



2016 Top Markets Report **Renewable Fuels** Sector Snapshot

Fuel Ethanol

As more countries mandate the blending of ethanol with gasoline to reduce greenhouse gas emissions in the transportation sector and enhance energy independence, new export opportunities are developing for U.S. fuel ethanol. In terms of total annual volume, the United States was the top exporter of fuel ethanol for four out of the past five years. Europe was the second largest market for U.S. fuel ethanol from 2010-12, but in the past three years, sales to Europe diminished sharply due to the imposition of anti-dumping duties. U.S. fuel ethanol exports have shifted to other markets, particularly Asian countries such as the Philippines and India. Canada, India and Brazil are expected to remain leading markets, and newly surging exports to China will also continue in the near term. Meanwhile, developments in Mexico are being closely monitored.

Nearly all ethanol is made through a traditional sugar fermentation process with a limited set of biomass-based raw materials (feedstocks), principally corn, other coarse grains (rye and barley), wheat, sugar cane or sugar beets. A small quantity of ethanol is made via “advanced” conversion technologies (primarily lignocellulosic biomass biochemically converted to alcohols) using wood and agricultural residues (waste streams), municipal solid waste or dedicated energy crops, like poplar trees, switch grass, giant cane or energy sorghum.

Roughly 96 billion liters of fuel ethanol was produced annually in 2015.¹ Ethanol trade is growing throughout the world as countries build domestic use through mandates and taxation policy. These policies are motivated by desire to improve energy security by lowering dependence on imported fossil fuels, the need to reduce greenhouse gas emissions or air pollution, and support rural economies.

Overview of Global Export Market Opportunities

Most fuel ethanol in the world today is consumed within the same country that it is produced. However, many countries do not have the full production capacity to meet their needs. Despite this, sometimes governments prohibit or impose limitations on the use of foreign fuel ethanol in order

Figure 1: Fuel Ethanol Exports 2016-17
Size of Import Market vs. U.S. Share

| Rank | Country |
|-----------------------------------|---|
| Strong Prospects | Canada <i>Large Market, Large Share</i> |
| | China <i>Large Market, Large Share</i> |
| | India <i>Large Market, Large Share</i> |
| | Brazil <i>Small Market, Large Share</i> |
| | South Korea <i>Small Market, Large Share</i> |
| Less Certain Export Growth | Mexico <i>Small Market, Large Share</i> |
| | Philippines <i>Small Market, Large Share</i> |
| | Netherlands <i>Small Market, Large Share</i> |
| | Peru <i>Small Market, Large Share</i> |
| Significant Obstacles | Jamaica <i>Small Market, Large Share</i> |
| | United Kingdom <i>Small Market, Large Share</i> |
| | Colombia <i>Large Market, Small Share</i> |
| | |

Figure 2: Ethanol Regional Hubs

| Country | Region Served | 2015 U.S. Fuel Ethanol Exports (L) – U.S. Census Data |
|---------|---------------|---|
| Oman | Middle East | 124,164,584 |
| UAE | Middle East | 108,171,311 |
| Tunisia | Africa | 87,848,339 |

to protect their domestic industry. Other times their blend mandates are adjusted according to the domestic capacity available every year. Some countries, such as India and Mexico, have a desire to increase the blending of ethanol with gasoline, but infrastructure or political problems prevent their local industry from growing.

Fuel ethanol use has become widespread, and the U.S. ethanol industry exports to every region of the world, including the European Union, where U.S. ethanol exports have faced antidumping duties since 2013. However, for purposes of this report, a handful of significant markets were not included in the rankings because U.S. exports were not being driven by a domestic biofuels policy in the destination market, which is usually the most predictable driving factor. Nevertheless, those markets must be noted as additional opportunities.

Looking at the trade data for U.S. exports in 2012-2015, several markets stand out even though they do not have blend mandates (Figure 2). For these markets, to which we will refer as “regional hubs,” it is assumed that the ethanol has a secondary destination. The reasons are varied. The U.S.–produced ethanol may be blended at a refinery and shipped out as a gasoline/ethanol blend to other markets in the region (e.g., the UAE).ⁱⁱ It is also common to have “discretionary blending” for octane boosting.

