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Spain's Bioethanol Sector Overview

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Report Highlights:

The 2016 elimination of the bioethanol specific target resulted in reduced market opportunities for bioethanol producers. Also, lower domestic bioethanol production since 2016 has opened up new opportunities for DDG imports. We expect little or no impact on raw material sourcing when sustainability measures are fully in place in January 2018, as producers are already using certified feedstocks.

Disclaimer: Spain, as a member of the European Union (EU), conforms to EU directives and regulations on biofuels. It is therefore recommended that this report is read in conjunction with the [EU-28 biofuels consolidated report 2017](#).

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Executive Summary:

Spain is among the seven top EU Member States in terms of bioethanol production and consumption. As in the majority of EU Member States, diesel is the main transport fuel in Spain. However, while the EU diesel-gasoline average ratio is 2:1, in Spain it is 3:1, which means that the potential for ethanol and gasoline to contribute to meeting the RED 10 percent goal is less than in the EU-wide fuel market. Since January 2013, bioethanol consumption in Spain was solely mandate driven. In 2016, the bioethanol specific target was phased out, since that time, bioethanol consumption depends on its price competitiveness and the need for petrol companies to observe volumetric blending limits.

Industry sources feared that the bioethanol specific target phase-out may further reduce marketing opportunities, as blenders may opt for meeting mandates with biodiesel or HVO which do not count

against the 7 percent blending limit for labeling purposes, but it are eligible for mandate compliance. Statistical data available for the first months of 2017 show a higher bioethanol consumption volume, likely due to the slight recovery of total gasoline sales and the increase in the overall mandate.

The majority of bioethanol in Spain is marketed as ETBE. With limited in-country direct blending or full implementation of double counting provision, pure bioethanol and bioethanol produced out of wine alcohol are exported to other EU Member States where direct blending is carried out and/or where double counting is fully enforced. While conventional fuel consumption has followed a steady downward trend since 2007, statistical data available for 2014, 2015 and 2016 show how diesel consumption, and gasoline consumption to a lesser extent, have started to recover.

In March 2016, poor margins forced Abengoa's Spanish in-land plant production to halt, resulting in a decrease in domestic production. Lower bioethanol production levels are anticipated for 2017 in Spain, as tight margins would still prevent Abengoa from resuming production in the in-land plant. On a positive note, lower domestic bioethanol production since 2016 has opened up new opportunities for DDG imports.

The seven percent cap on first generation (conventional) biofuels introduced by Directive (EU) 2015/1513, on indirect land use change (ILUC) represents a future challenge for the Spanish bioethanol producers. Second generation bioethanol in Spain is limited to Acciona's wine alcohol plant and a Waste to Biofuels plant in Babilafuente (Salamanca), currently on a production halt.

The impact of the projected full enforcement of sustainability measures in January 2018 is expected to be limited, as producers are already using certified feedstocks to fulfill their customers' demand and there are ample supplies of sustainable raw materials.

Trade barriers along with transposal to national law of Directive 1513/2015 will play a key role to determine the future of Spanish biofuels consumption and production dynamics.

References

- Abbreviations and definitions:

APPA: Spain's Renewable Energies Association

Bioethanol: Ethanol produced from agricultural feedstock used as transport fuel

CAP: Common Agricultural Policy

CNMC: Spanish National Market and Competition Commission

CORES: Spanish Corporation of Strategic Reserves of Oil-based Products

CY: Marketing Year

DDG: Distillers Dried Grains

EC: European Commission

ePURE: European Renewable Ethanol Association

EU: European Union

EXX: Blend of mineral gasoline and bioethanol with the number indicating the percentage of bioethanol in the blend, e.g. E10 equals 10 percent bioethanol and 90 percent conventional gasoline by volume.

GHG: Green House Gases

GOS: Government of Spain

Ha: Hectares

HS: Harmonized System of Tariff Codes

IDAE: Spanish Institute for Energy Diversification and Saving

ILUC: Indirect Land Use Change

MINETAD: Ministry of Energy, Tourism and Digital Agenda

MAPAMA: Ministry of Agriculture, Fisheries, Food and Environment

MS: Member State

MT: Metric tones

MY: Marketing Year

N/A: Not available

RED: Renewable Energy Directive

Q: Quarter of the year (Q1, Q2, Q3, Q4)

S: Semester of the Year (S1, S2)

Toe: Tons of Oil Equivalent

TMT: Thousand Metric Tones

USD: U.S. Dollars

VAT: Value Added Tax

- Energy content and Conversion rates:

