Cap and Trade Workshop on Refineries and Related Industries

August 13, 2013
Logistical Information

- Slides posted at
  [http://www.arb.ca.gov/cc/capandtrade/meetings/meetings.htm](http://www.arb.ca.gov/cc/capandtrade/meetings/meetings.htm)

- Email questions to:
  [auditorium@calepa.ca.gov](mailto:auditorium@calepa.ca.gov)

- Comments will be accepted at the above website until August 26th, 5 PM
Purpose

- To discuss the benchmarking approach for the second compliance period and following
  - Will also address true-up changes

- Discuss how related industries will be handled
Outline

- Purpose
- Status Update
- Product Based Benchmarking Principles
- Current Regulation and Options
- True-Up
- Solomon Presentation
- Discussion
Cap and Trade Status Update

- Cap-and-Trade Regulation effective January 1, 2012
- Regulatory Amendments effective September 1, 2012
- Emissions Compliance began January 1, 2013
- Linkage Amendments approved April 19, 2013
- Investment Plan released May 14, 2013
- Additional Amendments and Offset Protocols
  - Anticipated Board consideration Fall 2013
General Product-Based Allocation Equation

- Refineries will receive allocations using the same basic equation used for other sectors
  - \( A_t = \text{output} \times B \times AF_t \times c_t \)

- Benchmark B is set as
  - 0.9 \times (\text{emissions/output}) or
  - Best in class if no one refinery meets the above

- One Product – One Benchmark
  - Plan to keep this approach unless data shows need for different approach
Benchmark Treatment of Electricity and Steam

- Carbon cost recovery approach
- Steam consumed on-site included
  - Both produced or purchased from a third-party
- Electricity
  - Generated on-site and consumed: included
  - Generated on-site and sold: excluded
  - Purchased from grid and third party CHP: excluded
    - CPUC proceedings for compensation
- Propose that bottoming cycle cogeneration electricity sales will not be subtracted off to maintain consistency with MRR and CPUC decisions
Current Second Compliance Period Approach

- Carbon Dioxide Weighted Tonne (CWT)
  - Provides a carbon dioxide weighted factor (CWF) for each process unit normalized to the distillation unit
  - Throughput provided by unit and multiplied by CWF
  - Added for total CWT
  - Benchmark based on total emissions and total CWT for refineries

- Benchmark from EU
  - Based on EU data
  - Different stringency level
Option 1: Adjust CWT

- Base allocation on CWT with a few amendments:
  - Modify or add CA specific factors
  - Modify for treatment of electricity and steam
  - Modify stringency
  - Hydrogen included
  - Calcining excluded
Option 2: CWB-Based Allocation with Adjustment

- Base allocation on Complexity Weighted Barrel (WSPA-CWB), with a few amendments:
  - Exclude units not currently in CA or expected in CA
  - Similar process units grouped to keep incentive to use more efficient process
  - Treat steam and electricity consistently with other benchmarks
  - Other factors with no direct product are excluded
    - Adjustment for off-sites
    - Electricity use adjustment
  - Hydrogen included
  - Calcining excluded
Principles for Amending Process
Unit Factors for CA CWB

• Group together units which accomplish the same purpose, i.e. have very similar inputs and outputs
  • Maintain incentive to use most efficient technology available
  • Use average of factors for each unit, weighted by CA volumes
  • For example, the “Reformer” unit already averages across distinct technologies

• Keep separate units which have substantially different inputs or outputs
  • Provide appropriate allocation for the production accomplished by different processes
  • For example, atmospheric and vacuum distillation have different output mixes despite both being distillers
### Tentative CWB Process Units for Use in CA – Feedback Needed

