Update on HRVOC, NOx, and VOC ERCs and Allowances in Houston-Galveston-Brazoria

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Houston, Texas 77002
Mike Taylor Bio

- Founder and President of Emission Advisors, Inc.
- Eighteen years of experience in environmental trading, brokerage and consulting in emission reduction credit programs
- Transacted over a billion dollars of environmental credits
- Previously Emissions Trader with Louis Dreyfus Energy Services
- Managed Compliance for NRG’s 20,000 MW Power Fleet
- Board Member of Gulf Coast Chapter of the Air & Waste Management Association and Environmental Market Associations
- Amazon Best Selling Author with the book “Reduce Carbon Compliance Costs: Strategies for California and Quebec facilities”
- Graduated Summa Cum Laude with Degree in Finance from LSU
US Emissions House of the Year

- Brokerage and Consulting Firm Specializing in Emission Reduction Credits, MECT NOx and HRVOC Allowances, Carbon Trading, Low Carbon Fuel Standard, CSAPR NOx and SO2
- Market Overviews, Legislative Updates, Regulatory Updates, Analysis, Strategy Development, and Brokerage/Strategy Execution All Under One Roof
For NOx and VOC Emission Reduction Credits in Houston-Galveston-Brazoria (HGB):

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Potential to Emit (PTE)</th>
<th>Offset Ratio</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>New facility</td>
<td>≥ 25 tons</td>
<td>1.3 to 1</td>
<td>Previous – 1997-2016 Severe</td>
</tr>
<tr>
<td>Major modification</td>
<td>≥ 25 tons</td>
<td>1.3 to 1</td>
<td>Previous – 1997-2016 Severe</td>
</tr>
<tr>
<td>New facility</td>
<td>≥ 100 tons</td>
<td>1.15 to 1</td>
<td>2017- Sept 22(^{nd}), 2019 Moderate</td>
</tr>
<tr>
<td>Major modification</td>
<td>≥ 40 tons</td>
<td>1.15 to 1</td>
<td>2017- Sept 22(^{nd}), 2019 Moderate</td>
</tr>
<tr>
<td>New facility</td>
<td>≥ 50 tons</td>
<td><strong>1.2 to 1</strong></td>
<td>Sept 23(^{rd}), 2019 – Current Serious</td>
</tr>
<tr>
<td>Major modification</td>
<td>≥ 25 tons</td>
<td>1.2 to 1</td>
<td>Sept 23(^{rd}), 2019 – Current Serious</td>
</tr>
</tbody>
</table>

HGB and DFW has until July 20\(^{th}\), 2021 to comply with Serious
<table>
<thead>
<tr>
<th>Area</th>
<th>2017 Design Value</th>
<th>2018 Design Value</th>
<th>2019 Design Value (YTD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houston-Galveston-Brazoria</td>
<td>81</td>
<td>78</td>
<td>81</td>
</tr>
<tr>
<td>Dallas-Fort Worth</td>
<td>79</td>
<td>76</td>
<td>77</td>
</tr>
<tr>
<td>San Antonio*</td>
<td>74</td>
<td>72</td>
<td>73</td>
</tr>
<tr>
<td>El Paso-Juarez**</td>
<td>72</td>
<td>73</td>
<td>75</td>
</tr>
<tr>
<td>Waco</td>
<td>69</td>
<td>68</td>
<td>69</td>
</tr>
<tr>
<td>Austin</td>
<td>69</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Beaumont-Port Arthur</td>
<td>68</td>
<td>68</td>
<td>70</td>
</tr>
<tr>
<td>Corpus Christi-Victoria</td>
<td>66</td>
<td>64</td>
<td>63</td>
</tr>
<tr>
<td>Tyler-Longview-Marshall</td>
<td>65</td>
<td>65</td>
<td>66</td>
</tr>
<tr>
<td>Lower Rio Grande Valley</td>
<td>57</td>
<td>57</td>
<td>59</td>
</tr>
<tr>
<td>Laredo</td>
<td>53</td>
<td>53</td>
<td>59</td>
</tr>
</tbody>
</table>

* Deemed nonattainment Sept 24th, 2018
** Exception Event approved by EPA and TCEQ – deemed attainment April 30th, 2018
EMISSION REDUCTION CREDITS (ERCs)

• ERCs
  – ERCs are created upon shutdown, process change, or installed control technology
  – Entities have 2 years from reduction date to apply for ERCs
  – One-time purchase/offset potential to emit
  – Perpetual right to operate under air permit
  – Expires after 5 years of reduction date if not applied to permit
ERC GENERATION - PERMANENT REDUCTION IN VOC OR NOx EMISSIONS

Actual Emissions must have been reported or represented in inventory used for SIP determinations

For a partial or full shutdown, the permit must be modified

To apply for certification, applicants must submit application via STEERS

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

Reductions must be reviewed and approved by TCEQ

Once certified, ERCs are available for trade or use
Process to Sell ERCs

• Submit Banking Application via STEERS
• Hire Emission Advisors to market the ERCs

• Verbally agree to a deal with Buyer. Emission Advisors sends out deal confirmation.
• Buyer and Seller execute a mutually agreeable contract. Emission Advisors provides template.