1 Toe = 41.87 GJ

Biodiesel = 37.50 MJ/kg

1 MT Diesel = 1,195 Liters = 1.02 Toe

1 MT Biodiesel = 1,136 Liters = 0.90 Toe

1 MT HVO = 1,294 Liters = 1,051 Toe

Bioethanol = 26.90 MJ/kg

1 MT Gasoline = 1,342 Liters = 1.03 Toe

1 MT Ethanol = 1,267 Liters = 0.64 Toe

1 MT of BioETBE = 1,333 Liters = 0.86 Toe

- (HS) Harmonized Codes for Biofuels:

Trade figures for ETBE are based on Global Trade Atlas (GTA) data HS 29091910 code.

Trade figures for ethanol for fuel uses as of January 2012 are based on Global Trade Atlas (GTA) data HS code 2207 (220710 is for undenatured ethanol and 220720 for denatured ethanol).

Spanish Regulatory Framework

With all other incentives¹ phased out, biofuel consumption in Spain is solely mandate driven. Since **2016** the bioethanol specific target has been phased-out. Other governing regulations, affecting the biofuel sector include sustainability requirements implementation since **2016**, although full enforcement is not scheduled until **2018**. Double counting provision has been transposed to national law but is not fully enforced yet.

- **Biofuel Targets**

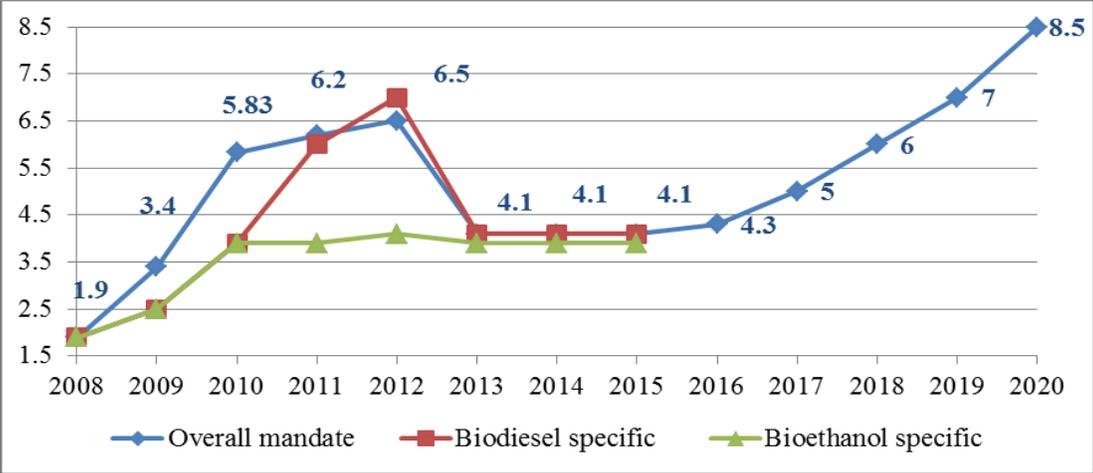
Consumption mandates followed a steady upward trend until 2013, when the downward revision of mandates introduced by [Royal Decree-Law 4/2013](#) reduced Spain's biofuels market size. Until **2016**, the overall mandate could be fulfilled by either biofuel. Given the diesel consumption recovery, the lower volume of gasoline used, and considering their respective blending limits (See the **Technical fuel specifications** Section), the excess over the bioethanol/biodiesel specific mandates was normally fulfilled with biodiesel.

[Royal Decree 1085/2015](#) eliminated the biodiesel and bioethanol specific targets in **2016**, and increased slightly the consumption targets for the 2016-2020 period. Interestingly, only the consumption target

¹ *Hydrocarbon tax exemption phased-out in 2013.*

proposed for 2019 (See Table 1 and Graph 1) will be higher than the mandate established back in 2012, prior to the downward revision of targets carried out in 2013.

