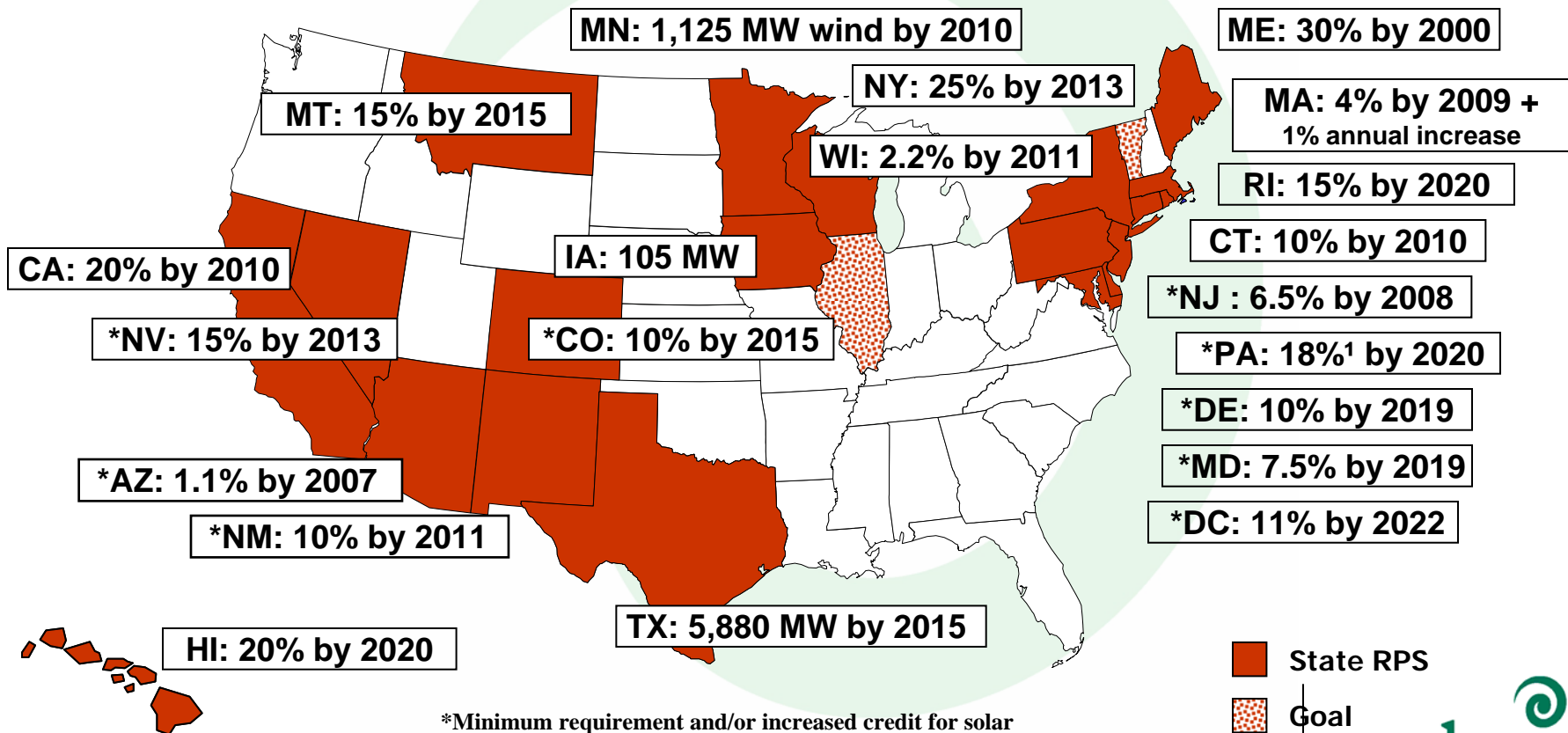
- DuPont
- Alcoa
- Staples
- Kinko's
- Johnson & Johnson
- IBM
- General Motors
- Pitney Bowes

Source: www.eere.energy.gov/greenpower/topten.shtml

Compliance Markets: Basics

- **Created by Renewable Portfolio Standards (RPS)**
- The most salient feature of the compliance markets is that they differ considerably from state to state, → prices differ.
- Compliance buyers are generally indifferent to the type of resource that created the REC (insofar as it qualifies), but they are limited to a specific geographic region from where the REC can be sourced.
- Approximate total volumes required in the compliance markets in 2005 are as follows:
 - Texas: 2.6 million MWh
 - Massachusetts: 1,000,000 MWh
 - Connecticut: 450,000 MWh
 - New Jersey: 750,000 MWh

