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**Prepared By:** Gaspar Nolte

**Approved By:** Dwight Wilder

**Report Highlights:**

Peruvian ethanol production in 2022 is forecast at 220 million liters, a slight increase compared to the previous year. Ethanol consumption for 2022 is forecast at 260 million liters. Peru is forecast to produce 208 million liters of biodiesel in 2022. Owing to supply chain interruptions, Peru temporarily suspended the biodiesel mandate resulting in significantly lower imports. Biodiesel imports in 2022 are forecast to fall 67 percent to 50 million liters.

## Executive Summary:

Peruvian total ethanol production in 2022 is forecast at 220 million liters, increasing 2 percent compared to the previous year. Total ethanol consumption for 2022 is forecast at 260 million liters, remaining at the same level as the previous year, the ethanol blend rate is expected to remain steady. Peru's Consumer Defense and Intellectual Protection Institute (INDECOPI) initiated a countervailing duty investigation against U.S. ethanol exports on April 25, 2017. On November 6, 2018, INDECOPI ruled in favor of the domestic industry and imposed countervailing duties between \$47.86 and \$47.94 per ton (4 cents/liter). Following a lengthy appeals process, INDECOPI announced on January 29, 2021, a reversal of their previous decision and all duties were repealed. Ethanol imports in 2022 are forecast at 185 million liters.

The expansion of fuel ethanol consumption slowed significantly after Peru met its target blend rate in 2013. Since that time, further increases are solely dependent on a growing gasoline market. However, gasoline consumption faces stiff competition from alternative and more affordable fuels such as natural gas and liquefied petroleum gas. Peru exports domestically produced ethanol to Europe. It then meets remaining domestic demand through imports. The blend rate holds steady at 7.8% with consumption forecast at 220 million liters in 2022 with a gasoline pool of 2,820 million liters.

Peru was also affected by rising fuel prices in 2022. Diesel prices increased 37 percent between January 2020 and December 2021. However, in the first quarter of 2022, prices rose another 28 percent. Gasoline prices have also increased sharply. From January to June 2022, the price for 95 octane rose 41 percent while 90 octane increased 31 percent. High fuel prices triggered nationwide farmer and transportation strikes, adding pressure on food costs. As a result of the price hikes and social response, the government temporarily exempting diesel and 84 and 90 octane gasolines from the excise tax. Although this measure reduced government revenues by roughly \$70 million, it had limited impact on lowering fuel prices.

Fuels in Peru are assessed an excise tax of 2.4 soles per gallon (\$0.6), 8 percent road tax and 18 percent value-added tax. Official data (OSINERMIN) shows that fuels have the following cost structure:

|                    | Plant Cost | Taxes | Commercial Margin |
|--------------------|------------|-------|-------------------|
| Biodiesel          | 77         | 14    | 9                 |
| Gasoline 90 Octane | 77         | 21    | 1                 |
| Gasoline 95 Octane | 72         | 26    | 2                 |
| Gasoline 97 Octane | 71         | 25    | 4                 |

Biodiesel consumption has slowed after the target blend rate was achieved in 2012. Since that time, further increases are solely dependent on a growing diesel market. Peru resumed biodiesel production in 2017 after a halt between 2014 and 2016. In 2021, Peru produced 208 million liters of biodiesel, an increase of 12 percent from the previous year, but biodiesel capacity use continues to remain low. Biodiesel imports are controlled through renewed anti-dumping and countervailing duties on U.S. biodiesel and more recently imposed countervailing duties on Argentine biodiesel. Peru is forecast to produce 208 million liters of biodiesel in 2022. Biodiesel imports in 2022 are forecast at 50 million liters, 67 percent lower than 2021. This sharp decrease is due to a temporary suspension of the blend mandate. Alleging supply chain interruptions, Peru suspended the biodiesel mandate on March 11, 2022, until September 9, 2022. Despite diesel price increases and based on continuing economic growth, diesel consumption is forecast to increase slightly while the blend rate falls according to temporary policy change, but the policy did help to buoy fuel demand.

Argentina requested consultations with Peru at the World Trade Organization (WTO) on September 2, 2022, regarding countervailing duties assessed on biodiesel imports. Argentina claims that such measures may run against provisions of the Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994 and the Agreement on Subsidies and Countervailing Measures. Reportedly, this meeting is pending.