Graph 1. Spain Biofuel Consumption Mandates (Percentage in terms of Energy)



Source: FAS Madrid based on Orden ICT/2877/2008. Ministry of Energy, Tourism and Digital Agenda and Royal Decrees 1738/2010 and 459/2011 and Royal Decree-Law 4/2013 and Law 11/2013 Royal Decree 1085/2015 on biofuels promotion

Table 1. Spain’s biofuel targets (percent in terms of energy)

Year	Type of mandate	Overall mandate	Biodiesel specific	Bioethanol specific
2008	Voluntary	1.9	1.9	1.9
2009	Mandatory	3.4	2.5	2.5
2010	Mandatory	5.83 4.78*	3.9	3.9
2011	Mandatory	6.2	6	3.9
2012	Mandatory	6.5	7	4.1
2013	Mandatory	4.1	4.1	3.9
2014	Mandatory	4.1	4.1	3.9
2015	Mandatory	4.1	4.1	3.9
2016	Mandatory	4.3	N/A	N/A
2017	Mandatory	5	N/A	N/A
2018	Mandatory	6	N/A	N/A
2019	Mandatory	7	N/A	N/A
2020	Mandatory	8.5	N/A	N/A

Source: Orden ICT/2877/2008. Ministry of Energy, Tourism and Digital Agenda and Royal Decrees 1738/2010 and 459/2011 and Royal Decree-Law 4/2013, Law 11/2013 and Royal Decree 1085/2015
 * According to MINETAD Resolution dated January 7th, 2011 Royal Decree 1085/2015 on biofuels promotion.

For additional information about Biofuels Mandates in other EU MS, please see GAIN report [GM17017](#).

Electricity from renewable sources used for electric road vehicles or rail transport would cover the gap between the 8.5 percent biofuel consumption mandate and the 10 percent target for 2020.

- Biofuel Target Compliance**

Biofuel target and sustainability compliance in Spain are managed through a Biofuel Entitlement System. [Ministerial Order ICT/2877/2008](#) appointed the Spanish National Market and Competition Commission (CNMC) as the authority responsible to monitor and control the amount of biofuels marketed or consumed through a certificate system. Biofuel producers and blenders are required to report to the CNMC the amount of biofuels sold to other market operators. Producers and blenders must report the amount of biofuel produced, imported and sold to other companies. Blenders must report on the quantity of regular fuel and biofuel marketed. The CNMC issues Biofuel Entitlements to the different industry actors. One entitlement equals a TdB marketed.

CNMC provisional data (See **Table 2**) show an excess in fulfilment in **2011** and **2012** and failure to comply in **2013** to **2016**. It is our understanding that the excess registered in **2012** may partially make up for the lower compliance the following years through certificate transfer in **2013 – 2016**. Also, **2013-2016** targets would be met once provisionally denied certificates are accounted for. Fines of 763 Euros are imposed per TdB that the obliged party fails to present.

Table 2. Mandate Compliance (percent in terms of energy)

Year	Overall		Bioethanol specific		Biodiesel specific	
	Mandate	Consumption	Mandate	Consumption	Mandate	Consumption
2011	6.2	6.2	3.9	4.3	6	6.6
2012*	6.5	8.5	3.6	4.1	7	9.5
2013*	4.1	3.4	3.9	3.4	4.1	3.4
2014	4.1	3.7	3.9	3.9	4.2	3.7
2015	4.1	3.6	3.9	3.8	4.1	3.6
2016	4.3	4.1	-	-	-	-

Source: CNMC

*Note: Mandate compliance in **Table 2** is based on final certificates issued. If provisional certificates were accounted, it would show how consumption targets have been met, at least in an aggregated manner, every year.*

Obliged parties may trade biofuel certificates (each certificate equals one per certificate/metric ton of oil equivalent that the marketed) as long as the CNMC is informed. The certificate trading period runs April-March. Certificate market value and number of certificates exchanged can be consulted in **Table 3**.

Table 3. Mandate Compliance Bioethanol Certificates Transfer

Year	2010	2011	2012	2013	2014	2015	2016*
Average Value	115	205	153	361	264	294	87

(Euros/Certificate)							
Number of Certificates Transferred	12,707	5,063	5,649	4,871	7,649	5,876	6,507

Source: FAS Madrid calculations based on CNMC.

**Data up to February 2017*

Since 2013, when the **hydrocarbon tax exemption for biofuels**, which amounted to 0.401 **Euros/liter** – applicable to the share of bioethanol contained in the blend, was phased out, the mandate breach fine was revised up from **0.177 Euros/liter** to **0.385 Euros/liter** in the case of bioethanol, according to [Resolution by the Under Secretary of Energy](#) dated July 8, 2013 (**Table 4**).

Table 4. Blending Incentive for Gasoline Blends (Euros/liter)

Incentive for Gasoline Blends	Prior to 2013	After 2013
Hydrocarbon tax exemption	0.401	0
Mandate breach fine	0.177	0.385
Total	0.578	0.385

Source: FAS Madrid based on [Resolution by the Under Secretary of Energy](#) dated July 8, 2013.