Renewables Portfolio Standards

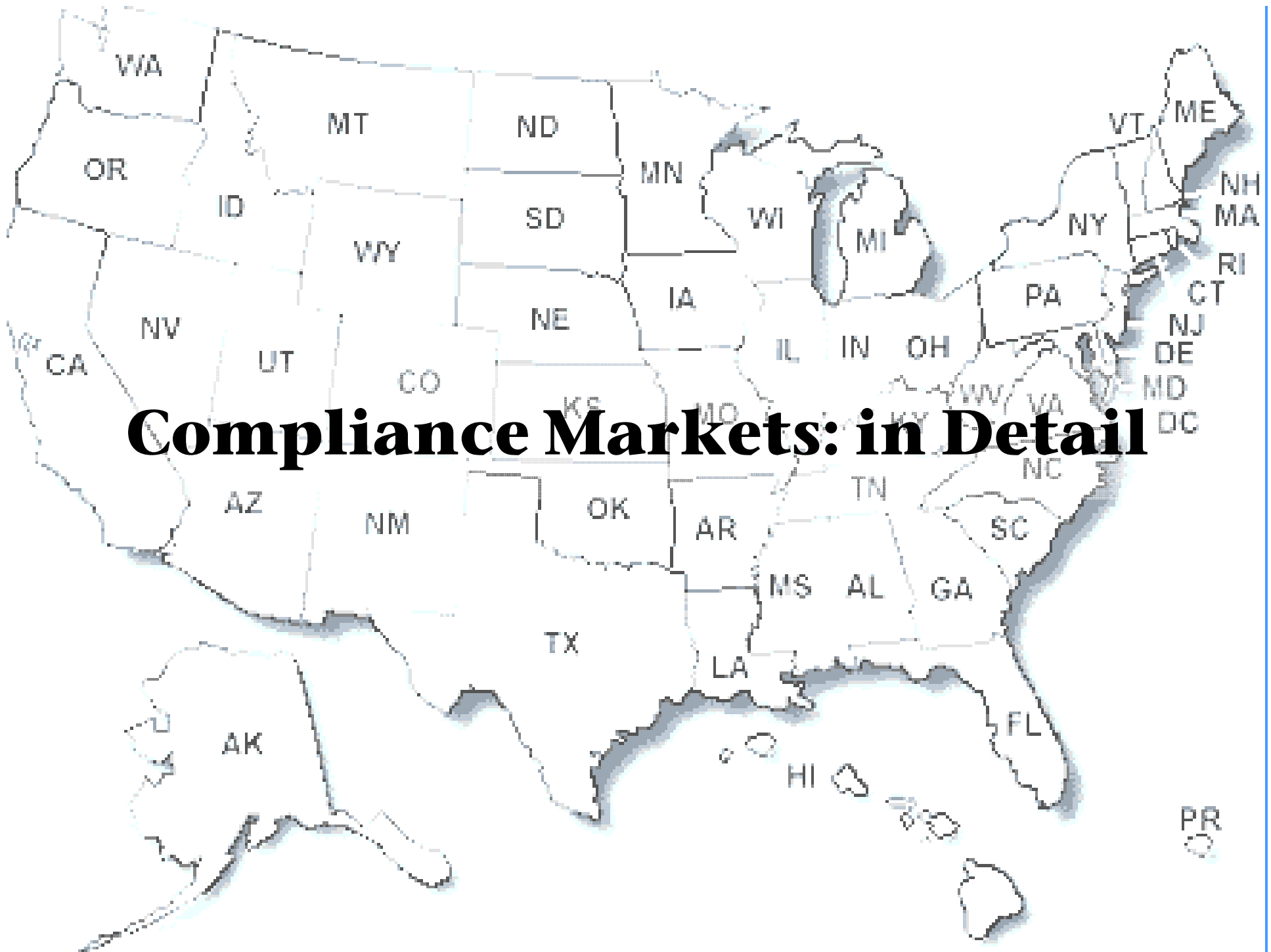


*Minimum requirement and/or increased credit for solar
¹ PA: 8% Tier I, 10% Tier II (includes non-renewable sources)

