Ethanol Emerging Issues –
Environmental Regulations & Global Landscape
April 2015
About Genscape

- An international company of more than 300 employees, with headquarters in Louisville, KY, and offices in Boston, Boulder, Houston, Austin, Amsterdam, London and Hamburg
- World’s leading provider of real-time, monitored information for the energy industry. Measuring more than 1 billion data points each year
- Privately held by DMG Information, a subsidiary of DMGT
- QAP provider for all renewable fuels – Genscape clients include more than 70 facilities, including more than 40 ethanol facilities.
- Growing information source for the ethanol supply chain, including ethanol storage inventory in Gulf Coast and NYH with Chicago coming September 1
• Genscape’s mission is to ensure greater transparency in the commodities and energy markets by providing the most accurate and complete fundamental data possible.

• Proprietary technology and analytics make this possible.
• For its storage reports, Genscape measures individual tank levels at major storage hubs, including New York Harbor for ethanol inventories.
Today’s Presentation Overview

• Environmental Regulations Update
  • US EPA RFS2
  • Other countries covered in Global Ethanol Landscape

• Global Ethanol Landscape
  • Canada and Brazil
  • Other Trade Partners
  • Information Sources for Transport Transparency – Ship Tracking Example
US EPA RFS2 Emerging Issues
RFS2 Emerging Issues

• According to a consent decree with some additional pledges, the 2014, 2015 and 2016 RFS2 renewable volume obligations are expected to be proposed by June 1.
  - EPA is expected to open a public comment period after the proposal.
  - The finalized 2014-16 RVOs will be issued no later than Nov. 30, 2015.
  - 2014 expected to be based on actual production based on EPA statements*
  - Proposed rules would potentially be the only information the market has to act on until the rules are final.
  - Timeline intended to get volumes back-on-track in terms of annual November 30 statutory timing
• New EPA waiver authority invoked in original 2014 proposal

*Source: http://www.platts.com/latest-news/oil/washington/industry-groups-sue-epa-for-missing-renewable-21174373
Broader Waiver Authority – Big Changes in 2014 and Beyond

CAA Renewable Statutory Volumes Not Preserved in 2014 Proposal

- In addition to cellulosic provision for adjusting the total renewable fuel, the EPA invoked its **general waiver authority**.
- EPA cited two factors for new use of waiver authority in 2014 proposed rule released in Nov. 2013
  - Limitations in the volume of ethanol that can be consumed in gasoline
  - Limitations in production
- Ultimately the 2014 proposal was not finalized and the EPA will re-propose the 2014 RVOs by June 2015.

![Implied Corn Ethanol RVO](image_url)
Three factors considered in the ethanol consumption forecast:

- **The overall demand for gasoline**
  - EIA’s 2013 Annual Energy Outlook used as source

- **The consumption of ethanol in E10, E15, and E85 blends**
  - E10 – 10.0% of total estimated gasoline consumption for transportation engines with accountancy for E85
  - E15 – 0 gallons
  - E85 – consumption estimated at between 100-300 million gallons with a Monte Carlo derived mean of 180 million gallons
  - E85 blend rate calculated at 74% denatured alcohol
    - Intermediate blends counted toward E85 gallons

- **The presence of non-oxygenated gasoline (E0)**
  - E0 – 0 gallons
  - No data sources, considered negligible

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**Defunct 2014 Proposal**

Total Denatured Ethanol = 12.95 to 13.09 billion gallons
Total Renewable = 15.00 to 15.52 billion gallons

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**EIA AEO 2013**

14.33 Quadrillion Btu (2014)

129 billion gallons of E10 equiv.

Account 100-300 million gallons of E85

12.95 to 13.09 billion gallons of ethanol

Source: 78 FR 71758ff
RFS2 2014 Industry Performance

A minimum of 1.6 billion gallons of renewable fuel (EEG) produced in excess of original 2014 proposal.

* Note – EPA estimated 2.6 billion total RIN carryover from 2012 to 2013 (78 FR 9301)

EPA estimated 2.6 billion total RIN carryover from 2012 to 2013 (78 FR 9301)
What 2015 Ethanol RFS Could Look Like Using the EPA’s 2014 Methods

IF the EPA uses similar methodology for 2015…

- The overall RFS demand for gasoline from AEO 2014 is about 130 billion gallons
  - Note that the AEO 2015 just came out (April 14) and indicates an 0.3% increase over 2014 projections.
  - E10 – 10.0% of total estimated gasoline consumption is about 13 billion gallons
- The consumption of ethanol as E0, E15, and E85:
  - E15 – 0 gallons … no substantial infrastructure changes yet
  - E85 – used the same as 2014 and the same 74% blend rate
  - E0 – 0 gallons
- What about advanced volumes?
  - Biodiesel produced about 2.7B gallons in a non-forward-looking tax credit year; cellulosic expected in the range of 0.05-0.2B