- **Transposition of RED and Sustainability implementation**

[Royal Decree 1597/2011](#) transposed sustainability criteria and provisions related to double counting to national law. Sustainability was projected to be required as of January 2013. However, in early 2013 (Royal Decree 4/2013) the GOS established a delay *sine die* in the implementation.

Since early 2013, during the so-called interim period, obliged parties were only requested to provide the CNMC (National Commission for Markets and Competence) with information regarding type of biofuel and Origin, and feedstock and origin. Reporting levels of greenhouse gas reduction and soil use were optional.

[On March 26, 2015](#) Spain was formally asked by the European Commission to correctly apply the Renewable Energy Directive for biofuels. [Resolution by the Secretary of Energy dated April 29, 2015](#) announcing enforcement was published on Spain’s official Gazette.

This document mandates that sustainability requirements are fully enforced in Spain since January 1, 2016. Since this date, the transitory period (to allow for the progressive adaptation of the verification system) began. During this period, no verification is being carried out under the national scheme. Hence, the large majority of obliged parties have opted for private scheme certifications in order to keep their options to sell their product in other member states open.

During the transitory period, only sustainable biofuels are eligible for national mandate compliance. Blenders can still accredit sustainability through private schemes or Responsible Declaration.

According to the [draft piece of law](#) made available for public consultation, the date for full implementation² would be January 1, 2018. Obligated parties will then need to accredit sustainability compliance with either private schemes or Responsible Declarations, which start being verified under the national scheme by the CNMC.

The impact of sustainability's full implementation in feedstock procurement for biofuels production is expected to be limited as obliged parties are using certified feedstocks to fulfill their customers' demand, and sustainable raw materials supplies are ample. Implementation details can be consulted in **Table 5**.

² *When obliged parties will need to accredit sustainability compliance with either private schemes or Responsible Declarations and this information starts being verified under the national scheme by the CNMC.*

Table 5. Sustainability Implementation Calendar

Date	Regulation	Comments	Implications
November 2011	Royal Decree 1597/2011	Spain transposes Sustainability Criteria to National law	-
January 2013	-	Intended day of Sustainability Implementation (According to Royal Decree 1597/2011)	Obligated parties must give information on: <ul style="list-style-type: none"> • type of biofuel • origin • feedstock • origin Optionally: <ul style="list-style-type: none"> • GHG reduction • Soil use
February 2013	Royal Decree-Law 4/2013	Establishes a <i>sine die</i> delay in Sustainability Implementation. The final date for sustainability requirements will be established by a Resolution by the Undersecretary for Energy. This resolution will be published in Spain's official gazette at least eight months prior to its enforcement.	
April 2015	Resolution by the Secretary of Energy dated April 29, 2015	Resolution effective since May 1, 2015 Beginning of a 8 months grace period	
January 2016	-	Beginning of a transitory period (to allow for the progressive adaptation of the verification system)	Obligated parties must give information on: <ul style="list-style-type: none"> • type of biofuel • origin • feedstock • origin • GHG reduction • Soil use Sustainability compliance is accredited using private schemes or Responsible Declaration.
January 2018 (tentative)	Draft Royal Decree on GHG for transport energy and fuels amending Royal Decree 1597/2011	Sustainability verification system fully in place	Obligated parties must give information on: <ul style="list-style-type: none"> • type of biofuel • origin • feedstock • origin • GHG reduction • Soil use Sustainability compliance is accredited using private schemes or Responsible Declarations, which start being verified under the national scheme.

Source: FAS Madrid

- **Double Counting Provision**

According to the Renewable Energy [Directive 2009/28/EC](#), second generation biofuels get double credit. [On April 16th, 2014](#) the Government of Spain published the list of raw material eligible for double counting against biofuels consumption mandates in the Official Gazette. This list includes Used Oils of animal or vegetal origin, animal fats (Categories 1 and 2 of [Regulation \(CE\) 1069/2009](#)).

In the case of blends or different raw materials only the share that is actually produced out of one of the listed products would count double. In order to be granted with the double credit, feedstock origin has to be properly documented. However, the double counting will only enter into force in Spain once more detailed guidelines are issued and, most likely, not until sustainability verification is fully in place³ (See **Table 5**).

The [Draft Royal Decree on GHG for transport energy and fuels amending Royal Decree 1597/2011](#) defines categories of raw materials eligible for double counting purposes classified in two groups:

- **Group A:** includes algae, bacteria, Organic Fraction of Municipal Solid Waste (OFMSW), industrial residues not fit for food or feed use, forest residues and other cellulosic or lignocellulosic material, sewage sludge, straw, cobs cleaned of kernels of corn, husks, animal manure, glycerin, tall oil pitch, palm oil mill effluent and empty palm fruit bunches., bagasse, grape marcs, wine lees, nut shells, and renewable liquid and gaseous fuels of non-biological origin..
- **Group B:** Used Cooking Oils and Animal Fats.

