

# Unobligated RINs for Renewable Fuel Exports

Impact on Ethanol Volumes

*October 16, 2017*

**CRA** Charles River  
Associates

## Providing unobligated RINS for ethanol exports would be expected to increase overall demand for US-produced ethanol

- The proposed regulatory change that we examined:

*Remove the automatic obligations (RVOs) for biofuel exporters and grant RINs for exported volumes of undenatured ethanol designated as fuel*

- Expected impacts on ethanol demand:

- **Domestic consumption remains steady**

- The RFS mandate is no longer the primary driver of ethanol volumes blended in E10
- Ethanol is the most economic option for octane enhancement, and ~10% is the base blend amount required for regular gasoline's mandated octane level
- Mandated volumes beyond the blend wall have been met by biodiesel, not ethanol

- **Export volumes increase**

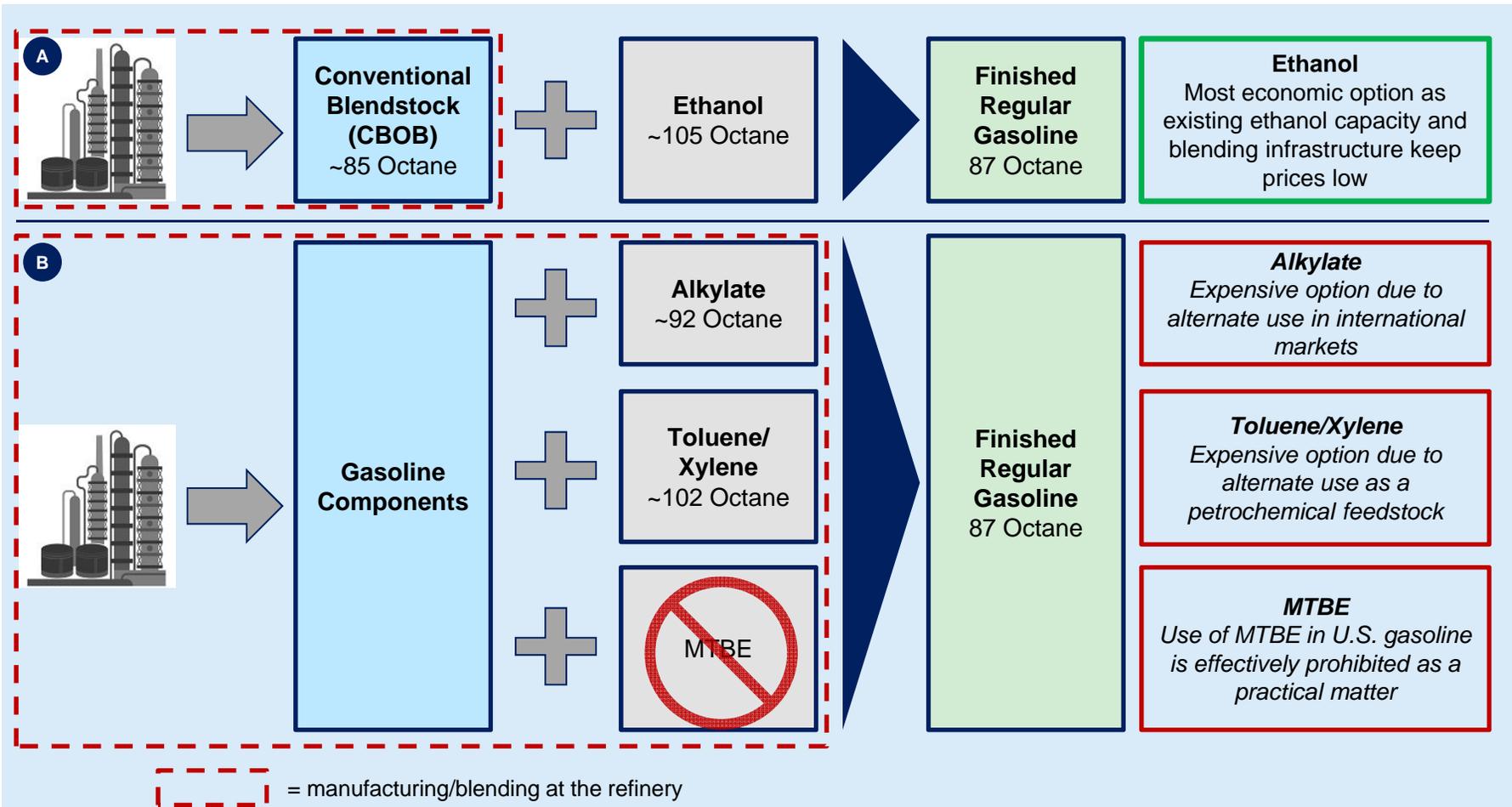
- Providing RIN value improves the price position of US-produced ethanol in global markets
- CRA has estimated the scale of the opportunity as up to 1.2 billion gallons per year (greater than baseline export levels)