## II. Policy and Programs

Peru does not provide tax incentives or set prices to directly support profitable biofuel margins, which would give biofuels an advantage over fossil fuels. Instead, Peru relies solely on mandatory blend rates, passing any costs over fossil fuels directly to consumers. At COP21 of the United Nation's Paris Climate Change Conference, Peru committed to a 30-percent, economy-wide reduction in emissions by 2030. While it plans to obtain this primarily through its forestry sector, a national law promoting the investment, development, and use of biofuels is included in this strategy (Supreme Decree 012-2009).

In December 2020, Peru updated its National Determined Commitment (NDC) for 2030 to a non-conditioned commitment of 208.8 MTCO<sub>2</sub>Eq (million tons of carbon dioxide equivalent) and a 179 MTCO<sub>2</sub>Eq conditional commitment, dependent upon international cooperation. In 2015, Peru filed a non-conditioned NDC of 238.6 MTCO<sub>2</sub>Eq and conditioned NDC of 208.8 MTCO<sub>2</sub>Eq.

### Biofuel Policy Framework and Mandates

**Supreme Decree 013-2005 EM - Regulation for Biofuels Market Promotion:** This 2005 decree sets the biofuel content in fuels distributed and sold in Peru. Gasoline must contain at least 7.8 percent ethanol. Diesel must have a biodiesel content of no less than five percent. This minimum blend level mandate applies to all diesel end-use markets, both on and off-road and heat and power.

<https://www.minem.gob.pe/minem/archivos/file/Hidrocarburos/Legislacion/Biocombustibles/Decreto Supremo No 013-2005-EM.pdf>

**Law 28,054 – Biofuels Market Promotion:** This law (April 20, 2007) establishes the legal framework for promoting the use of biofuels. The legislation seeks to increase employment, diversify the country's fuel sources, strengthen agricultural development, reduce environmental contamination and degradation, and provide an alternative source of income to illicit coca cultivation and drug production. This law promotes investment in biofuel production and its commercialization. The law established the PROBIOCOM program within Peru's investment agency (PROINVERSION) in order to attract investment in the local biofuel sector. While the framework of this law remains in force, no new investments were made beyond the initial years. The Biofuels Market Promotion legislation establishes the technical committee responsible for determining blend rates and schedules and recommending regulations for biofuel production and commercialization. The committee is also responsible for enhancing public awareness of the benefits of biofuels. The Ministries of Energy and Mines, Economy and Finance, Agriculture, PROINVERSION, DEVIDA (alternative development agency), and the private sector make up the technical committee's membership.

<https://www.minam.gob.pe/wp-content/uploads/2017/04/Ley-N°-28054.pdf>

**Supreme Decree 021-2007 EM – Regulation for the Commercialization of Biofuels:** This law (April 2007) establishes the legal requirements for trading and distributing biofuels in Peru. It also establishes quality standards and procedures for registering biofuel blends with the Ministry of Energy and Mines. The decree sets the schedule for biofuel blending minimums in fossil fuels. Beginning in 2010, all gasoline sold in Peru was required to contain at least 7.8 percent ethanol, but full phase in of this requirement took three years to complete. The required blend level has been met each year since 2013.

Since 2011, diesel fuel sold in Peru must contain a minimum of five percent biodiesel, but that goal was met one year late. The blend rate remained steady at B5 until it was temporarily suspended in 2022. <https://www.minem.gob.pe/minem/archivos/file/Hidrocarburos/Legislacion/Biocombustibles/Decreto Supremo No 021-2007-EM.pdf>

**Supreme Decree 014-2021 EM** – *Regulation that establishes sulfur content for diesel and gasoline and simplifies gasoline commercialization*: This regulation consolidates gasoline octanes (84, 90, 95, 97 and 98) in two categories. ‘Regular’ gasoline is set at 91 octane and Premium is set at 96 octane. This regulation was scheduled to enter into force on July 1, 2022, however it was postponed until January 1, 2023. The regulation also establishes, as of July 1, 2022, a sulfur content limit at 50 ppm for both diesel and gasoline. By the first quarter of 2024, the sulfur content should not exceed 10 ppm. <https://cdn.www.gob.pe/uploads/document/file/1963869/DS 014-2021-EM.pdf.pdf?v=1624399256>

These regulations delineate responsibilities among the different agencies:

*Ministry of Agricultural Development and Irrigation*: Responsible for promoting the development of the agricultural areas necessary for biofuel production.