2015 Rough Case Study Volumes
- Total Denatured Ethanol ~ 13.2 to 13.5 billion gallons
- Total Renewable ~ 15.7 to 16.4 billion gallons

EIA AEO 2014
~14.6 Quadrillion Btu (2015)
131 billion gallons of E10 equiv.
Account 100-300 million gallons of E85
13.2 to 13.3 billion gallons of ethanol
Other Notable RFS2 Regulatory Changes

- EPA RFS efficient producer petition process
  - Enables RIN generation over and above the corn or sorghum ethanol plants grandfathered capacity
  - 24 petitions granted so far
- Biodiesel from Argentina – CARBIO Tracking Methods
  - Total expected maximum impact on RFS biomass based diesel in 2015 would be on the order of 600 million gallons.*
  - Could create competition for US biodiesel producers
  - May be an accounted RVO factor in BBD expectations for 2016 and out years
  - Impacts price of D5 RINs and value of Brazilian ethanol imports in terms of meeting the total advanced mandate

* Based on National Biodiesel Board statements

There is additional domestic and international capacity being added for RFS.
Global Ethanol Landscape –
Overall Picture

- 2014 exports increased 16% over 2013 and 11% over the five year average
  - New export trade destinations emerged
  - Averaging over the year, the US ethanol price per gallon fell about $0.23 from 2013 to 2014
  - Very little US import activity

US Ethanol Imports and Exports

Source: US Energy Information Administration
2014 US Export Picture by Country

- Top four export destinations accounted for 69% of total exports
- Remaining 31% was spread out among 28 other trade destinations*

TOTAL
20.1 million barrels
847 million gallons

*Includes countries that have imported 40,000bbls or more in total over last 5 years from US Energy Information Administration
Export Trends – Net Increase from 2013 to 2014

• Canadian exports are stable with some marginal growth.
• There was a substantial increase in exports to Brazil in 2014 – a lot of factors impact this volatile relationship.
• Emerging and existing trade partners outside of Canada and Brazil contributed significantly to the year on year growth.
• Decreases were namely observed in exports to Sweden, Norway and Peru.
• The trade decreases due to the Feb 2013 EU were sustained in 2014.
  • 63.3 Euros/ton ~$9.24/bbl

Source: US Energy Information Administration
What about Imports?

2014 Imports by Country

- Brazil
- Guatemala
- Canada
- Netherlands
- Singapore
- Nicaragua

Source: US Energy Information Administration
Global Ethanol Landscape –
Canada
Export Trade Trends – Top Two: Canada

- Canadian renewable fuel standard targets drive base imports – 5% federally with Saskatchewan higher
- However, blend rates have been higher than the federal mandate since 2012
  - 7.1% in 2014, similar forecast for 2015*
- No Canadian production increases expected in 2015
- FAS gasoline usage forecast increases very marginally for 2015
  - 352 million liters, fraction of a percent
- **Ultimately, ethanol exports from US to Canada are expected to be very similar in 2015**
- Beyond 2015 …
  - Domestic production incentives sunset in 2017 – could make ethanol imports into Canada more competitive
  - Forecast gasoline demand increases on average 0.6% per year through 2022.

![US Exports to Canada](chart)
Factors to Watch – US Dollar Inflation Relative to Canadian Dollar

- US dollar has inflated more than 10% against the Canadian dollar since Sept. 2014
- The exchange rate hasn’t been this low since the inception of the Canadian federal mandate in 2010.
- Inflation rate also impacts other imports, so it is not a factor in isolation.

Source: Bloomberg Business
Factors to Watch – Canadian Gasoline Price Relative to Ethanol

Even with the US dollar inflation, US ethanol and Canadian gasoline rack prices are not diverging on a percentage basis.

Pricing Sources:
Natural Resources Canada
USDA Economic Research Service
YTD 2015 vs. 2014 – Exports to Canada

- This year’s exports compared to last year are down 14%, but it’s early in the year.
- Historically, the majority of exports to Canada have happened in the last half of the year.
- Almost all exports to Canada YTD have been denatured ethanol

Source: USDA Foreign Agricultural Service – Global Agricultural Information Network
YTD 2015 vs. YTD 2014 – EIA Data on Exports to Canada

U.S. Exports to Canada of Fuel Ethanol

Source: U.S. Energy Information Administration

Troughs typical in early part of calendar year

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Global Ethanol Landscape – Brazil
Several factors have primary influence on the ethanol trade between the US and Brazil in 2015 and beyond – it’s a complicated and volatile trade picture:

