



Landfills and the Environmental Markets

Prepared for the 7th Annual Landfill Methane Outreach
Program (LMOP) Conference and Project Expo

Washington, DC

January 6 - 7, 2004

Presentation Overview

- **The Environmental Markets:**
 - **Renewable Energy Credits (RECs)**
 - Compliance vs. Voluntary
 - Specific markets
 - » Pricing
 - » Opportunities
 - **Emissions**
 - Common questions
 - The domestic greenhouse gas (GHG) market
- **Overlap between RECs & GHG**
- **Looking ahead**

REC Pricing (per MWh) - I

■ Compliance markets: little price discretion among resource types

- Texas: low: \$3 high: \$17

Hovered in \$11 - \$13 range
for almost a year; now ~\$14

- New Jersey:

Class I ~ \$6, Class II, ~ \$3

- Massachusetts:

2002: \$25

2003: \$30+

2004: \$40+

■ Voluntary markets: price discretion based on resource type:

- Solar: can be as high as \$250

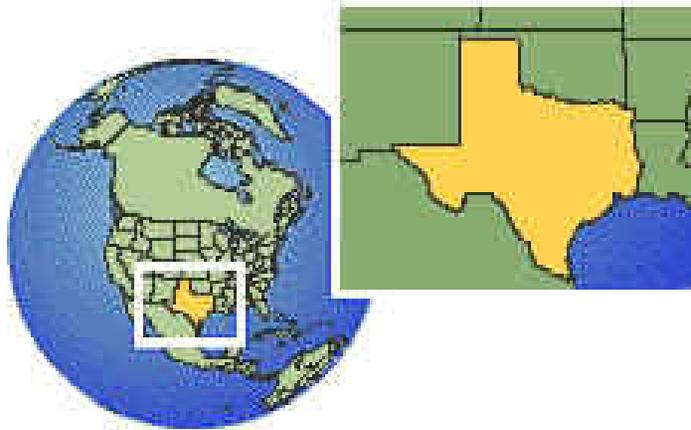
- Wind: \$6 - \$20, depending
on location

- Biomass, hydro: \$3 - \$5



REC Pricing (per MWh) - II

- RPS vary, so do the markets they create...
- The impact of an RPS is a combination of percentage, eligible resources, and penalties...
 - Maine: 30% requirement, but 50% of supply qualifies → price <\$1
 - Massachusetts: 1% requirement, but limited resources qualify, and \$50 “alternative compliance payment” → prices \$30 - \$40+



Texas Snapshot

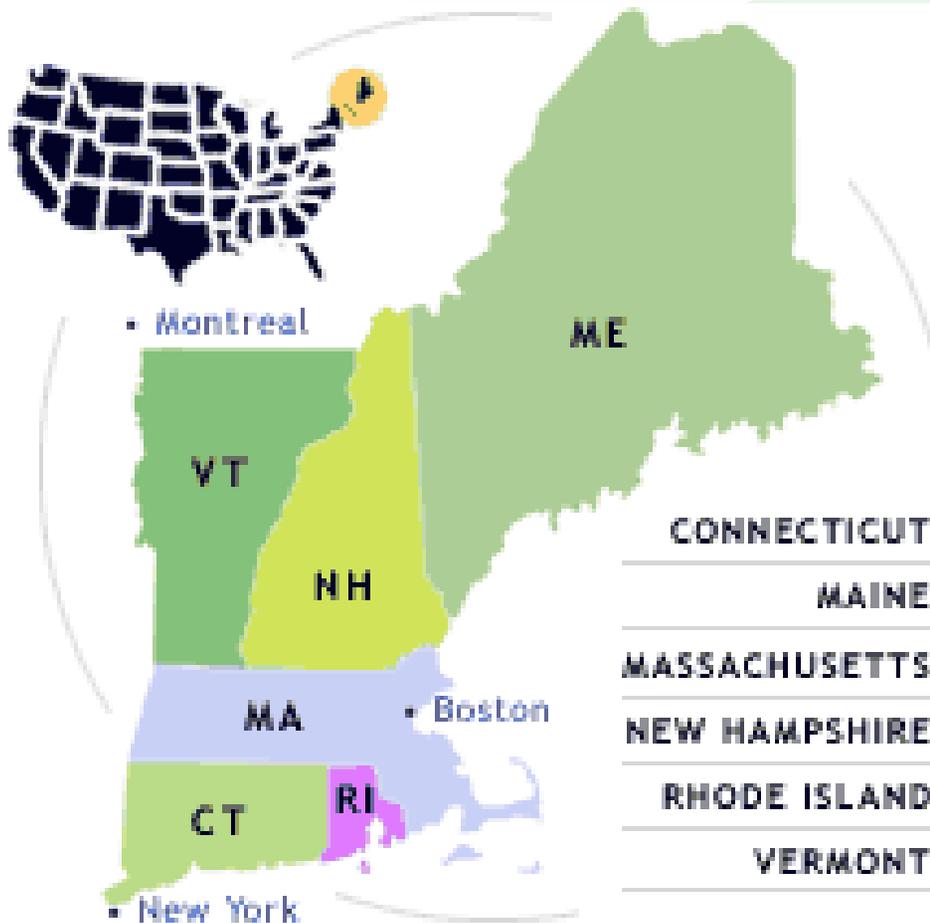
- First in nation to trade
- Uses GIS (Generation Information System) to track RECs
- Program success has been striking:
 - 400 MW mandated for 2002 - 2003, but
 - **1000 MW** already on line (940 MW wind, 30 MW landfill)
- Market participants notably more willing to take risk
- Two key factors:
 - Certificates can be **traded at any time**
 - Certificates can be **banked for 3 years**



