The Importance and Impact of Including Fuels and Natural Gas in California’s Cap-and-Trade Program

December 11, 2014

Guest Speakers:

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Andre Templeman, Alpha Inception LLC
Energy and commodity price benchmarking and market insights


illuminating the markets
Fuels under the cap

Cynthia Obadia, West Coast Business Development
Argus Media: global, market-focused, independent

• World’s largest independently held energy markets PRA - 700 staff, 23 countries

• Publish > 8,000 daily commodity price assessments + energy market intelligence

• Recent acquisitions
  ◦ DeWitt, JJ&A (Petrochemicals)
  ◦ FMB (Fertilizers)
  ◦ Wax Data
  ◦ Metals

• Coverage expansions
  ◦ US Natural Gas
  ◦ Base Oils

• Services
  ◦ Price reporting and indexation
  ◦ Consulting
  ◦ Conferences

• Indexation examples
  ◦ US crude oil and condensate
  ◦ US refined products (incl. VGO)
  ◦ Global liquefied petroleum gas/natural gas liquids
Cap-and-trade at the rack

• Point of regulation is roughly at the rack, or where fuels go from wholesale pipelines and tanks to trucks for distribution to retail

• Emissions intensity varies on octane and winter/summer blend

• Compliance obligation mostly applies to fossil fuels, small amount of covered emissions from biofuels.
Cap-and-trade at the rack

- Rack markets are highly competitive and profit margins tend to be thin

- Cap-and-trade price should apply evenly to all large distributors

- Competitiveness of the racks could lead to attempts to use the CCA price as another avenue to undercut the other sellers

- Experience with RINs suggests that rack players will end up applying the carbon price across the board
**Cap-and-trade at the rack**

- Cap-and-trade compliance covers only sellers of over 25,000t CO₂e equivalent in fuel or the sum of both fuels.

- Smaller sellers would have to prevent their sales going over the 25,000t barrier in any year.

<table>
<thead>
<tr>
<th>25,000t CO₂e in gallons of fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.11</strong> Gasoline</td>
</tr>
<tr>
<td><strong>2.44</strong> Diesel</td>
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</tbody>
</table>

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Cap-and-trade markets

![Graph showing the price of CCO Guaranteed, CCA month, CCA Dec-13, CCA Dec-14, and CCA Dec-15 from September 2011 to September 2014. The graph illustrates the price movements over time, with peaks and troughs indicating market fluctuations.](image-url)
Cap-and-trade at the rack

- Implied carbon allowance price for California gasoline is currently around 9.8¢/USG (in Quebec 3.08¢/l), Diesel is around 12.5¢/USG (3.83¢/l)

- Limited opportunities to undercut competitors’ compliance costs
  - 8pc offsets
  - Well-timed buying, auctions
  - In Quebec, increased blending of biofuels since Canada has weaker biofuel blending mandates
Gasoline prices more volatile

LA Gasoline

LA Diesel
Possible effect on fuel prices

**Gasoline**
- CCAs for gasoline
- LA regular gasoline
- Gasoline taxes

**Diesel**
- CCAs for diesel
- LA diesel
- Diesel taxes

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Gasoline LCFS deficits versus CCAs

- CCAs are the larger price component, but affect everyone.
- LCFS depends on the marketer, larger firms can have an easier time with blendstocks, price risk.
- LCFS portion will become larger once targets start increasing in 2016.
Carbon savings are possible, but small

- Auction prices have been lower than in the spot market, but that spread is unpredictable and not guaranteed

- Savings from using offsets

- On the diesel side in California, blending higher levels

<table>
<thead>
<tr>
<th>Summer Regular, all CCAs ($12.25)</th>
<th>Summer Regular, 8pc gold CCOs at $10.50 ($12.11)</th>
<th>Summer Regular, if auction 20 cents lower and 8pc offsets ($11.93)</th>
</tr>
</thead>
</table>
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1 Introduction to Alpha Inception
Andre Templeman, Managing Director & Founder –

• Over 12 years of experience in commodity structuring and origination with Macquarie Bank, Goldman Sachs, Duke Energy and Iberdrola Renewables. Developed, built and led teams in the WECC and ERCOT while at Macquarie and Goldman Sachs. Extensive experience developing and executing innovative hedge structures for end-users with a specific focus on renewables and natural gas-fired power plants. MBA from the Ivey School of Business at the University of Western Ontario and BA from York University.
Best-in-class Relationships

- Private equity, investment managers, utilities, and industrial end-users:
  - Alpha Inception’s clients manage over 10,000 MW of generation, transmission and load, with over $7 Billion under active management
  - Vast network with all significant sector groups and associated environmental markets
  - Access to alternative sources of capital and hedging opportunities
  - Best-in-class learning while maintaining confidentiality

- Partnerships and working relationships with other institutions:
  - Environmental product brokers
  - Offset project developers
  - Financial institutions and marketers
  - Power plant developers and Gas E&P companies

- Frequent communication and open discussions with regulators:
  - CARB, CAISO, and CPUC
  - Regulatory bodies and trade associations
  - Legislative and executive branches
Building a customized approach to carbon risk mitigation...
Carbon Market Observations
Complex Markets

Energy Markets

Commodity Pricing

RPS Supply

Hydro Output

WECC Regional Prices

Compliance Markets

Allowances

Offsets

Supply & Demand Linkages

California Market

Quebec Market

Other?