The case of South Korea is still unclear and deserves continued monitoring. ITA decided to include South Korea in the 2016 Top Markets fuel ethanol ranking because of steadily increasing export activity. The records indicate that over 200 million liters (worth \$109 million) of U.S.–produced fuel ethanol was delivered to South Korea in 2015, compared to 125 million liters the previous year. Exports to Korea were relatively low prior to 2014, with the previous peak of 29 million liters in 2012. This sudden surge

has no simple explanation, given that South Korea has no blend mandate and the public opinion is against ethanol from food crops. According to most industry observers, South Korea is only importing ethanol as an industrial chemical. Although there is a separate trade code for ethanol for non-beverage use, it is estimated to be more economical to distill imported fuel grade ethanol into high-quality industrial ethanol.

Similarly, U.S. fuel grade ethanol imported into India (which, as of July 2016, had already reached 145 million liters, surpassing the 2015 total) is being used to fill a domestic demand for industrial ethanol rather than regional re-distribution. Thus, both India and Korea are included in the *Top Markets Report* rankings despite not being linked directly to blending mandates.

Meanwhile in the Netherlands, domestic consumption with a 5.5 percent blend mandate combined with redistribution within the EU has kept a steady flow of imported ethanol. U.S.–sourced ethanol decreased following the imposition of antidumping duties in 2013. However, the Netherlands imported 128 million liters from the United States in 2015 out of an estimated 265 million liters imported overall. The closure of an Abengoa facility in Rotterdam was expected to increase imports further, but the U.S. share of those imports is by no means guaranteed. Although the U.S. industry was successful in bringing a court case against the antidumping duties, the EU has filed an appeal, which prolongs the situation for another year or two. Fortunately, U.S. fuel ethanol exports have diversified over the past two years to markets in Asia and Latin America, lessening its dependence on the EU as an export market. (Figure 3)

Despite several exclusions from the rankings and the downturn in U.S. exports to the EU, ITA identified 12 markets for this report. The countries near the top of the rankings are strong prospects. Those in the middle of the rankings are less predictable in the near term but still expected to be significant buyers of U.S. fuel ethanol. For the countries towards the bottom of the rankings (the UK and Colombia), no substantial increase in U.S. exports is anticipated, assuming protectionist policies in those markets might not be eased until the latter half of 2017.

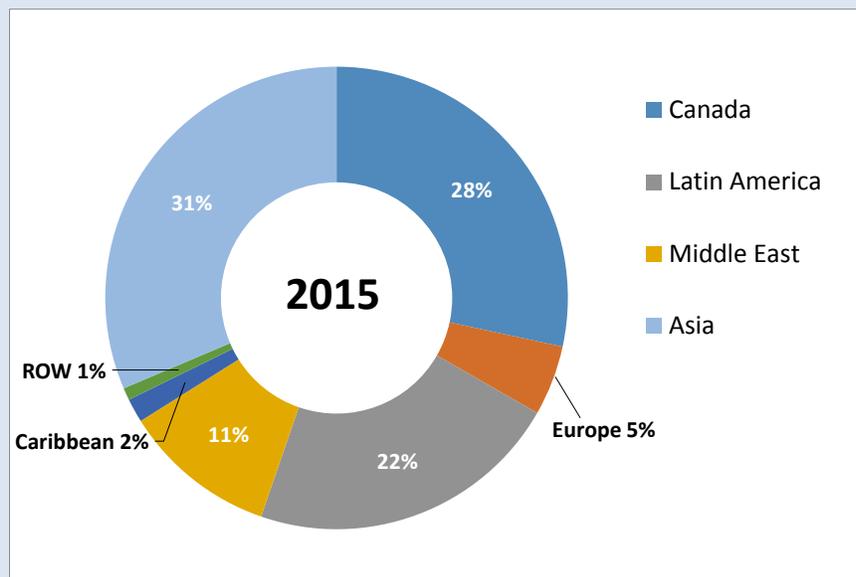
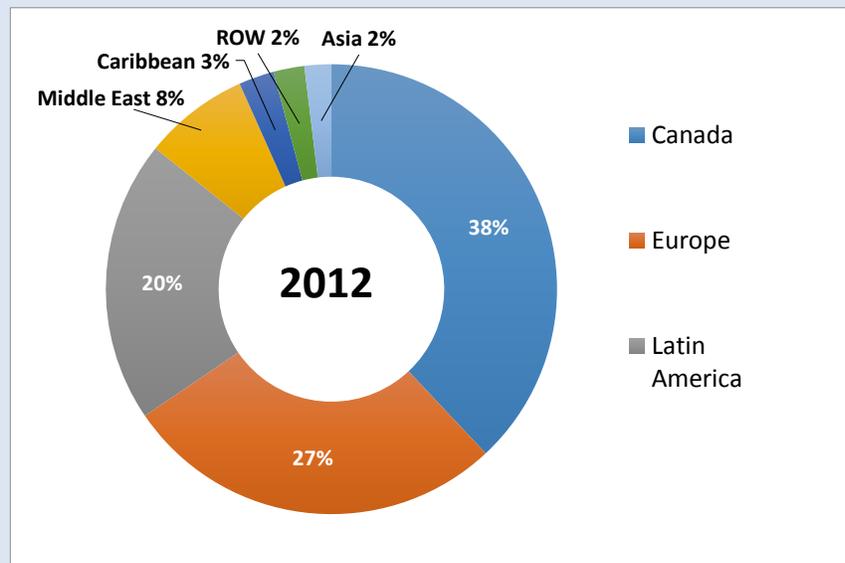
Export Opportunities in the Near Term