PJM Snapshot

- NJ Interim RPS mandates retail electric providers to source a percentage of their load from renewables:
 - Class I = solar, wind, biomass, landfill
 - Class II = small hydro (<30 MW), MSW
- Class I prices around \$6.50, Class II prices around \$4.25
- Officially, no trading of certificates yet – possibly this year?
- Proposed amendments to RPS may be viewed at:
<http://www.state.nj.us/bpu/wwwroot/secretary/rps200309.pdf>

NEPOOL Snapshot



- Uses GIS system
- Three states have RPS:
 - Massachusetts
 - Connecticut
 - Maine
- Massachusetts:
 - trading, banking limited
 - 2004 demand will exceed supply
 - market still young, forward curve not established, “Catch-22” for developers
- Connecticut:
 - certificate prices highest in country
 - 115,000 MWh have traded for 2004
 - 95,000 MWh have traded for 2005 – 2006



New York Snapshot

- Environmental disclosure (labels)
- RPS has been “fast tracked”
 - Many basics still under discussion – eligible resources, percentages, “imports” & “exports” ...
 - RPS Proceedings homepage: <http://www.dps.state.ny.us/o3e0188.htm>
- No tradable certificates yet; under consideration
- No on-line tracking system yet; under consideration
- “Exports” to NEPOOL difficult but possible



California Snapshot

- RPS passed mid-September 2002, implemented June, 2003
- 20% by 2017; increase of ~1% a year
- Implementation process consists of three phases, recently completed second phase
- No binding annual targets, no penalty for shortfall, electricity prices regulated
- Currently involved in development of a certificate tracking system (“WREGIS” - Western Renewable Energy Generation Information System)

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| 29 | 30 | 31 | | | | |

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Voluntary Renewables Market Prices: [WATCHER](#) [EDIT](#)

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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 |
|--------------|--------------|-------|-------------|--------|-------------|------|---------|
| New TRC | South East | | landfill | 10,000 | 2004 - 2005 | Sell | \$3.50 |
| Existing TRC | WECC | | geothermal | 5,000 | 2004 | Sell | \$3.00 |
| Existing TRC | WECC | | geothermal | 10,000 | 2004 | Sell | \$2.00 |
| Existing TRC | WECC | | geothermal | 20,000 | 2004 | Sell | \$1.00 |
| New TRC | WECC | | wind | 30,000 | 2003 | Sell | \$3.00 |
| New TRC | WECC | | wind | 10,000 | 2004 | Sell | \$7.00 |
| New TRC | WECC | | wind | 20,000 | 2004 | Sell | \$6.00 |
| New TRC | WECC | | wind | 5,000 | 2004 | Sell | \$7.50 |
| New TRC | WECC | OR | biomass | 77,000 | 2004 - 2005 | Sell | \$3.00 |
| New TRC | Mid Atlantic | | wind | 10,000 | 2003 | Sell | \$15.00 |
| Existing TRC | NEPOOL | | small hydro | 2,500 | 2004 | Sell | \$4.00 |
| New TRC | Central | | wind | 10,000 | 2004 | Sell | \$5.00 |
| Existing TRC | NEPOOL | | small hydro | 3,000 | 2003 | Sell | \$3.00 |
| Existing TRC | NEPOOL | | wind | 1,000 | 2003 | Sell | \$13.00 |
| New TRC | NEPOOL | | small hydro | 500 | 2003 | Sell | \$5.00 |