At the moment, the large majority of the biofuels produced out of double counting feedstock are being exported to other EU Member States where double counting is fully in place. The enforcement of the double counting provision would lead to increase domestic consumption instead of exports, which would further reduce the market for biofuels made out of conventional feedstock.

³ *In January 2016 a transitory period to allow for the progressive adaptation of the verification system began. A Draft Royal Decree projects full implementation for 2018. For additional information, see **Transposition of RED and Sustainability Implementation Section**.*

- **Technical fuel specifications in place**

EU Fuel Quality [Directive 2009/30](#) enabled fuel operators to market B7 and E10. This piece of regulation was transposed into national regulation by [Royal Decree 1088/2010](#), which increased the biodiesel content allowed from five percent to seven percent and the bioethanol content permitted from five percent to ten percent.

Blends with volumetric biodiesel content over seven percent, or volumetric bioethanol content over ten percent, or volumetric bioethanol content over five percent and over 2.7 of oxygen content in terms of mass, should be labeled indicating the biofuel content. In addition, the following disclaimer should be present: “Before using this product, please make sure it is suitable for your engine”.

In the case of gasoline blends, in order to protect the oldest vehicles that are not prepared to operate on higher bioethanol contents, until **December 31, 2013**, supply of at least the lowest octane index gasoline with less than five percent bioethanol in terms of volume, and less than 2.7 percent of oxygen in terms of mass will be granted in all petrol stations. This type of gasoline is known as so-called "protective petrol". Same octane index gasoline can be also available with higher oxygen or bioethanol contents. The [Ministerial Order IET/2458/2013](#) extended the mandatory supply of protective petrol in all petrol stations until the end of **2016**, and [Ministerial Order ETU/1977/2016](#) granted with an additional extension until the end of **2018**.

[Commission Decision](#) dated November 8, 2013, allowed direct blending in Spain during the summer months (May through September).

- **Cap on Food Crop Based Biofuels**

On October 5, 2015, [Directive 1513/2015](#) officially introduced a seven percent cap (energy basis) on food based biofuels thus limiting consumption first generation or conventional biofuels within the wider ten percent target for biofuels in EU transportation fuel by 2020 set by the RED.

Additionally, a non-binding 0.5 percent national target for advanced (non-food) biofuels was included. EU Member States will have until September of **2017** to enact the reformed legislation. While no consumption target has been defined for the post 2020 period, in Spain, according to [Royal Decree 1085/2015](#), an advanced biofuels, the consumption target shall be defined. According to the [draft piece of law](#) made available for public consultation, the advanced biofuels target in Spain would be set at 0.1 percent.

ILUC Directive also includes a New Annex listing raw materials that **count double** against the consumption mandates, grape marcs and wine lees are specifically mentioned, and so are in the drafted piece of national law (See **Double Counting Provision** Section).

This Directive also increases the **multipliers factors** for electricity produced from renewable energy sources consumed by electric road vehicles (from 2.5 to five) and rail transport (from one to 2.5) for the calculation of market share of renewables in transport, reducing fossil fuels market share for mandate compliance. The ten percent target in road transportation for 2020 remains unchanged.

Fuel suppliers are obligated to submit annually to Member States the provisional mean values of the estimated **indirect land-use change emissions** from biofuels traded.

Additionally, the Directive **increases the minimum reduction threshold of greenhouse gas** (GHG) emission for biofuels and bioliquids produced in new facilities.

GHG emission saving from the use of biofuels shall be:

- At least 60 percent for biofuels produced in facilities starting operation after October 5, 2015.
- At least 35 percent until December 31, 2017, and at least 50 percent from January 1, 2018 for biofuels produced in facilities starting operation before October 5, 2015, which is the case of all Spain bioethanol plants.

- **EU Policy Developments affecting Spain**

At the EU level, regulations influencing EU biofuels use in transport include the Renewable Energy Directive (RED), and the Fuel Quality Directive (FQD), both amended by the Indirect Land Use change Directive (ILUC). EU Directives are not directly applicable to Member States as they require prior transposal. While RED and FQD have already being transposed to Spanish law, the ILUC Directive is yet to be transposed.