*Ministry of Energy and Mines*: This ministry authorizes the commercialization of biofuels and blends thereof with gasoline and diesel fuels.

*Ministry of Production*: Authorizes the operation of biofuel production facilities.

*OSINERGMIN*: Supervises and controls operations throughout the production chain.

*PROINVERSION*: Promotes investment in the biofuels sector.

**Supreme Decree 012-2009 MINAM, National Environmental Policy**: The Mining and Energy chapter of this Supreme Decree establishes as a priority the promotion of investment, development, and use of biofuels as a substitute for petroleum and natural gas in order to reduce carbon emissions.

### **Environmental Sustainability and Certification**

Peru does not have environmental sustainability (i.e., greenhouse gas emission limits) or environmental certification requirements for biofuels. All ethanol plants in Peru have developed sustainability reports certified by third parties.

In its original and updated NDC commitments, Peru did not include any references to how or if bioenergy or biofuels would contribute to meeting its NDCs.

### **Import Policy Including Duties**

Per the U.S.-Peru Trade Promotion Agreement, U.S. ethanol and biodiesel is imported into Peru duty free as of 2018. Biodiesel imports, both 3826.00 (covering blends above B30 to B100) and 2710.20 (petroleum oils containing 1 - 30 percent biodiesel), enter Peru duty free. Ethanol imports of both undenatured and denatured ethanol (HS codes 2207.10 and 2207.20) are assessed a six percent import duty plus an 18 percent value-added tax. Under the U.S.-Peru Trade Promotion Agreement, a ten-year tariff phase out schedule was applied to U.S. denatured ethanol. As of 2018, denatured U.S. ethanol is

imported into Peru duty free. Undenatured U.S. ethanol was granted duty free entrance when the Agreement entered into force in 2009. Peru primarily exports undenatured ethyl alcohol (2207.10).

On January 29, 2021, Peru's Consumer Defense and Intellectual Protection Institute (INDECOPI) reversed the countervailing duty imposed in 2017 to U.S. ethanol exports to Peru.

Peru imposed temporary anti-dumping and countervailing duties on U.S. biodiesel in December 2009 in response to imports that began in December 2008. U.S. shipments totaled 85 million liters in 2009, which was equal to half of Peru's consumption that year. U.S. exports stopped immediately following the imposition of these temporary duties, except for two shipments in March and June of 2010. On August 23, 2010, Peru's INDECOPI published Resolution 151-2010-CFD-INDECOPI imposing permanent countervailing and anti-dumping duties on all U.S. exports of B51-100. These duties are \$178 per metric ton and \$212 per metric ton, respectively. The duties were renewed in 2016 after the expiration of the initial countervailing and anti-dumping duties. U.S. biodiesel shipments to Peru resumed in 2013, under Chapter 2710.20, to which the higher duties are not applied.

INDECOPI published resolution 011-2016/CDB-INDECOPI on January 25, 2016, establishing countervailing duties on all Argentinean biodiesels. This process was initiated after allegations from Palmas del Espino (Grupo Romero), who halted production at its Tocache production plant, claiming unfair competition from biodiesel from Argentina. Due to these countervailing duties, imports from Argentina fell in 2016 and 2017, and FAS Lima forecasts that B100 Chapter 38 imports from Argentina will remain limited in 2022.

**Table 1**

| <b>Countervailing Duties Against Argentinean Biodiesel</b> |              |
|------------------------------------------------------------|--------------|
| <b>Producer</b>                                            | <b>\$/MT</b> |
| <b>LDC Argentina</b>                                       | 15.4         |
| <b>Molinos Rio de la Plata, Renova Vicentin</b>            | 17.1         |
| <b>Cargill</b>                                             | 24.1         |
| <b>Aceitera General Deheza, Bunge Argentina</b>            | 31.3         |
| <b>Others</b>                                              | 208.2        |

Source: INDECOPI

On September 2, 2022, Argentina requested consultations with Peru at the WTO, regarding countervailing duties assessed on biodiesel imports. Argentina claims that such measures may run counter to WTO provisions.