<table>
<thead>
<tr>
<th>Coker</th>
<th>Delayed Coker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fluid Coker</td>
</tr>
<tr>
<td></td>
<td>Flexicoker</td>
</tr>
<tr>
<td>Fluid Catalytic Cracking</td>
<td>Fluid Catalytic Cracking</td>
</tr>
<tr>
<td></td>
<td>Mild Residual FCC</td>
</tr>
<tr>
<td></td>
<td>Other FCC</td>
</tr>
<tr>
<td></td>
<td>Thermal Cracking</td>
</tr>
<tr>
<td>Hydrogen Production</td>
<td>Hydrogen Production: Steam-Methane Reforming</td>
</tr>
<tr>
<td></td>
<td>Hydrogen Production: Steam-Naphtha Reforming</td>
</tr>
<tr>
<td></td>
<td>Hydrogen Production: Partial Oxidation</td>
</tr>
</tbody>
</table>
Potential Adjustment of Process Unit Factors

- Most process unit factors are similar under CWT and CWB.
- Sulfur is substantially different:
  - 140, measured in light tons, under WSPA-CWB.
  - 18.6, measured in metric tons, under EU-CWT.
- ARB proposes to use sulfur factor based on EU-CWT:
  - Unless there are data available to support this difference.
- Most other units do not show such dramatic differences between WSPA-CWB and EU-CWT factors.
Option 3: CWB-Based Allocation without Grouping

- Base allocation on WSPA-CWB, with a few amendments:
  - Exclude units not currently in CA or expected in CA
  - Treat steam and electricity consistently with other benchmarks
  - Other factors with no direct product are excluded
    - Adjustment for off-sites
    - Electricity use adjustment
  - Hydrogen included
  - Calcining excluded
  - Still need explanation for sulfur unit differences
Calcining

- Separate benchmark
- 90% or best-in-class
- Process-based cap decline factors
Hydrogen

- Gaseous Hydrogen included in the CWB or CWT approach
- Liquid hydrogen proposed to have a separate benchmark based on quantity sold
True-Up in Other Sectors

- Product based benchmarks in other sectors receive a true-up in allocation once actual output is available.

- Initial allocation is based on data two years prior to the vintage year of the allowance allocation:
  - Nov 2014 – allocation for year 2015, based on 2013 verified data with a true-up for the difference between 2011 and 2013 product data.

- The purpose is to account for what the facility should have gotten if ARB had the information at the time of allocation.
Refrinery True-Up Proposal

- Adding a true-up for non-EII facilities

\[
\min \left( O_{x,t-2} \times B_R \times c_{t-2} \times AF_{R,t-2}, AE_{x} \times c_{t-2} \times AF_{R,t-2} \right) - A_{x,t-2}
\]

- Modifying the EII facility true-up to be consistent with other sectors and the purpose of the true-up (to update for actual information on production)
  - Making the credit and debit equation the same
  - Adding in a sector allocation true-up
    - Considering an alternate possibility of not modifying distribution factor Df – only the sector allocation SA and fraction F
ARB Has Conducted Preliminary Analysis Using the Survey Data

- Equity for smaller refineries
  - Analysis does not suggest that smaller refineries and larger refineries systematically would get a different % of the allowances they need

- Considered whether EU process units not in CWB may be worth adding

- CWT v. CWB effect for individual refineries
  - Mostly similar, but some substantial changes; SD= 23% change
  - Still considering which of these are due to data anomalies

- Compared to CWT, some refineries will benefit and some will lose
Additional Analysis

- Correlation(GHG emissions, EU-CWT) = 0.84
- Correlation(GHG emissions, WSPA-CWB) = 0.99

(note these would be slightly different without data problems)
Next Steps

- Comments due by August 26th 5 PM at: http://www.arb.ca.gov/cc/capandtrade/comments.htm

- Board Hearing October 24-25th for both MRR and Cap and Trade

- MRR amendments would need to be in effect Jan. 1, 2014
Contacts

- Cap and Trade Regulation – Refineries
  Eileen Hlavka, lead staff
  ehlavka@arb.ca.gov (916) 322-7648

  Elizabeth Scheehle, manager
  escheehl@arb.ca.gov (916) 322-7630