On November 30, 2016 the EC announced the new biofuels policy for the 2020-2030 period, without setting mandatory targets for biofuels consumption ([Renewable Energy Directive post 2020](#)). The future of biofuel in EU is under discussion for the 2021-2030 period. The RED proposal sets a cap on food crop-based biofuels starting at 7 percent in 2021 and decreasing gradually to 3.8 percent in 2030 and a GHG emissions reduction of 40 percent compared to 1990 levels.

Bioethanol Market and Feedstock Use

- **Capacity**

Total bioethanol production capacity remains unchanged since 2009. Since 2015, production capacity of the grain-based plants has been revised down, as a result of the decision to start the phasing-out of certain production lines in existing plants. No further production capacity variations are anticipated in the near future (Table 6). In-country capacity slightly exceeds domestic demand.

Table 6. Spain’s Bioethanol Plants

Plant	Location	Company	Bioethanol Prod. Capacity ⁴		DDG (MT)	Grain consumption (MT)	Start of Operation
			(MT)	(Million liters)			
Ecocarburantes Españoles	Cartagena (Murcia)	Abengoa 95% IDAE 5%	78,900	100	110,000	300,000	2000
Bioetanol Galicia	Texeiro (La Coruña)	Abengoa 90% XES Galicia 10%	115,000	145	130,000	340,000	2002
Biocarburantes Castilla y León	Babilafuente (Salamanca)	Abengoa	161,745	205	120,000	585,000	2006
			Pilot project ⁵ 4,000	5	-	Straw. Enzymatic hydrolysis of glucose.	2009
			Pilot project 25,000*	31	-	25,000 (Urban Solid Waste)	2013
Bioetanol de la Mancha	Alcazar de San Juan (Ciudad Real)	Acciona - Uriel investments	34,058	43	-	None. Operates on wine alcohol	2006
Total			389,703	494	360,000	1,225,000	-

Source: FAS Madrid and Industry Sources.

**Not included in total capacity.*

⁴ Capacity revised down since 2014.

⁵ The experimental barley and wheat straw based pilot plant in Babilafuente (Salamanca), property of Abengoa Bioenergy, has been adapted to try the Waste to Biofuels technology.

Graph 1. Spain's Bioethanol Plants Location



Source: FAS Madrid

Until **2016**, bioethanol production in Spain was carried out by two large engineering and renewable energy companies (**Table 6**): Abengoa owned three grain-based plants (located in Cartagena, Texeiro and Babilafuente) and Acciona owned a wine-alcohol based plant (Alcazar de San Juan).

Abengoa, Spain's largest engineering and renewable energy company, filed an insolvency proceeding on November 25, 2015. The debt restructuring plan presented by the company to avoid bankruptcy included the sale of all non-core assets, such as the first generation biofuels business units. On March 20, 2017 the company announced the sale of the Spain-based bioethanol plants (and their share of the France plant in Loc) to the fund manager Trilantic Europe. The sale of assets was authorized by the CNMC on April 18th, 2017.

The former Abengoa's property bioethanol production inland plant (Babilafuente) is intended for direct blending, which is still a relatively small market in Spain. Consequently, a large share of production of this plant was normally exported to other European Member States, mainly Italy and the United Kingdom (for additional information See **Trade Section**). This plant has been running idle since March 2016 due to poor margins.

The other two plants recently acquired by Trilantic are in port locations and supply fuel refineries (**Graph 2**) (Coruña, Cartagena) with ethanol intended to ETBE production for the domestic market and/or to be exported to other countries.

Acciona's main costumer used to be the refinery located in Puertollano (**Graph 2**) given its proximity. However as bioethanol produced out of residues from winemaking (wine pomace and lees) is eligible

for double counting in other European Member States, since 2012, a large share of Acciona's bioethanol output goes to other European countries such as Italy, the United Kingdom or Portugal where double counting is in place.

Graph 2. Spain-based Refineries



Source: Industry sources

- **Production**

Maintenance operations carried out in Abengoa's bioethanol largest plant (Babilafuente, Salamanca) in early spring and summer resulted in a bioethanol production decline in **2012**. CNMC data for **2013** and **2014** confirm a recovery in production levels, driving up capacity use up to 75 percent. Statistical information for **2015** shows how bioethanol production peaked, most likely driven by a secured and somewhat higher domestic and European demand, as the aftermath of trade restrictions in place and favorable margins due to low feedstock prices.

In **2016**, as a consequence of the uncertainty resulting from Abengoa's announcement of the sale of their first generation biofuels business units and the fact that Abengoa's Spanish in-land plant production halt, Spain's bioethanol production decreased in **2016 (Table 7)**.