### **Suspension of Biodiesel Mandate**

Issued on March 11, 2022, *Ministerial Resolution 095-2022 MINEM/DM*, temporarily suspended the biodiesel mandate for 30 days. The Ministry of Energy and Mines explained that this measure would avoid interruptions in the fuel market due to reported low stocks as result of supply chain problems.

On June 8, 2022, *Ministerial Resolution 211-2022 MINEM/DM* extended the temporary suspension of the biodiesel mandate for another 90 days, ending on September 9, 2022. As of September 14, the suspension has not been renewed.

### III. Ethanol

Peru began producing fuel ethanol in 2008. It produced fuel ethanol in sufficient volumes to supply domestic consumption through 2014, when one of the producing plants temporarily closed due to financial difficulties. Since Peru began producing ethanol, it has exported high-value, sugar cane-based ethanol to the European Union. This created the demand for imports to meet domestic demand. Peru met the E7.8 requirement (initially scheduled for 2010) in 2013 after a three-year delay.

**Table 2**

| Ethanol Used as Fuel and Other Industrial Chemicals<br>(Million Liters) |      |      |      |      |      |      |      |      |       |       |
|-------------------------------------------------------------------------|------|------|------|------|------|------|------|------|-------|-------|
| Calendar Year                                                           | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021  | 2022f |
| <b>Beginning Stocks</b>                                                 |      |      |      |      |      | 30   | 40   | 48   | 64    | 63    |
| Fuel Begin Stocks                                                       | 12   | 21   | 5    | 2    | 27   | 28   | 39   | 28   | 1     | 1     |
| <b>Production</b>                                                       |      |      |      |      |      | 172  | 222  | 212  | 216   | 220   |
| Fuel Production                                                         | 204  | 190  | 152  | 205  | 165  | 140  | 173  | 150  | 173   | 175   |
| <b>Imports</b>                                                          |      |      |      |      |      | 193  | 208  | 190  | 182   | 185   |
| Fuel Imports                                                            | 114  | 63   | 112  | 113  | 112  | 173  | 190  | 153  | 165   | 180   |
| <b>Exports</b>                                                          |      |      |      |      |      | 142  | 171  | 131  | 139   | 145   |
| Fuel Exports                                                            | 149  | 102  | 94   | 113  | 91   | 108  | 170  | 131  | 138   | 130   |
| <b>Consumption</b>                                                      |      |      |      |      |      | 213  | 251  | 255  | 260   | 260   |
| Fuel Consumption                                                        | 160  | 167  | 173  | 180  | 185  | 194  | 204  | 199  | 200   | 220   |
| <b>Ending Stocks</b>                                                    |      |      |      |      |      | 40   | 48   | 64   | 63    | 63    |
| Fuel Ending Stocks                                                      | 21   | 5    | 2    | 27   | 28   | 39   | 28   | 1    | 1     | 6     |
| <b>Refineries Producing Fuel Ethanol (Million Liters)</b>               |      |      |      |      |      |      |      |      |       |       |
| Number of Refineries                                                    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2     | 2     |
| Nameplate Capacity                                                      | 350  | 350  | 350  | 350  | 350  | 350  | 350  | 350  | 350   | 350   |
| Capacity Use (%)                                                        | 58%  | 54%  | 43%  | 59%  | 47%  | 40%  | 49%  | 43%  | 47.1% | 50.0% |
| <b>Co-product Production (1,000 MT)</b>                                 |      |      |      |      |      |      |      |      |       |       |
| Bagasse                                                                 | 842  | 784  | 627  | 846  | 680  | 578  | 714  | 619  | 712   | 723   |

