The Scarcity and Expense of HGB Emission Reduction Credits: Issue and Opportunity

October 1, 2013

CONFIDENTIAL AND PROPRIETARY
Launched in 2005, Element Markets has become the leading marketer of environmental commodities in the U.S.

- Leading marketer of environmental commodities with a focus on Emissions, GHG, and Renewable Energy (Energy and Transportation Credits), and Biomethane
- Transacted over $1.4 billion in environmental commodities since inception in 2005
- Currently Provides Environmental Asset Management Services for over 8,000 MW
- Strong presence in the TX Emissions markets with over 30 years of TX expertise on staff
- Customer base of over 700 companies across North America
- Recently conducted highest price trade for VOC ERCs in the history of the US Emissions Market ($300,000/ton for Houston/Galveston VOCs)

**Energy Risk Environmental Rankings**
- #1 U.S. Regional Greenhouse Gas Dealer
- #1 U.S. Voluntary GHG Credit Dealer
- #2 Renewable Energy Credit Dealer
  - #1 NOx & SO2 Dealer

**Environmental Finance Magazine**
- Best Trading Company in North American Renewable Energy
- Runner-Up, Best Trading Company of North American GHG Markets (California)
  - Best Trading NOx & SO₂ Company Emission Credits
ELEMENT MARKETS ADDRESSING CLIENT NEEDS OVER A FACILITY’S LIFECYCLE

**Facility Lifecycle**

**Client Needs**

- Budget, Education, and Procurement of Emissions Reduction Credits (ERCs)
- Budget, Education, and Procurement of annual allowances
- Contract support
- Process Transfer Paperwork

**Element Markets’ Solution**

- Planning and Permitting Stage
  - Annual NOx and HRVOC compliance
  - Portfolio and Risk Management
  - Position Reporting

- Asset Operations and Expansion
  - Banking and Monetizing VOC Emission Reduction Credits
  - Monetization of MECT Nox Allowances

- Retirement, Reduction of Emissions or Redevelopment
WILL EMISSIONS COSTS AND AVAILABILITY CHOKE HGB EXPANSIONS?

Potential Requirements:

- VOC ERCs (Scarce Supply and Expensive)
  - Alternative Options
    - VOC DERCs
    - NOx DERCs
  - NOx MECT NOx
- HRVOC (Harris County Only)
EMISSION REDUCTION CREDITS & ALLOWANCES

- ERCs
  - One time purchase/offset potential to emit
  - Perpetual right to operate under air permit
  - Each ERC market unique
  - ERCs are created upon shutdown, process change, or installed control technology

- MECT/HRVOC Allowances
  - Annual Program
  - True Up each year
  - Can sell excess or buy shortfall
  - Supply of Allowances is capped and usually reduced over time
  - Allowances allocated at start of program from a historical baseline
  - New facilities do not receive allocation, but must buy in the marketplace
**Key Features**

- NOx, VOC ERCs required; quantified in tons per year
- Banked ERCs expire after 5 years
- Must bank ERCs within 180 days of reduction
- Case by case inter-pollutant trading
- Currently no trading between regions, but lobbying and modeling exercises trying to change this

**Counties**

<table>
<thead>
<tr>
<th>HGB</th>
<th>Brazoria</th>
<th>Chambers</th>
<th>Fort Bend</th>
<th>Galveston</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Harris</td>
<td>Liberty</td>
<td>Waller</td>
<td>Montgomery</td>
</tr>
<tr>
<td>DWF</td>
<td>Collin</td>
<td>Dallas</td>
<td>Denton</td>
<td>Ellis</td>
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<tr>
<td></td>
<td>Johnson</td>
<td>Kaufman</td>
<td>Parker</td>
<td>Rockwall</td>
</tr>
<tr>
<td></td>
<td>Tarrant</td>
<td>Wise</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Offset Thresholds (Tons/Year)**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Major Source</th>
<th>Major Mod</th>
<th>Minimum Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGB VOC ERCs</td>
<td>25</td>
<td>25</td>
<td>1.3 : 1</td>
</tr>
<tr>
<td>HGB NOx ERCs</td>
<td>25</td>
<td>25</td>
<td>1.3 : 1</td>
</tr>
</tbody>
</table>

Source: TCEQ 2012
**HOW ERC MARKETS WORK**

Houston Facility

- **Permit Application**
  - Emissions Threshold: 25
  - Potential to Emit: 100

- **ERCs Purchased**
  - 130*

- **Actual Emissions**
  - 75**

- **ERCs Banked**
  - 75

55 ERCs Reduced from Market (42%)

*Apply District offset ratio of 1.3

**Average actual emissions in last two years was lower than normal operations
Emissions must have been reported or represented in inventory used for SIP determinations

For a permanent shutdown, the entire permit must be voided

To apply for certification, applicants must submit Form EC-1

Once certified, ERCs are available for trade or use within the same nonattainment area