Despite the recent acquisition of Abengoa's first generation biofuels business, somewhat stagnant bioethanol production levels are anticipated for **2017** in Spain, as tight margins would still prevent from resuming production in the in-land plant.

Table 7. Spain’s Bioethanol Production, Capacity and Capacity use

Year	2010	2011	2012	2013	2014	2015	2016	2017e
Production (1,000 m³)	470	464	381	442	455	494	328	280
Production Capacity (1,000 m³)	588	588	588	588	588	494	494	494
Capacity Use (%)	80	79	65	75	77	100	66	57

Source: CNMC, Industry sources and FAS estimates.

- **Other Renewable Biofuels**

At present experience on advanced bioethanol in Spain is limited to Acciona’s wine alcohol plant and Abengoa’s experimental Waste to Biofuels plant (See **Capacity** Section).

The experimental plant in Babilafuente (Salamanca), previously owned by Abengoa Bioenergy, was initially conceived as a barley and wheat straw based plant, but in 2013 was adapted to try Waste to Biofuels technology.

Further development of second generation biofuels plants will be determined by the regulatory framework. In particular, according to industry sources, the elimination of the bioethanol specific target would create an unattractive investment environment for second generation biofuels to replace gasoline (See **Biofuel Target** Section).

In Spain, according to [Royal Decree 1085/2015](#), with advanced biofuels the consumption target shall be defined. The [draft piece of law](#) made available for public consultation sets the advanced biofuels target in Spain at 0.1 percent.

- **Feedstock and By - Products**

The large majority of bioethanol in Spain is produced out of grains. Only about 2 percent of total domestic bioethanol production is produced out of wine alcohol. At the moment, there are not any plants producing bioethanol out of sugar beet or sugar cane in Spain.

Grain-based plants

The grain-based bioethanol producing industry normally consumes around one million metric tons of grains. This industry’s demand contributes to increase by one million metric tons the country’s grains shortfall. While the bioethanol plants can easily adapt to different types of grains, corn is usually the preferred raw material as the corn DDG that are produced along with the biofuel are preferred by the Spanish Feed Compounders compared to the by-products when processing other grains such as barley or wheat.

Overall grain consumption in bioethanol production decreased in **2016**, as the grain-based inland plant is running idle since late March. Additionally, the price spread between corn and wheat led to a switch from corn to wheat throughout the summer months in the port plants, which explains the lower share of bioethanol produced out of grains and the shift towards wheat for **2016** in **Table 8**. While in **2016** some substitution by wheat took place, corn is anticipated to be the preferred grain in **2017**.

Additional information on the Grain Market Situation in Spain in **2017** can be found in GAIN Report [SP1714](#).

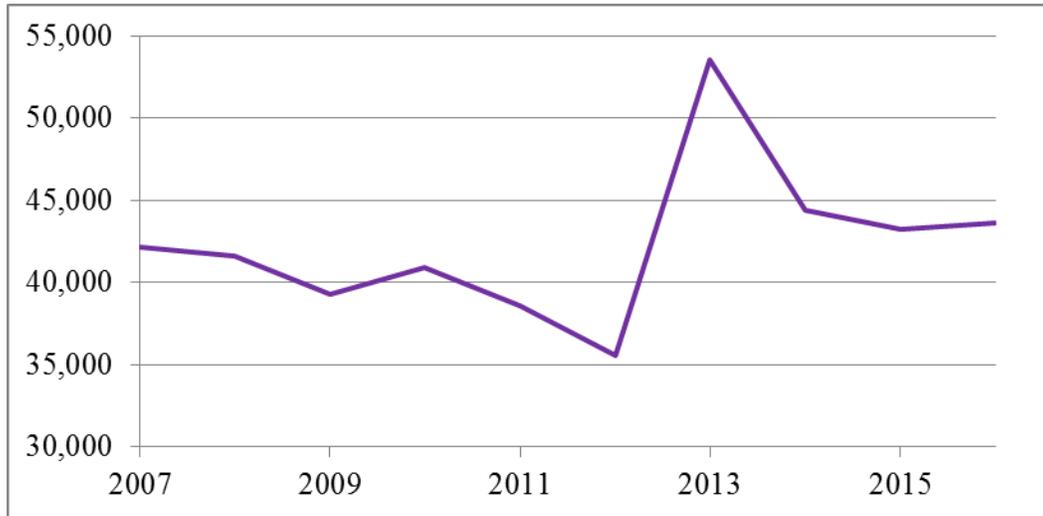
Wine Alcohol-based Plant

The Acciona's plant, located in Spain's largest wine producing region (Castile-La Mancha), produces bioethanol out of raw alcohol obtained by domestic distilleries out of residues from winemaking (wine pomace and lees)⁶. Raw material availability for bioethanol production depends on overall wine output. Normally higher wine and must production levels (See **Graph 3**) result in larger volumes distilled. Since **2014**, double counting implementation in neighboring countries resulted in a bioethanol produced out of wine alcohol rebound. In **2017** winemaking residues bioethanol production could be somewhat reduced due to the smaller grape crop anticipated.