 State RPS
 Goal

Compliance Markets: Pricing

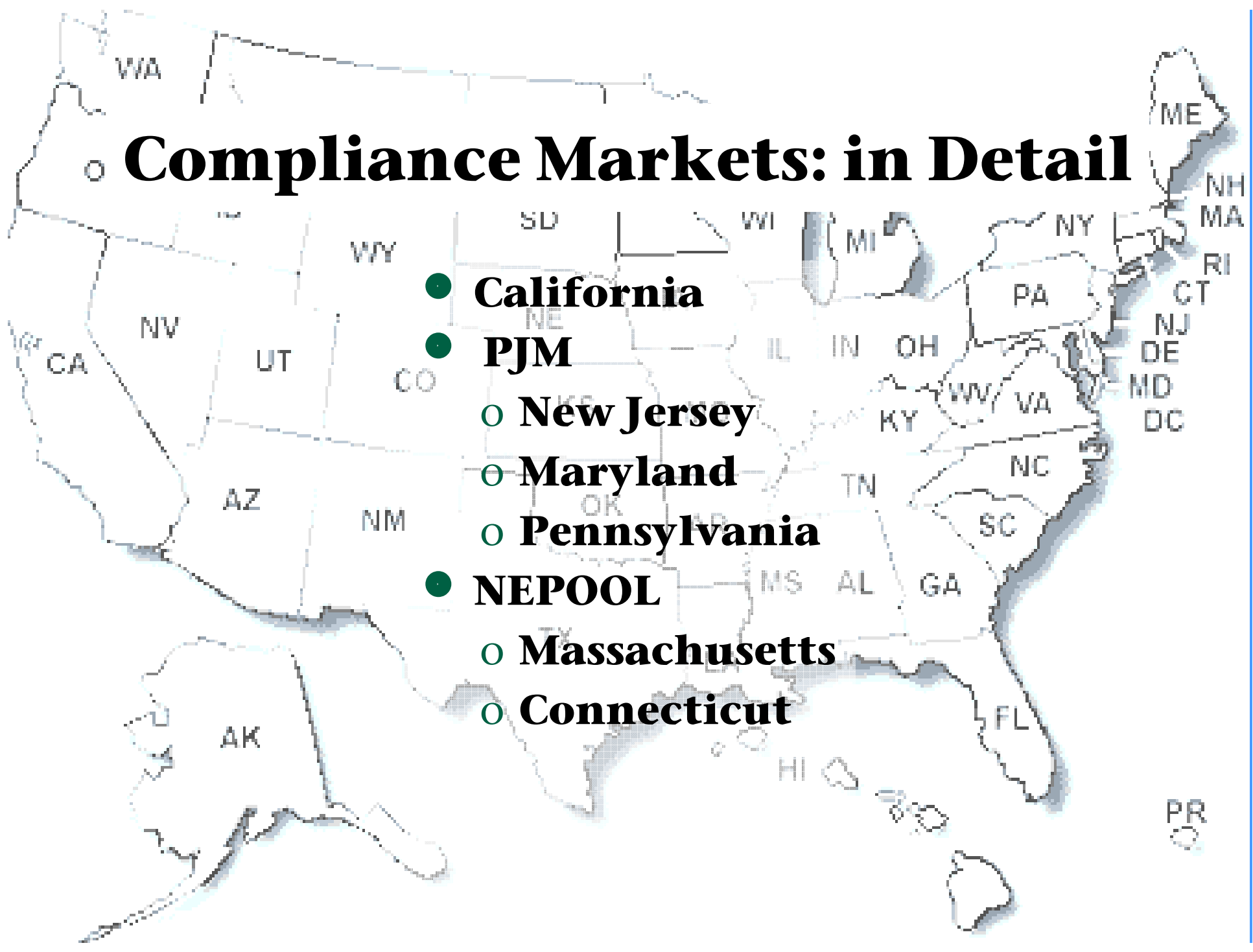
- RPS vary, so do the markets they create...
- The impact of an RPS is a function of supply (eligible resources) and demand (percentage requirements), enforced by penalties...
 - Maine: 30% requirement, but 50% of supply qualifies → price ~\$0.30
 - Massachusetts: 2% requirement ('05), but limited resources qualify, and \$53 “alternative compliance payment” → prices \$50+



Compliance Markets: in Detail

Compliance Markets: in Detail

- **California**
- **PJM**
- **New Jersey**
- **Maryland**
- **Pennsylvania**
- **NEPOOL**
- **Massachusetts**
- **Connecticut**





California Snapshot

- Municipalities (Munis) are required to implement their own “internal RPS”.
- Only Investor Owned Utilities (IOUs) are required to comply with the state’s RPS.
- However, the IOUs may not use “unbundled” RECs for RPS compliance.
- As a result: ironically, a state with one of the nation’s most aggressive RPS has some of the lowest REC prices.
- Consequently, unbundled wind RECs in CA are currently offered as low as \$1.50/MWh with low liquidity. In the absence of regulatory changes, unbundled California RECs will continue to be worth very little.