Once approved, TCEQ will list on the Emission Reduction Credit Registry

Reductions must be reviewed and approved by TCEQ
<table>
<thead>
<tr>
<th>Date</th>
<th>Total VOC</th>
<th>% Change in VOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/23/2010</td>
<td>755.9</td>
<td></td>
</tr>
<tr>
<td>4/27/2010</td>
<td>66.2</td>
<td>-91%</td>
</tr>
<tr>
<td>11/29/2011</td>
<td>143.1</td>
<td>116%</td>
</tr>
<tr>
<td>4/26/2012</td>
<td>263.6</td>
<td>84%</td>
</tr>
<tr>
<td>8/3/2012</td>
<td>299.7</td>
<td>14%</td>
</tr>
<tr>
<td>6/15/2012</td>
<td>263.6</td>
<td>-12%</td>
</tr>
<tr>
<td>8/3/2012</td>
<td>299.7</td>
<td>14%</td>
</tr>
<tr>
<td>11/7/2012</td>
<td>295.5</td>
<td>-1%</td>
</tr>
<tr>
<td>1/3/2013</td>
<td>533.4</td>
<td>81%</td>
</tr>
<tr>
<td>2/4/2013</td>
<td>547.5</td>
<td>3%</td>
</tr>
<tr>
<td>9/17/2013</td>
<td>757.9</td>
<td>38%</td>
</tr>
</tbody>
</table>
**PROCURING VOC**

- VOC ERCs:
  - VOC has become extremely scarce and competition is fierce
  - Little to none of the ERCs are on the registry are available for sale today
  - Companies have had to be very proactive to procure VOC ERCs because most have been pre-sold before they are issued by the TCEQ
  - Element Markets works with companies to voluntarily reduce, bank, and monetize VOC ERCs
  - 6 to 18 months lead time should be allowed to obtain VOC ERCs, the higher the volume the more lead time
  - Element Markets has worked with numerous companies in various industries to plan and manage risk for their upcoming projects
HGB MECT NOx Market
The Mass Emissions Cap and Trade (MECT) Program was adopted in December 2000 in the Houston-Galveston-Brazoria (HGB) area.

Regulates NOx emissions from stationary facilities with design capacity to emit at least 10 tons of NOx per year.

The program began on 1/1/2002.

Established an initial cap that declined annually until 2008.

Overall, facilities reduced emissions to 80% from baseline by 2008.

Initially, facilities received allocations based on 1997-1999 Baseline.

March 1st – compliance date for previous year emissions.

January 30th – last day to submit trade for previous year.

Banking allowed for 1 year, then expires.

Current Vintage used before Banked Vintage.

New sources must buy all their allowances.

10% penalty (paid in allowances) for non-compliance.
HGB NOx MECT Supply vs. Demand

Total Emissions
Excess Allowances
% oversupplied

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

% Oversupplied

0.0 20,000.0 40,000.0 60,000.0 80,000.0 100,000.0 120,000.0 140,000.0
0% 20% 40% 60% 80% 100% 120% 140%

Total Yearly Allocation
EXAMPLE OF OFFSETTING COMPLIANCE

- Facility’s potential to emit is 100 tons of NOx a year.
  - 30% benefit of the environment requires an additional 30 tons.
  - The first 100 tons can be offset using Perpetual Allowances to meet MECT and NSR requirements.
  - The additional 30 tons can be met with ERCs or Perpetual Allowances or DERCs (process change).

- This is the cheapest way to comply because the 100 Perpetual Allowances will count towards MECT Compliance annually as well as meet the NSR requirement.

### HGB Offsetting Requirement

<table>
<thead>
<tr>
<th>Requirement to offset 100 tons</th>
<th>Total Requirement</th>
</tr>
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<tbody>
<tr>
<td>NSR Requirement, 100</td>
<td></td>
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<tr>
<td>30% Requirement, 30</td>
<td></td>
</tr>
</tbody>
</table>

Total # of Tons

- 0
- 20
- 40
- 60
- 80
- 100
- 120
- 140
NOx COMPLIANCE

- MECT NOx stream:
  - Element Markets requested and received notification from TCEQ verifying regulations which allow facilities to use MECT NOx Perps for both New Source Review (NSR) and MECT NOx.

**Example for 50.0 tons:**
- 1.3 offset ratio required for NSR = 65.0 tons
- 1.0 usually kept for MECT NOX Annual Program = 50.0 tons
- TCEQ immediately retires the 0.3 portion for NSR = 15.0 tons of MECT NOX
- TCEQ requires facility to leave the remaining 50.0 tons in account to count towards NSR and Annual MECT NOx Program for every year into the future

- Market is on an up trend is very cynical with economy
- Prices are forecasted to continue to recover with Houston’s chemical, energy transportation and storage expansion and future NAAQS 2013 standards
Summary

**OPPORTUNITY**

- Opportunities exist for profitable NOx and VOC create creation

**ISSUE**

- Plan ahead if your company has a project that has VOC and Nox needs as they are scarce and expensive.
THANK YOU

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• “US Emissions House of the Year - 2010” by Energy Risk

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