| Feedstock Use for Fuel Ethanol (1,000 MT) |       |       |       |       |       |       |       |       |       |       |
|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Sugar Cane                                | 2,550 | 2,375 | 1,900 | 2,563 | 2,062 | 1,750 | 2,163 | 1,877 | 2,157 | 2,190 |
| Market Penetration (Million Liters)       |       |       |       |       |       |       |       |       |       |       |
| Fuel Ethanol Use                          | 160   | 167   | 173   | 180   | 185   | 194   | 204   | 205   | 218   | 220   |
| Gasoline Pool 1/                          | 2,047 | 2,147 | 2,223 | 2,303 | 2,373 | 2,487 | 2,614 | 2,628 | 2,810 | 2,820 |
| Blend Rate (%)                            | 7.80% | 7.80% | 7.80% | 7.80% | 7.80% | 7.80% | 7.80% | 7.80% | 7.80% | 7.80% |

f: forecast

Source: Ministry of Agriculture, Private Sector, Ministry of Energy and Mines, FAS Lima analysis (Note: Forecasts are based on the assumption that Peru will continue to reach the E7.8 mandate. Some small volumes of ethanol traded may be for beverage use and other industrial chemicals not used as fuel.)

## Production:

Peruvian total ethanol production in 2022 is forecast at 220 million liters, a 2 percent increase compared to the previous year. Fuel ethanol is estimated at 175 million liters. Nameplate capacity is forecast to remain the same in the near future at 350 million liters with only a near 50 percent capacity use rate.

Peru's two ethanol production facilities are located in the state of Piura in northern Peru. Coazucar's Aurora facility, with about 6,500 hectares of sugarcane, is configured to produce sugar or ethanol depending on the economics at a given moment. This company is owned by Grupo Gloria (Peru's largest dairy processor). The other production facility is Caña Brava, a \$210 million facility owned by the Romero Group. It maintains approximately 8,000 hectares of planted sugarcane fields with a production capacity of 127 million liters per year.

Peru uses sugarcane as the feedstock for bioethanol production. This sugarcane is cultivated on formerly idle, non-irrigated desert lands. Ethanol production is centered in Piura where companies take advantage of the favorable weather conditions (i.e., ample sunlight due to proximity to the equator). Despite an average annual rainfall of only 25 millimeters, sugarcane is cultivated year-round using modern irrigation technology. The sugarcane fields are drip irrigated with water drawn from the Chira River. The river is also fed by the Poechos Reservoir, which has a one billion cubic meter capacity and a discharge rate of four cubic meters per second. The reservoir is 30 kilometers from the Peru-Ecuador border.

Several sugarcane growers are evaluating the economic feasibility of diverting part of their crop to ethanol production. However, sources indicate that there are no immediate plans to initiate commercial operations.

Sugarcane yields can be as high as 200 metric tons (MT) per hectare, although average yields normally are around 140 MT per hectare, with 13 to 18 months between cuts. Brazil's shorter 180 day growing season produces lower yields of 70 MT per hectare. Sugarcane cultivation in Piura absorbs about 17,000 cubic meters of water per hectare per year.

## Consumption:

Total ethanol consumption for 2022 is forecast at 260 million liters, remaining at same levels as 2021. Fuel ethanol is estimated at 220 million liters, with the blend rate unchanged. Peru met its ethanol mandate in 2013, three years late, and has continued to reach it since that year. Unless there is an increase in the ethanol blend mandate, ethanol consumption will only increase as gasoline consumption increases. However, increasing fuel prices as a result of higher international prices and the Peruvian Sol devaluation could eventually result in higher substitution rates of gasoline with less expensive fuels.

Any growth in the size of the gasoline pool and thus pace of demand for E7.8 gasoline has slowed in recent years as taxis and passenger vans, which represent a significant portion of Peru's public transport sector, increasingly turn to liquefied natural gas (LNG) and liquefied petroleum gas (LPG). Demand for these two alternative fuels in 2020 accounted for about 50 percent of total fuel use by light duty vehicles. This trend directly affects gasoline and thus ethanol consumption, slowing growth opportunities for fuel ethanol.

FAS Lima forecasts that despite growing demand for LNG and LPG as transportation fuels, increased automotive ownership and the continuation of the E7.8 requirement will lead to increased demand for gasoline and thus ethanol. Currently, gasoline accounts for 22 percent of total fuel consumption while Liquefied Petroleum Gas accounts for 23 percent.