• Submit transfer via STEERS. Must be done after ERCs are issued by TCEQ.
• Buyer pays Seller within 5 business days of written confirmation of transfer
SIP emissions year for credit generation projects will change on January 18th, 2019:

<table>
<thead>
<tr>
<th>HGB Emission Sources</th>
<th>Past SIP Emissions Year</th>
<th>Current SIP Emissions Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric generating units with emissions recorded in the Environmental Protection Agency’s Air Markets Program Data for the SIP emissions year</td>
<td>2015</td>
<td>2018</td>
</tr>
<tr>
<td>All Other Point Sources</td>
<td>2014</td>
<td>2016</td>
</tr>
<tr>
<td>Area and Mobile Sources</td>
<td>2014</td>
<td>2017</td>
</tr>
</tbody>
</table>
Offsetting NOx New Facility

<table>
<thead>
<tr>
<th>Program</th>
<th>Threshold</th>
<th>Offset Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECT only</td>
<td>10 tons – 49.9 tons</td>
<td>1 to 1</td>
</tr>
<tr>
<td>MECT and NSR</td>
<td>&gt; 50 tons</td>
<td>1.2 to 1 (Serious)</td>
</tr>
</tbody>
</table>

• Best Options:
  – Buy MECT NOx Allowances for PTE portion (1 to 1)(not NOx ERCs) These allowances usable for New Source Review Permit and Annual Compliance in MECT Program.
  – If PTE Above 50 tons, the 0.2 portion can be offset with NOx ERC or MECT NOX allowances, whatever is cheaper.
ERC NOx Pricing Chart
2016-Present
OFFSETTING VOC IN PERMIT IN HGB

- Provide HGB VOC ERCs
  - Historical Route
- Provide HGB NOx ERCs
  - Modeling, EPA and TCEQ approval
  - 1 ton of NOx used to offset 2.4 tons in December 2018 (First Time ever more than 1 to 1 was approved)
  - New process:
    - Interpollutant Trading Modeling must be submitted 30 days prior to 2nd notice to TCEQ
    - EPA no longer required to approve ratio or IPT in writing
    - If EPA doesn’t object during public comment, than it is deemed approved
  - A few applications pending

- Provide HGB VOC DERCs for every year of operation
  - Limited due to Supply of VOC DERCs

- Provide HGB NOx DERCs for every year of operation
  - Modeling, EPA and TCEQ approval (Method has not been used since 2013/2014)
Max Yearly Price For HGB VOC ERCs

![Bar chart showing the maximum yearly price for HGB VOC ERCs from 2007 to 2019. The prices range from $0 to $350,000, with significant increases in 2013 and 2014.]
HGB ERC VOC Pricing Chart
2016-Present

VOC ERC Price Chart
- Final Amount Traded
- Price per ton or tpy

Traded Volume in tons
Price, $/ton
HGB MECT NOx ALLOWANCES

• NOx MECT Allowances
  – Any facility that has collective uncontrolled design capacity to emit 10 tons or more of NOx
  – MECT NOx stream of allowances can be used in lieu of NOx ERCs with NSR Permit
  – If under 50 tons for a new facility, offset ratio is 1 to 1
  – If over 50 tons for a new facility, offset ratio is 1.2 to 1
  – New facilities do not receive allocation, but must buy in the marketplace
<table>
<thead>
<tr>
<th>Year</th>
<th>Supply</th>
<th>Demand</th>
<th>Excess</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>39,958</td>
<td>29,964</td>
<td>9,994</td>
</tr>
<tr>
<td>2015</td>
<td>39,955</td>
<td>30,490</td>
<td>9,465</td>
</tr>
<tr>
<td>2016</td>
<td>39,976</td>
<td>29,736</td>
<td>10,240</td>
</tr>
<tr>
<td>2017</td>
<td>39,979</td>
<td>30,362</td>
<td>9,617</td>
</tr>
</tbody>
</table>
MECT NOx Stream Pricing and Volume Chart 2016-Present
MECT NOX Strategy

• Sell MECT NOx perps at $100,000/ton
• Receive 5-year Hedge at $200/ton
• Buy Year by Year after year 5
• Successfully has deployed since 2009 last year of the allowance supply cut
HECT HRVOC SUPPLY vs. DEMAND

Total yearly allocation

Year


Emissions Surplus % Oversupplied

0% 20% 40% 60% 80% 100% 120% 140% 160% 180%

500.00 1,000.00 1,500.00 2,000.00 2,500.00 3,000.00 3,500.00 4,000.00

% Oversupplied
## HECT HRVOC Stream Pricing

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Price</td>
<td>$130,000</td>
<td>$170,000</td>
<td>$180,000</td>
</tr>
<tr>
<td>High Price</td>
<td>$175,000</td>
<td>$185,000</td>
<td>$205,000</td>
</tr>
</tbody>
</table>
Summary

- Sept 23rd, 2019 – Redesignation to Serious
- July 20\textsuperscript{th}, 2021 – Date for HGB to achieve 75 PPB or may be bumped up to \textbf{Severe}
- 2020 Presidential Election – NAAQS 2022?
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HGB AREA AND MOBILE SOURCES

• TCEQ amended EBT rules effective Oct 12, 2017 so that ERCs could be generated by area and mobile sources

• **As of 10-30-18 – HGB ERC Registry consists of Area tons:**
  - 0.4 tons NOx
  - 15.6 tons VOC

• These emissions do not have to be in the SIP (major change)

• Area Sources:
  - Inelastic sources not eligible – gas stations, restaurants, etc.
  - 61% of VOC emissions in 2014

• Mobile Sources
  - on-road mobile sources that are part of industrial, commercial, non-profit, institutional or municipal fleet and operate 75% of the time in the non-attainment area are eligible to generate
  - No residential sources
  - 67% of NOx emissions from Mobile Sources

• Multiple sources can be aggregated to meet 0.1 ton ERC min issuance
SIP Year HGB Stationary Source Emissions

NOX emissions

- 2006: 55000 tons
- 2014: 33000 tons
- 2016: 33000 tons

VOC emissions

- 2006: 43000 tons
- 2014: 27000 tons
- 2016: 25000 tons