Background information about ethanol production, consumption, import/export and U.S. market share is detailed in the country case studies.

Each market is at various stages of development and levels of openness to U.S. exports. China, for example, developed a sudden and high-volume demand for imports over the past year that surprised many U.S. producers who had considered China's market difficult to penetrate. Mexico, on the

other hand, is much more promising in the long run for U.S. exporters given the closer trade ties and geographic proximity. However, recent policy decisions have prohibited ethanol blending in the three major metropolitan areas, which complicates the process of developing business relationships. Meanwhile, U.S. exporters reaching out to Indian buyers must keep in mind that they are indirectly contributing to the domestic 5 percent mandate. Indian policy discourages the use of imports as fuel, but imports can backfill industrial use demand in order to free up more domestic supply for fuel use.

Figure 3: U.S. Fuel Ethanol Exports by Volume, Regional Comparison: Shift from Europe to Asia
 Source: US Census Data



Some policymakers would like to see a 10 percent blend of ethanol. However, India's ethanol is produced from sugar cane, which can be subject to unpredictable fluctuations. More details about the ups and downs of India's biofuels policy environment are provided in the case study.

Market intelligence can thus play a key role in helping U.S. ethanol exporters differentiate the conditions faced by each potential business partner. Based partly on last year's *Renewable Fuels Top Markets Report*, in February 2016 the National Ethanol Conference (NEC) in New Orleans hosted five delegations (China, Brazil, the Philippines, India and Mexico) through ITA's International Buyer Program. During the NEC, the companies in these delegations held brief business-to-business meetings with U.S. companies who were interested in expanding their exports. Attending the NEC also gave the international buyers an opportunity to better understand trends and policy factors that

affect U.S. production and therefore the availability of supply. The program will be implemented again at the NEC in 2017.

Planning for the Long Term

The unpredictability of factors that affect U.S. ethanol exports – such as weather, prices and exchange rates – should not deter long term strategic planning. Furthermore, even as commercial scale “second generation ethanol” production finally gains momentum in the United States, U.S. producers of “conventional ethanol” can continue to look abroad for opportunities. Imported corn-based ethanol will be an affordable option in countries whose level of economic development cannot support domestic production. Also, since the harvest season for sugar cane is not aligned with the harvest season for corn, imports from the United States can also supplement domestic supply.

ⁱ Renewable Fuels Association, US Department of Energy Alternative Fuels Data Center. (2016). *Ethanol Industry Outlook 2016*, page 8. Retrieved from <http://www.afdc.energy.gov/data/10331>.

ⁱⁱ Prentice, Chris. (2015). Louis Dreyfus ships big U.S. ethanol cargo to Middle East. *Reuters*.