Electricity

Natural Gas

Coal

Allocations

Auction

Bilateral

CCOs

CRTs

Early Action Credits

California Market

Quebec Market

Other?
Cap & Trade Compliance

- **Compliance Period I (2013-2014)**
  - Electric generation units, Industrial stationary sources, and Importers of electricity from specified sources with emissions of over 25,000 tons per year.

- **Compliance Period II (2015-2017)**
  - Natural Gas Pipelines, Tailpipe Emissions and other sectors will be added to the program as it triples in size. Entities who emit in excess of 25,000 tons of CO\(_2\) per year and are estimated to account for approximately 20% of the states overall emissions, will be added to the program.

- **Compliance Period III (2018-2020)**
  - By the end of Phase 3, all covered entities should have together reduced their overall GHG emissions below the “AB 32 2020 Baseline of 1990 emission levels.”
GHG Emissions Goals / Cap*

Note: Baseline includes reductions due to 33% RPS and Pavley I standard

* This slide was provided at the courtesy of Roger Yang of Ambiente Group Inc. based on information from ARB.gov
Regulatory Amendments

2013-2014 Amendments:
• Revised “assistance factors” for Emissions Intensive Trade Exposed Industries
• Enhanced role of “Market Monitor”
• Allocation percentages to Natural Gas Distribution Utilities
• New market monitoring and Disclosure Requirements
• “Legacy Contract” treatment and CHP exemption

Potential Future Amendments:
• Post 2020 emission reduction targets
• Further reductions in “transitional assistance” to Emissions Intensive Trade Exposed Industries
• EPA-required changes for compliance under Clean Power Plan
• Other?
California Carbon Allowances or CCAs:

- CCAs have traded on a generally downward trend over the last couple of years from a highs of ~$24 down to recent prices of approximately $12
- Significant range of forecasts as high as ~$40/mt and as low as $10/mt
- Volume is sporadic and increases before and after the auctions (liquidity event)
- CARB has now completed 9 successful auctions and the market has started to show more confidence in the program

<table>
<thead>
<tr>
<th>Auction</th>
<th>Allowance Reserve</th>
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<tr>
<td>Frequency</td>
<td>Quarterly Auction</td>
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<tr>
<td>Available for sale</td>
<td>Current vintage and current vintage + 3 years</td>
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<tr>
<td>Format</td>
<td>Single-round, sealed-bid, uniform price format</td>
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<tr>
<td>Fixed Price Sale - Tiers of Allowances, with minimum purchase price for each tier; Participants submit bids for purchase of allowances from each tier</td>
<td></td>
</tr>
<tr>
<td>Eligible Participant</td>
<td>Anyone</td>
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<tr>
<td>Floor Price (2015)</td>
<td>$12.10</td>
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<tr>
<td>$45.20 (Tier I)</td>
<td></td>
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<tr>
<td>$50.86 (Tier II)</td>
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<tr>
<td>$56.51 (Tier III)</td>
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<tr>
<td>Floor Prices (2015+)</td>
<td>Increases every year by CPI+ 5%</td>
</tr>
<tr>
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Auction vs Secondary Markets

**Auctions:**
- Spot current or Spot forward
- Exposed to timing between auctions
- No innovation
- 167mm Sold (Current Auctions)
  - Incl. ~5mm Quebec Allowances
- 73mm Sold (Forward Auctions)
  - Incl. ~7mm Quebec Allowances

**Secondary Markets:**
- Spot and Future
- Reduce slippage risk, hedge when needed
- Growing innovation
- Offsets

**Price Comparison:**

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<tr>
<td>Recent ICE Settles (Dec 10, 2014)</td>
<td></td>
<td>$12.35</td>
<td></td>
<td>$12.12</td>
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V14Dec14  V17Dec14
Carbon Offsets

- A compliance entity can surrender up to 8% of obligation as offsets.
- Introduced as a cost-containment mechanism and accounts for 50% of the carbon reductions CARB is predicting.
- Variety of products, structures, risk sharing and pricing (gCCOs, CCO3, CCO8, Prepays, Early-Action)
- Buyer wears offset invalidation risk unless contractually limited
  - Clean Harbors approx. 89,000 credits invalidated
  - CARB concluded that the facility at issue failed to comply with a permit issued under the Resource Conservation and Recovery Act (RCRA)
  - CARB reached this conclusion even though it determined that “the [GHG] emission reductions represented by the offsets at issue here are real, quantified, and verified reductions.”
  - U.S. EPA Region 6 inspection report describing potential RCRA violations (from 02/2/12 – 02/3/12) – i.e., not treating calcium chloride brine material generated by the facility as a hazardous waste – triggered noncompliance for purposes of California’s offset program.