California: Market Outlook

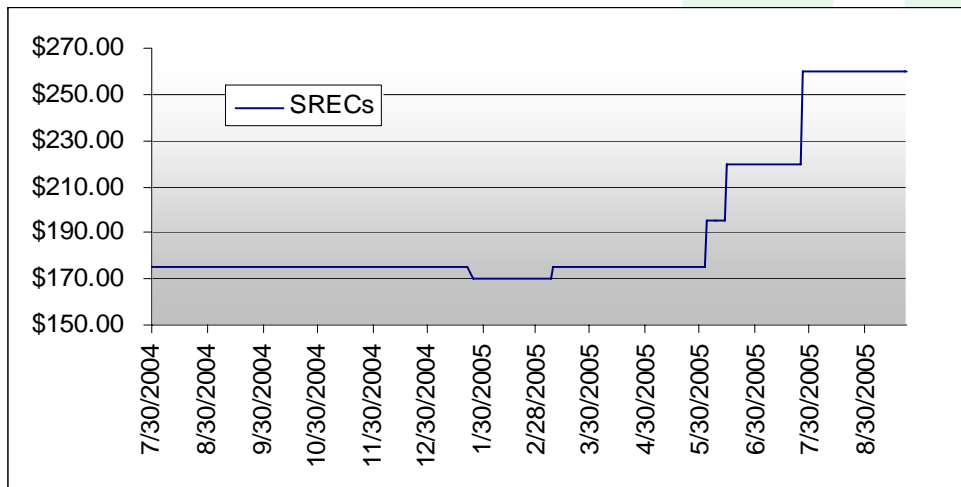
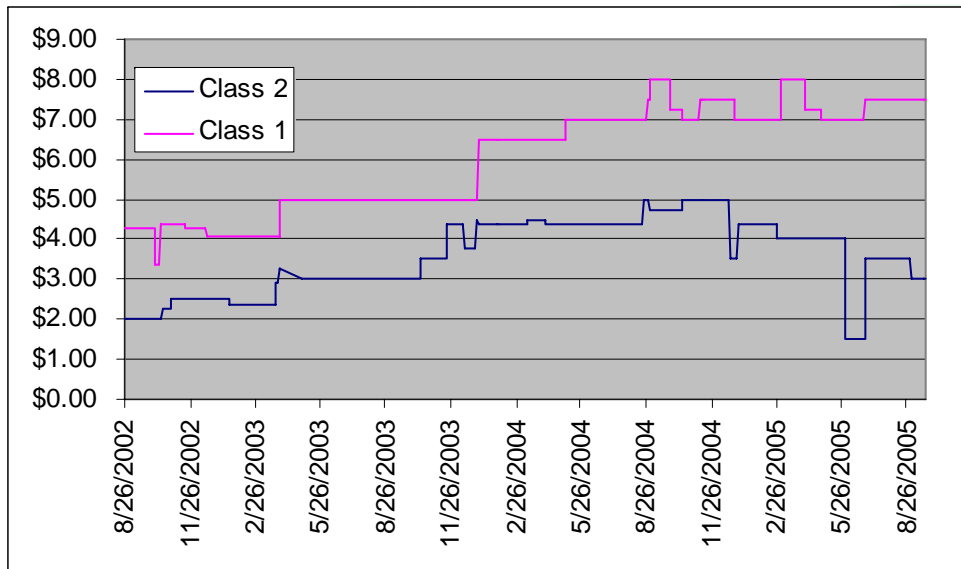
- Ultimately, REC prices in California are almost certainly going to depend on the following:
 - The eligibility of unbundled RECs for compliance purposes.
 - The eligibility of RECs generated outside of California for compliance purposes.
 - The role of ESP's and CCA's in the RPS.
 - An increase in percentage requirements and/or a change in target dates of the current RPS.
 - 8,469 MW of New Installed Renewables Needed by 2017