- **FX**: Brazilian Real falling relative to USD ▼
- **Brazilian ethanol price falling compared to US prices ▼
- **Increased blending mandate in Brazil from 25% to 27% began in 2015 ▲
- **Decreased fuel costs for shipping transport ◀◀
- **LCFS mandates favor sugarcane ethanol ▼
- **D5 RIN prices for sugarcane ethanol higher than last year▼
- **Biodiesel production handled the bulk of the RFS2 advanced fuel mandate in 2014 but production is struggling this year ▼

**US Exports to Brazil**

Source: US Energy Information Administration
Trade balance favored US exports early in 2015 but falling Brazilian ethanol pricing and USD inflation could make imports tractable again.
Overall 2015 Import Trends so Far

- Zero imports recorded so far by the EIA through the week ending 4/10/2015.
- Reuters reported on March 18 that Royal Dutch Shell booked a cargo of about 30,000 tons of ethanol headed to Florida from Brazil.*

*Source: Reuters, March 18 2015 (http://www.reuters.com/article/2015/03/18/markets-ethanol-idUSL2N0WJ29220150318)
YTD 2015 vs. 2014 – GATS Data on Exports to Brazil

Undenatured Ethanol Exports to Brazil

- Almost all exports to Brazil so far have been undenatured ethanol
- This year’s exports through February compared to last year are up 31%.

Source: USDA Foreign Agricultural Service – Global Agricultural Information Network
Recent Ethanol Export to Brazil

- Using its storage intelligence, Genscape monitors large draws from Houston area tank terminals.
  - Other terminals also monitored
- Genscape uses its VesselTracker technology to identify ships potentially carrying ethanol from US ports.
Recent Ethanol Export to Brazil
Recent Ethanol Export to Brazil

Ships at anchor

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~85,000bbls

- Where available, arrival port data may be used to obtain information about ship contents and volume loaded.
Global Ethanol Landscape –
Other Trade Partners and Wrap-up
Emerging Partners

- Exports to Korea increased by 746,000bbls, nearly 200% increase over the five year average
- Exported 443,000bbls to Spain in 2014 – no previous export activity
- 405,000bbl increase to Tunisia after exports began in 2013 (68% increase)
- Exported 49,000bbls to Panama in 2014 – no significant previous exports

Notable Increases in Existing Trade Partners

- 730,000bbl increase in UAE (29% increase*) – rebound to 2011 levels
- 482,000bbl increase to India (32% increase)
- 402,000bbl increase to Nigeria (66% increase) – rebound from 2013
- 368,000bbl increase to Philippines (13% increase)
- 292,000bbl increase to the Netherlands (34% increase)
- 232,000bbl increase over 2013 to Puerto Rico (75% increase)

* Percentage increases based on average of 2013 and 2014
Source: Energy Information Administration
Trade Trends: Selected Partner Details

Philippines
• Philippine DOE National Biofuels Plan creates a blending mandate of 10% moving to 20% in 2020
  • Fuel consumption projections moving upward at 2% annually according to FAS GAIN projections
• USDA FAS forecasts relatively flat Philippines imports between 2014 and 2015 due to increased domestic production with three additional plants coming online
  • GAIN report mentions potential decrease in imports in 2016
• Brazil and Thailand also have market share exporting to the Philippines, where economics could create price competition

Spain and the Netherlands
• There have been reports that the ethanol shipments to Spain may be blended into gasoline and re-exported to North Africa* – may avoid EU tariff because finished product is not consumed in EU (similar intelligence discovered about biodiesel from Argentina)
• Same could be true for the Netherlands although economics could also be driving these exports to EU

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Overall YTD 2015 Export Trends so Far

Source: USDA Foreign Agricultural Service – Global Agricultural Information Network
Emerging Trade Trends – Overall Factors to Watch

- **2015, 2016 USEPA RFS2 mandates in new RVO era**
  - Stronger mandate would tend to reduce export potential, both from a supply and pricing standpoint
  - However, the limits of production capacity are not likely to be tested unless there is a policy shift.

- **US interest rate hikes looming**
  - A rate hike usually strengthens the value of dollar relative to other currencies and negatively affects overall exports.

- **Brazilian currency deflation along with supply trends**

- **Price of US ethanol**
  - US planted acres and crop progress
    - Planting intentions report indicates corn acreage down 2% from 2014 (near 2010 levels)
    - Equivalent to 13.4 billion bushels at a yield projection of 164 bushels/acre – 0.8 billion bushels smaller than last year*
    - CME December corn is +$0.25 to May
  - Gasoline prices
    - Iran oil sanctions may be lifted which could lower oil prices by $5-$15/barrel
    - Summer driving season predictions for retail prices at $2.45 nationwide from EIA (more than a dollar less than last year)