The city of Lima and its immediate surroundings account for roughly 65 percent of the country's ethanol and gasoline demand. REPSOL (Spain's national petroleum company) and Petro Peru (state-owned) are the Peruvian market's main gasoline suppliers. After initial opposition, these suppliers are now more open to discussing an increase to the current ethanol blend rate of 7.8 percent, likely due to the expectation it will lower costs.

### **Trade:**

FAS Lima forecasts Peru's 2022 fuel ethanol exports at 130 million liters, increasing four percent compared to the previous year. Attractive European Union market prices have encouraged production in Peru in the last several years. Fuel ethanol imports in 2022 are forecast at 185 million liters, mostly from the United States.

**Table 3**

| <b>Peruvian Undenatured Ethyl Alcohol Exports (220710)<br/>(Million Liters)</b> |             |             |             |
|---------------------------------------------------------------------------------|-------------|-------------|-------------|
|                                                                                 | <b>2019</b> | <b>2020</b> | <b>2021</b> |
| <b>World</b>                                                                    | 170         | 131         | 139         |
| <b>Netherlands</b>                                                              | 129         | 119         | 130         |
| <b>U.K.</b>                                                                     | 18          | 0           | 0           |
| <b>France</b>                                                                   | 14          | 5           | 0           |
| <b>Ecuador</b>                                                                  | 5           | 5           | 9           |
| <b>Colombia</b>                                                                 | 4           | 1           | 0           |

Source: Peruvian Customs

**Table 4**

| <b>Peruvian Undenatured Ethyl Alcohol Imports (220710)</b><br><b>(Million Liters)</b> |             |             |             |
|---------------------------------------------------------------------------------------|-------------|-------------|-------------|
|                                                                                       | <b>2019</b> | <b>2020</b> | <b>2021</b> |
| <b>World</b>                                                                          | 18          | 37          | 52          |
| <b>Bolivia</b>                                                                        | 17          | 31          | 41          |
| <b>Brazil</b>                                                                         | 0           | 5           | 8           |
| <b>Ecuador</b>                                                                        | 1           | 1           | 0           |
| <b>U.S.</b>                                                                           | 0           | 0           | 2           |

Source: Peruvian Customs

**Table 5**

| <b>Peruvian Denatured Ethyl Alcohol Imports (220720)</b><br><b>(Million Liters)</b> |             |             |             |
|-------------------------------------------------------------------------------------|-------------|-------------|-------------|
|                                                                                     | <b>2019</b> | <b>2020</b> | <b>2021</b> |
| <b>World</b>                                                                        | 190         | 153         | 182         |
| <b>U.S.</b>                                                                         | 190         | 152         | 181         |
| <b>Ecuador</b>                                                                      | 0           | 1           | 1           |

Source: Peruvian Customs

The average export price for Peruvian ethanol in 2021 rose 24 percent to \$0.83 per liter. Ethanol was imported into Peru at an average price of \$0.68 per liter, an increase of 28 percent compared to the previous year. Peruvian ethanol exported to the European Union (EU) benefits from duty-free access under the EU – Peru Free Trade Agreement as well as certain price premiums for some growers who are able to implement green harvesting (i.e., harvesting without cane field burning) and biological pest control among other more environmentally friendly measures.

Peru's ethanol does not meet biofuel land use change requirements under the US Energy Act of 2007 (EISA 2007) and thus cannot count towards fulfilling obligations (mandates) under the Renewable Fuel Standard (RFS), making it ineligible for Renewable Identification Numbers (RINs). RINS add value to biofuels sold in the United States. Peruvian ethanol's higher cost (compared to U.S. corn ethanol) and lack of RINs eligibility limits its market opportunity in the United States. For some years now, the only market for higher-priced sugarcane ethanol has been California and that market is dominated by Brazil.

Biofuels imported to the United States can fulfill RFS obligations and generate RINs if the biofuel plant was "grandfathered" by supplying the U.S. market prior to 2007 or by certifying that the biofuel: 1)

comes from feedstock grown on lands that were cultivated prior to 2007; 2) is covered by a feedstock tracking and certification scheme that insures ineligible feedstock are excluded; and 3) meets a minimum environmental sustainability standard of 20 percent greenhouse gas savings over fossil fuel to qualify for conventional biofuel or 50 percent to qualify for an advanced non-cellulosic fuel. No plants in Peru were grandfathered, and Peru does not meet the land use condition because desert lands used to produce ethanol were converted after 2007. As a result, ethanol produced using feedstock from those lands cannot meet RFS obligations as defined under EISA 2007.