PJM Snapshot

- NJ currently the only active compliance market
- MD has passed RPS – begins in 2006
- PA has passed RPS – begins in 2007 (but not for everyone)

PJM Snapshot: New Jersey



- **NJ is the first compliance market in PJM**

- **Began 2002, new RPS rules went into effect June 1, 2004**

- **Relatively aggressive target (2.5% by 2008)**

- **Alternative compliance: \$50 for Class I/II, \$300 for Solar**

- **Prices: Class I -- \$7.00; Class II -- \$2.00; Solar -- \$225-\$260**

- **NJ RPS expected to be extended through 2020 with a goal of 20%**

- **Supply & Demand: forward picture very murky - demand could increase with other state RPS, but supply will increase as PJM expands.**

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PJM Snapshot: Maryland

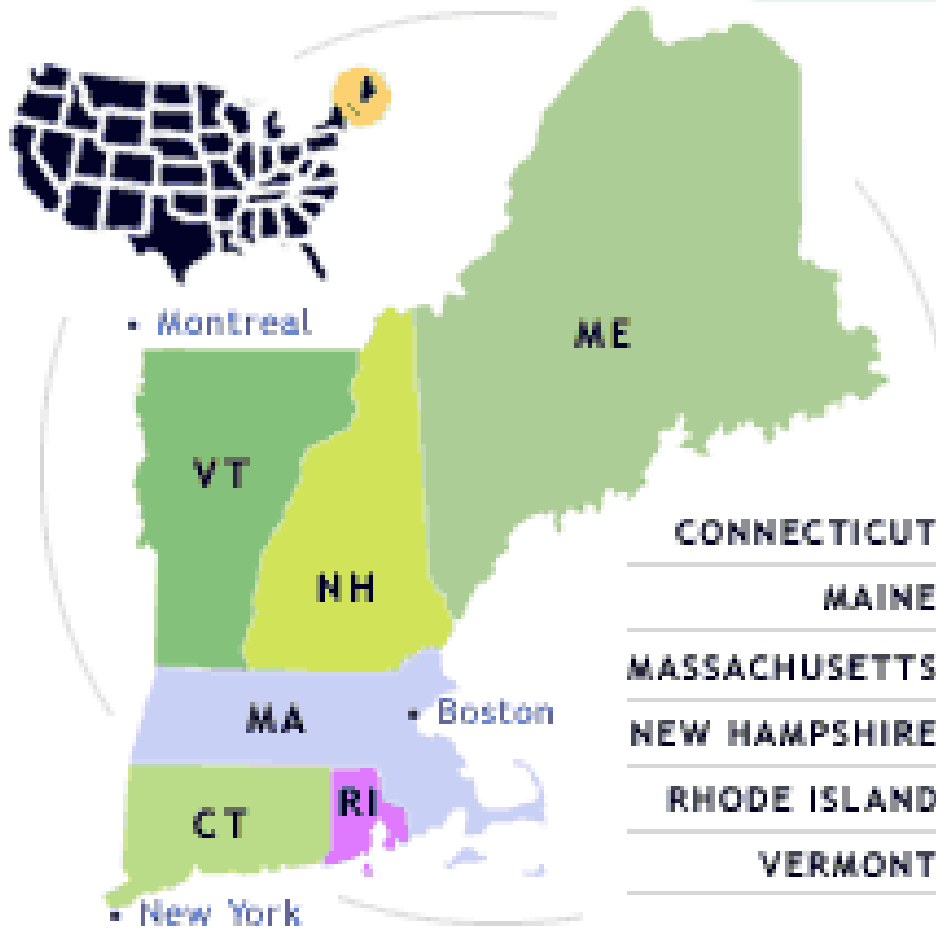
- MD will be the second compliance market in PJM
 - RPS passed in May 2004, 2006 will be first compliance year.
 - RPS target (Tier I): 7.5% by 2014.
 - Alternative Compliance: Tier I - \$20; Tier II - \$15/MWh.
 - Prices: only one Tier I trade has occurred, price was ~\$3.00.
 - Supply & Demand: supply will depend on geographic eligibility – some regulatory uncertainty.