- Overall – Continued domestic use of ethanol for octane enhancing and increased exports would result in a net increase in ethanol demand under the proposed regulatory change

## Domestic Consumption Volumes

Ethanol competes with petroleum-derived octane enhancers, such as aromatics

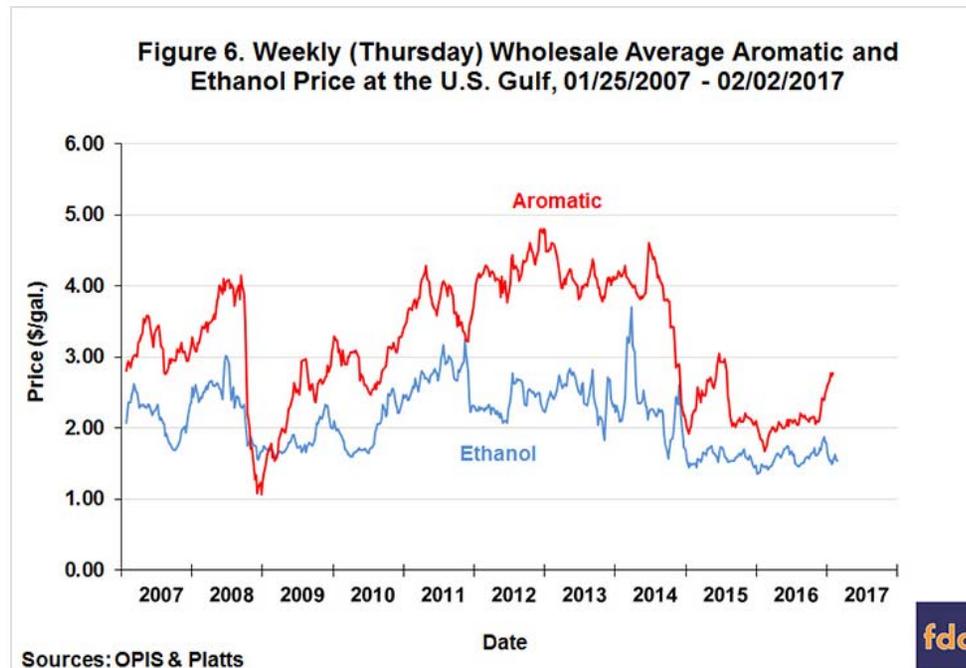
- Refiners and blenders have two options for meeting octane requirements:



## Domestic Consumption Volumes

Now that ethanol production infrastructure is in place, ethanol is the economic option for meeting octane requirements

- Studies have shown that ethanol volumes have displaced aromatics in domestic gasoline blending<sup>1</sup>
- The following chart (from a University of Illinois study) shows the price of ethanol versus the price of other octane enhancers (benzene, toluene, and xylene)