#### **IV. Biodiesel/Renewable Diesel**

##### **Production:**

Peru is forecast to produce 208 million liters of biodiesel in 2022, remaining at the same level as the previous year. After halting biodiesel production between 2014 and 2016, Peru resumed production in 2017. Peru produced 186 million liters of biodiesel in 2020 and increased to 208 million liters in 2021. Peru does not export biodiesel, so a steady increase in production over the past five years is due to declining imports resulting from antidumping duties assessed on Argentinean biodiesel.

Peru produces biodiesel using crude palm oil (CPO) as a feedstock. PetroPeru, the entity that regulates biodiesel production and imports, notes that palm oil biodiesel quickly solidifies as temperature drops at higher altitudes, clogging fuel filters and damaging truck engines. This is the primary reason given for not raising the blend rate above B5, and there has been no move to produce renewable diesel (HDRD) which would eliminate this constraint.

**Table 6**

| <b>Biodiesel (Million Liters)</b>           |       |       |       |       |       |       |       |       |       |       |
|---------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Calendar Year                               | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  | 2021  | 2022f |
| <b>Beginning Stocks</b>                     | 6     | 11    | 9     | 9     | 59    | 35    | 12    | 51    | 57    | 70    |
| <b>Production</b>                           | 10    | 0     | 0     | 0     | 37    | 112   | 153   | 186   | 208   | 208   |
| <b>Imports</b>                              | 304   | 315   | 323   | 402   | 294   | 223   | 237   | 165   | 203   | 50    |
| <b>Exports</b>                              | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| <b>Consumption</b>                          | 309   | 317   | 323   | 352   | 355   | 358   | 351   | 345   | 398   | 310   |
| <b>Ending Stocks</b>                        | 11    | 9     | 9     | 59    | 35    | 12    | 51    | 57    | 70    | 18    |
| <b>Production Capacity (Million Liters)</b> |       |       |       |       |       |       |       |       |       |       |
| Number of Biorefineries                     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| Nameplate Capacity                          | 350   | 350   | 350   | 350   | 350   | 350   | 350   | 350   | 350   | 350   |
| Capacity Use (%)                            | 2.9%  | 0.0%  | 0.0%  | 0.0%  | 10.6% | 32.0% | 43.7% | 53.1% | 59.4% | 59.4% |
| <b>Feedstock Use (1,000 MT)</b>             |       |       |       |       |       |       |       |       |       |       |
| Crude Palm Oil                              | 9     | 0     | 0     | 0     | 34    | 103   | 141   | 171   | 193   | 193   |
| <b>Market Penetration (Million Liters)</b>  |       |       |       |       |       |       |       |       |       |       |
| Biodiesel, on-road use                      | 309   | 317   | 323   | 352   | 355   | 358   | 351   | 345   | 398   | 310   |
| Diesel Pool, total 1/                       | 5,943 | 5,809 | 6,303 | 6,631 | 6,685 | 6,690 | 6,812 | 6,500 | 7,560 | 7,600 |
| Blend Rate (%)                              | 5.2%  | 5.5%  | 5.1%  | 5.3%  | 5.3%  | 5.4%  | 5.2%  | 5.3%  | 5.3%  | 4.1%  |

f: forecast

Source: Peruvian Customs, PetroPeru, Private Sector, FAS Lima Analysis

**Table 7**

| <b>Peruvian Biodiesel Imports – 3826.00 (Million Liters)</b> |      |      |      |
|--------------------------------------------------------------|------|------|------|
|                                                              | 2019 | 2020 | 2021 |
| <b>World</b>                                                 | 188  | 124  | 133  |
| <b>Spain</b>                                                 | 145  | 63   | 55   |
| <b>Indonesia</b>                                             | 0    | 0    | 40   |
| <b>Malaysia</b>                                              | 0    | 40   | 28   |
| <b>Netherlands</b>                                           | 0    | 0    | 10   |
| <b>Others</b>                                                | 44   | 22   | 0    |

Note: Assume all product is B100.