PJM Snapshot: Pennsylvania

- PA has the newest compliance market in PJM
 - RPS passed in November 2004, 2007 will be first compliance year (but several utilities exempt until 2009-2010)
 - RPS target: 18% by 2021.
 - Alternative Compliance Payment: \$45/MWh (Tiers I & II)
 - Prices: too early to tell, but likely to follow NJ REC prices?
 - Supply & Demand: RPS rules not final. Qualifying generation resources likely to be located anywhere in PJM service territory or deliver into PJM grid.

NEPOOL Snapshot



- Uses GIS system
- Three states have RPS:
 - Massachusetts
 - Connecticut
 - Maine
- Maine RPS is relatively lax, prices are quite low
- Massachusetts and Connecticut have very aggressive RPS
 - MA & CT likely to be undersupplied for the next few years; changes in CT's "import" rules could change this
 - certificate prices highest in country
 - disconnect between developers' and buyers' time horizons



MA Snapshot

- 2004, 2005 REC supply is almost “sold out”
- “Imports” from NY providing much-needed breathing room
- 2006 supply picture looks a little better, but also likely to be tight...(Recent ruling against Low-emission Biomass)
- 2005 prices have gone as high as \$52.80 (against a \$53.19 alternative compliance payment)
- 2006 ACP expected to be between \$55.50 - \$56.00, 2006 has already traded \$53.25



CT Snapshot

- RPS passed June, 2003 - rules finalized October, 2004
- 2005 CT Class I market was short until the upgrading of older Biomass facilities that qualified for CT RPS
- Prices were trading between \$35-\$40 (as of 7/15/05) and by end of 2005 markets was “no bid” @ \$2.50
- Energy Independence Act ruled against “Mail In” RECs until 2010
- 2006 CT Class I market trading between \$6.75 and \$7.75...market expected to be quite oversupplied again
- Regulatory uncertainty has prevented term trading from happening

NEPOOL : Resource Mix

- The RECs sold in the MA and CT compliance markets are almost exclusively from landfill gas, biogas and biomass.
- Biomass is likely to dominate the compliance RECs market for the next few years, primarily because of:
 - the relative ease/low cost of retrofitting existing facilities.
 - relatively plentiful fuel supply (whereas wind resources are generally not good).
- Although wind is an eligible resource, there are no major wind projects operating in NEPOOL at present. In terms of wind, the proposed 420 MW Cape Wind project is by far the biggest potential source within NEPOOL.
- However, New York state has excellent wind resources, and while exporting to NEPOOL involves additional cost and some technical obstacles, many developers are considering this option.



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« January 2005 »

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31						

Evolution Express

Administrator

www.evomarkets.com/evoid

Voluntary Renewables Market Prices:

- [CLICK TO VIEW](#) | [EMISSIONS](#) | [COMPLIANCE RECS](#) | [VOLUNTARY RECS](#) | [COAL](#) | [EMISSIONS \(GHG\)](#) |

The following are indicative offers of Tradable Renewable Certificates (TRCs) and do not constitute a binding offer to sell. Some of these TRCs may be eligible for inclusion in Green-e certified products. [Click here to learn more about Evolution Markets' Green-e certified TRC products.](#)

category	region	state	generation	MWh	year	b/s	price
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New TRC	South East		landfill	15,000	2005 - 2008	Sell	\$2.00
New TRC	Central		wind	15,000	2005 - 2010	Sell	\$2.50
Existing TRC	WECC	CA	landfill	5,000	2004 - 2007	Sell	\$0.75
Existing TRC	WECC		geothermal	10,000	2004	Sell	\$1.50
New TRC	WECC		wind	5,000	2004 - 2008	Buy	\$1.75
New TRC	WECC		wind	5,000	2004 - 2008	Sell	\$2.75
New TRC	WECC	CA	solar	250	2004	Sell	\$50.00
New TRC	PJM		wind	15,000	2004	Sell	\$16.00
Existing TRC	New York	NY	small hydro	25,000	2005	Sell	\$4.00
Existing TRC	New York	NY	small hydro	25,000	2004	Sell	\$4.00
New TRC	WECC		wind	20,000	2003	Sell	\$1.25
New TRC	WECC		wind	20,000	2004	Sell	\$1.50
New TRC	WECC	CA	landfill	40,000	2005	Sell	\$2.00
New TRC	WECC	CA	landfill	40,000	2004	Sell	\$1.50

Voted Top Renewables Broker – North America

2003, 2004, 2005 Environmental Finance Customer Survey

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