- Large undersupply expected in CP2 (2015-2017) but uncertainties remain:
  - Will compliance entities optimize compliance portfolio?
  - How does supply/demand change if only 6% or 4% is optimized?
  - Future invalidation risk
Supply/Demand in CP2 are the same since demand is constrained by lack of supply.
Fundamentally Oversupplied in Compliance Period 1:

- Based on Alpha’s proprietary analysis and conversations across market participants, our models show the market has been oversupplied by 40-45 million mt in Compliance Period 1.
- The model assumes ~4% utilization rate for offsets. Oversupply increases assuming any utilization from 4-8%.
  - Low utilization due to i) uncertainty of invalidation risk and ii) low clearing allowance prices negate the cost-saving benefit of offsets.
- Role of speculators is uncertain. How much did speculators vs compliance buyers purchase in 2013 & 2014 with the intent to bank until future compliance periods?
  - Market cost of capital is high at 4-5%
  - Difficult for compliance entities to justify when expectations are that prices will remain near floor levels.
Introduction of the Fuels Sector:

- In the second compliance period beginning in 2015, the program expands to apply to distributors of transportation fuels, including natural gas. For the transportation fuel distributors, the regulated entity is the fuel provider that distributes the fuel upstream.

- **Auction supply increases by ~150% from 2014 - 2015**
  - 2014 Allowance Budget = 159.7 mm
  - **2015 Allowance Budget = 394.5 mm (~75 mm likely offered per auction)**
  - 2016 Allowance Budget = 382.4 mm
  - 2017 Allowance Budget = 370.4 mm

- **Expected total cumulative excess supply in CP2:**
  - 2015 = > 75 mm
  - 2016 = > 90. mm
  - 2017 = > 94.0 mm
Quebec Linkage – 2014

- CARB linked California cap and trade to Quebec cap and trade system
- First joint auction held Nov. 25, 2014.
- Linkage opened a new market for greenhouse gas allowances (CCAs and QCAs) and offsets for California’s regulated entities and offset generators
- Quebec's emissions cap is far more aggressive than California's but only regulates roughly 80 facilities, so the net effect of the aggressiveness is immaterial

Quebec Offset Market
- In addition to accepting California offsets, Quebec has adopted three offset protocols
  - Covered Manure Storage
  - Landfill Gas
  - Ozone Depleting Substances
3 Price Drivers and Other Issues
According to a comprehensive study commissioned by Western States Petroleum Association, the Boston Consulting Group concluded:

- California’s cap-and-trade auction program, as currently written and being implemented, will increase the cost of making gasoline and diesel **14 cents per gallon to 69 cents per gallon**, depending on the cost of carbon allowances.
- The cost of compliance could be significantly higher if the cost of carbon rises above CARB’s projected auction prices.
- Carbon costs could be extremely volatile initially, creating the potential for market disruptions.

Other studies have suggested a lower price impact.
Issues to Consider

- Do Compliance Period 2 organizations understand rules, market dynamics, and position (including secondary impacts)?
- Complex interaction between various compliance instrument markets.
  - Allowances / Offsets / RPS / Power / Nat Gas and other CP 2 new entrants
- What is actual Supply and Demand?
  - Supply can be estimated but will change and demand will be difficult to ascertain until after the fact.
    - For the first few years supply and demand in each auction is more important than the long term fundamental supply/demand picture
  - Contractual, credit and regulatory requirements associated with each product?
  - How will forward year allowances be sold and priced? Risks?
  - Will the price containment mechanism and floor work?
- EMAC Analysis and Recommendations:
  - Frequency of auctions
  - Two-sided auction (buyers/sellers)
  - Hard price caps
  - Revisions to holding limits
Issues to consider cont’d

• Be prepared for the unexpected.
  ▪ Prices below the floor?
  ▪ Failed auctions?
  ▪ Lack of liquidity?
  ▪ …

• Work with regulators through industry associations such as The Carbon Market Compliance Association (CMCA)
  ▪ A forum to share ideas to resolve market issues.
  ▪ Receive timely and commercially-relevant information on market developments, fundamentals and regulatory changes through frequent updates.
  ▪ Professional networking where they can find insight into commercial hedging opportunities/structures to help members adopt best-in-market approaches.
4 Contact Details
We encourage prospective clients to contact us for a 30-minute complimentary discussion about market fundamentals, strategy or any other relevant question.