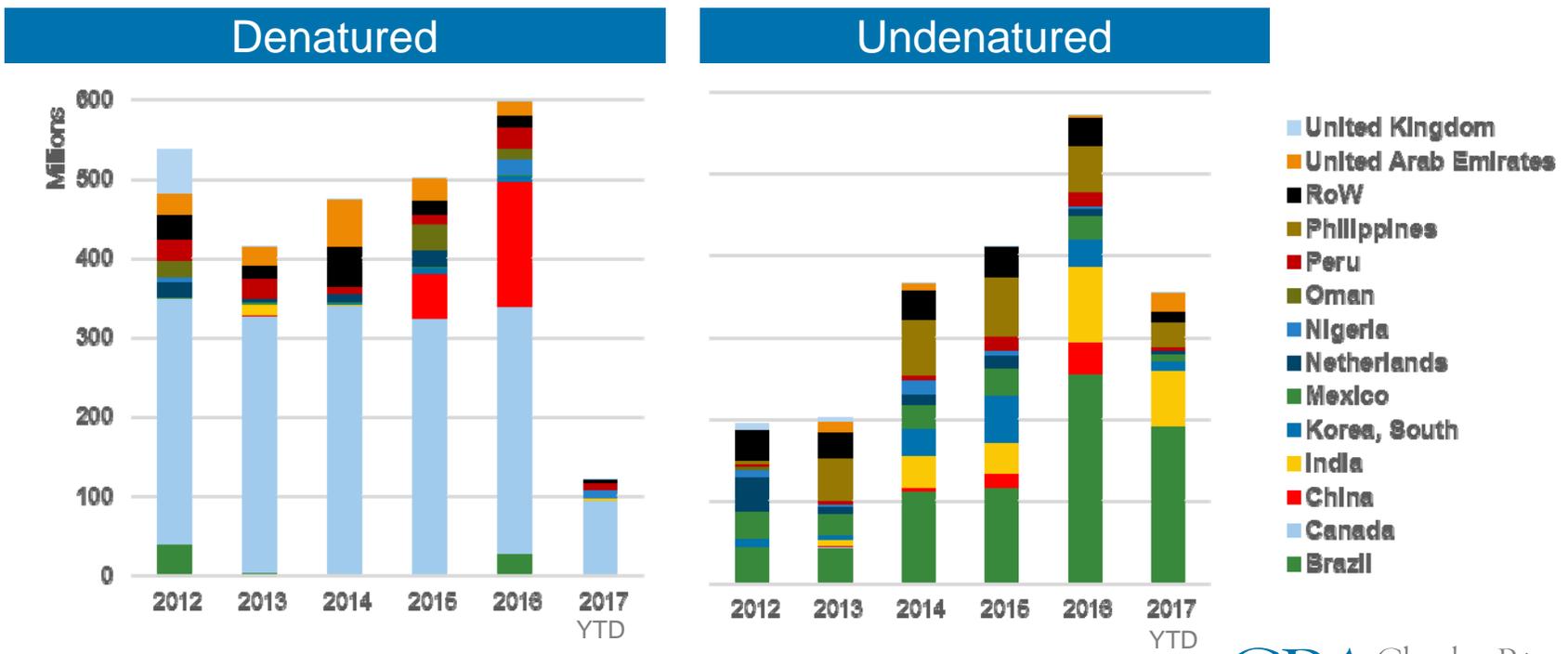
- This dynamic would be expected to persist under the proposed regulatory change

## Export Volumes

Historical ethanol exports have varied significantly year-to-year and between denatured/undenatured ethanol

- The U.S. exported ethanol to 34 different markets in 2016 alone
- There are several countries that were previously major importers that have been lost as export markets
- Largest single year gains were Brazil, China and India in 2016, and largest loss is China in 2017

### U.S. Ethanol Exports, 2012-2017 (million gallons)



# Export Volumes

The scale of the new opportunity is dependent on macroeconomics and policies, but is likely significant

- RIN value provides competitive value for US exporters, helping them:
  - Overcome protective tariffs of importing countries
  - Make increased mandates in other countries more economically palatable
  - Directly compete on price with foreign producers
- We conducted a scenario analysis to examine the scale of the export volume opportunity

Key Assumptions																	
Current tariffs, proposed tariffs, and current macroeconomic trajectories will hold. Non-corn feedstock prices move slightly against U.S. corn ethanol.	No major changes by foreign governments to severely limit biofuels consumption that cannot be overcome by price factors																
RIN value of \$0.25/gallon of exported fuel ethanol	No constraints to US ethanol production/export expansion																
Key Findings																	
By 2020, the RIN value for exporters could increase exports by <b>1.2 billion gallons</b> over a scenario with no RIN value for the exports	The following represents country-level shares of the incremental exports: <table border="1"> <caption>Country-level shares of incremental exports</caption> <thead> <tr> <th>Country</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>China</td> <td>22%</td> </tr> <tr> <td>Brazil</td> <td>17%</td> </tr> <tr> <td>Mexico</td> <td>18%</td> </tr> <tr> <td>Other Countries</td> <td>14%</td> </tr> <tr> <td>Canada</td> <td>12%</td> </tr> <tr> <td>Philippines</td> <td>11%</td> </tr> <tr> <td>India</td> <td>6%</td> </tr> </tbody> </table>	Country	Share (%)	China	22%	Brazil	17%	Mexico	18%	Other Countries	14%	Canada	12%	Philippines	11%	India	6%
Country		Share (%)															
China	22%																
Brazil	17%																
Mexico	18%																
Other Countries	14%																
Canada	12%																
Philippines	11%																
India	6%																
The majority of this volume represents expanded opportunity. It also includes: <ul style="list-style-type: none"> <li>• Regaining ethanol volumes that have already been lost (such as the losses experienced in 2017)</li> <li>• Protecting volumes that would likely be lost between now and 2020 if RINs are not granted for ethanol exports</li> </ul>																	