Source: Peruvian Customs

**Table 8**

| <b>Peruvian Petroleum Oils and Preparations Containing up to 30 percent Biodiesel Imports – 2710.20 (adjusted to B100-equivalent, Million Liters)</b> |             |             |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|
|                                                                                                                                                       | <b>2019</b> | <b>2020</b> | <b>2021</b> |
| <b>World</b>                                                                                                                                          | 49          | 41          | 70          |
| <b>U.S.</b>                                                                                                                                           | 49          | 41          | 70          |

Note: The assumed average blend rate for imports is B10.

Source: Peruvian Customs

### **Consumption:**

FAS Lima forecasts biodiesel consumption at 310 million liters in 2022, a 22 percent decrease compared to 2021. Consumption remains heavily dependent on imports which are forecast to fall significantly this year due to the suspension of the biodiesel blend mandate. Peru met the B5 requirement in 2012, one year late, after the blending requirement went into effect. Until the suspension, the blend rate remained quite steady near B5 since 2012, but is expected to fall in 2022. FAS Lima expects this blend rate to recover to the same level once the suspension of the currently lower mandate is lifted. Timing will be dependent on various factors and is difficult to predict.

### **Trade:**

Biodiesel imports in 2022 are forecast to fall 67 percent to 50 million liters. This significant import reduction is explained by the suspension of the biofuels blend mandate. Peru's government stated that limited inventories due to disruptions in the supply chain triggered this measure, however, other economic and political factors likely also play a role.

Biodiesel imports, both 3826.00 (covering blends above B30 to B100) and 2710.20 (petroleum oils containing 1 – 30 percent biodiesel), enter Peru duty free. Post believes that product imported under 2710.20, all of which comes from the United States, contains 10 percent biodiesel. If soy oil biodiesel is used (the most common type of U.S. biodiesel), it would perform better in colder temperatures than CPO-based biodiesel when blended at the same levels due to a naturally lower concentration of fatty acids in the feedstock.

## **V. Advanced Biofuels**

There is currently no ongoing research on advanced biofuels in Peru. There is also no policy in place to support advanced biofuels research. FAS Lima is unaware of any announcements by Peruvian airlines to being using advanced biofuels in their operations.

## **VI. Notes on Statistical Data**

Ethanol production in Peru utilizes the diffusion method, adopted from Brazilian technology. This method consists of shredding harvested sugarcane stalks very thinly, then moving the shreds through thirteen consecutive warmer water (70-80°C) showers. The water from the final shower is allowed to ferment with alcohol producing yeast. Once the fermentation process is completed, the ensuing “liquor” is distilled. Industry sources clarify that this procedure is more efficient than traditional milling. The continuous flow also keeps plant idle time at a minimum. In order for a 350,000 liter per day ethanol plant to operate efficiently, 20 hectares of sugarcane must be processed daily. With an average sugar content of 17 percent, one metric ton of sugarcane produces roughly 170 kilograms of sugar or an amount equivalent to 80 liters of ethanol.

One metric ton of sugarcane also produces some 330 kilograms of bagasse (i.e., fibrous material that remains after sugarcane stalks are crushed to extract their juice). The bagasse, or sugarcane fiber, is used to produce 660 Kilograms of steam. Steam-turned turbines generate the processing plant’s electricity needs. Ethanol operations utilize about eight megawatts per month. The excess energy produced (normally two to four megawatts) is sold to the national power grid. The following provides additional information on tables:

### Table: Ethanol Used as Fuel (Million Liters)

Conversion: 1MT of sugar cane = 80 liters of ethanol

1MT of sugar cane = 330 kilograms of bagasse

Ethanol Trade: In this report, all exports of HS 2207.10 and 2207.20 to Europe is for use as fuel, while exports to other countries are for beverage or other industrial use. All imports of 2207.20 from the U.S. are fuel grade ethanol, while imports from other countries are for use as beverage or other industrial uses.

### Table: Biodiesel Used as Fuel (Million Liters)

Conversion: 1MT of Crude Palm Oil = 1080 liters of biodiesel

**Attachments:**

No Attachments