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Compliance RECs Market Prices on 12/31/03: [WATCHER](#) [EDIT](#)

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Colored rows highlight watched markets

Texas RECs prices on 12/31/03

| term | bid price (change) | | offer price (change) | | last price (change) | | date | actions | | |
|------|--------------------|-----|----------------------|-----|---------------------|-----|---------|---------|--|--|
| 2003 | \$13.75 | n/c | \$15.50 | n/c | \$14.00 | n/c | 11/6/03 | | | |
| 2004 | \$9.00 | n/c | \$13.00 | n/c | | | | | | |

NEPOOL MA New Certificates prices on 12/31/03

| term | bid price (change) | | offer price (change) | | last price (change) | | date | actions | | |
|-------|--------------------|-----|----------------------|-----|---------------------|-----|----------|---------|--|--|
| Q2'03 | \$35.00 | n/c | | | \$38.00 | n/c | 11/13/03 | | | |
| Q3'03 | \$38.00 | n/c | \$45.00 | n/c | \$40.50 | n/c | 12/18/03 | | | |
| Q4'03 | \$38.00 | n/c | \$45.00 | n/c | \$40.00 | n/c | 12/18/03 | | | |
| Q2'04 | \$42.00 | n/c | \$50.00 | n/c | \$40.00 | n/c | 9/11/03 | | | |
| Q3'04 | \$42.00 | n/c | \$50.00 | n/c | \$40.00 | n/c | 9/11/03 | | | |
| Q2'05 | \$35.00 | n/c | \$40.00 | n/c | | | | | | |

NEPOOL CT Class I prices on 12/31/03

| term | bid price (change) | | offer price (change) | | last price (change) | | date | actions | | |
|--------|--------------------|-----|----------------------|-----|---------------------|-----|----------|---------|--|--|
| Cal'04 | \$43.00 | n/c | \$52.00 | n/c | \$48.00 | n/c | 11/06/03 | | | |
| Cal'05 | \$43.00 | n/c | \$52.00 | n/c | \$43.00 | n/c | 10/29/03 | | | |
| Cal'06 | \$43.00 | n/c | \$52.00 | n/c | \$43.00 | n/c | 10/29/03 | | | |

Internet

Landfill and the Emission Markets

Common questions:

- 1) “Can landfill facilities can participate in the SO₂ and NO_x markets?”
- 2) “Is there a market for GHG credits from my facility?”
- 3) “Can I can sell RECs ***and*** emission credits?”

The reality:

- The US has cap and trade programs to reduce emissions of SO₂ and NO_x, but not for GHG
 - The SO₂ cap and trade program applies to utilities only
 - The NO_x SIP Call cap and trade program applies to sources of >50 tons/annually in an 19-state region (regional NO_x programs also exist)
 - Other sources can “opt in”, but usually not worth it
- Most REC programs explicitly disallow the “carving out” of GHG benefits from RECs

The Greenhouse Gas (GHG) markets

■ Internationally:

- The EU cap and trade market starts in 2005
- Kyoto (if ratified) starts in 2008

■ Domestically:

- Because the US hasn't ratified Kyoto, no US projects can sell GHG credits in either of these markets
- US GHG market primarily voluntary, some states have launched their own initiatives

CCX (<http://www.chicagoclimateexchange.com>)

- Started trading 12/12/03
- 19 member companies have taken on voluntary reduction commitments
- Baseline established, must reduce by 4% by 2006
- Members receive allowances, then proceed under cap & trade format
- As of 12/30/03, 31,100 tons of CO₂e traded, average price of \$0.97/ton

RECs and GHG: is there any overlap?

- Some voluntary GHG programs recognize the purchase of RECs toward GHG reduction targets
- Some “green tag” marketers would argue that this is the strongest driver in the voluntary REC market
- Allocating a GHG “offset” value to a REC can be tricky – exactly what was offset or displaced? (e.g., timing, location?)

Looking ahead...

- Currently, the REC markets offer much more opportunity for landfill than the emission markets
- The northeast is the most promising region, but
- Evolving regulatory landscape
 - Difficult to establish forward curves
 - Lack of forward curves make it difficult for developers to secure financing

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