Additional information on the Spanish Wine Sector can be found in GAIN Report [SP1607](#).

⁶ *The distillation of by-products of winemaking is granted with a national support program by which a fixed aid is received per alcoholic content and volume produced (1.1 Euros/Hectoliter and alcoholic content when produced from wine pomace, and 0.5 Euros/Hectoliter and alcoholic content when produced from lees). The product obtained in this supported distillation, with an alcohol content of 92 percent, can only be used for industrial or energy purposes to avoid distortion of competition. Alcohol intended for the beverages market is not granted with this support. As set out by [Royal Decree 548/2013](#), the support to winemaking by-products distillation still applies in the period 2014-2018. Until MY2008/09 the wine alcohol market was overseen by the Spanish Fund for Agricultural Guarantee (FEGA). This entity coordinated the bidding procedure to allocate alcohol obtained by distillers. Since then, the wine alcohol was liberalized and distillers sell directly their products. Industrial processors other than energy producers are normally able to pay higher price for the raw alcohol; hence the level of competition in the purchases of raw material is really high.*

Graph 3. Spanish Wine and Musts Production (1,000 HI)



Source: FAS Madrid based on MAPAMA data.

In the absence of official data on raw materials for biofuels produced in Spain, based on information published on raw materials used for biofuels sold in Spain, and industry sources information we estimate raw materials use as shown in **Table 8**.

Table 8. Raw Material used in the Bioethanol Produced in Spain*

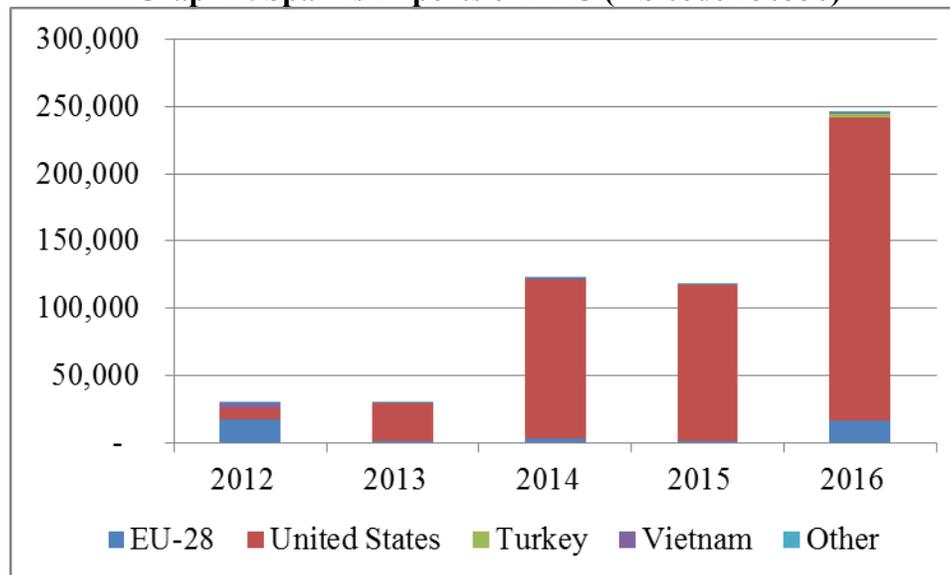
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017e
Corn* (%)	51	44	65	99	95	99	99	85	97
Wheat* (%)	27	36	25	-	4	-	-	12	
Barley* (%)	14	15	5	-	-	-	-		
Wine Alcohol (%)	8	5	5	1	1	1	1	3	3

Source: FAS Madrid estimates and projections based on CNMC data.

**Note: Percentage of the bioethanol produced in Spain. It does not include bioethanol imported and consumed in Spain.*

In **2016**, lower domestic production of bioethanol, and consequently, lower availability of domestic DDG opened up import opportunities for DDG, from U.S. origin in particular.

Graph 4. Spain's Imports of DDG (HS code 230330)



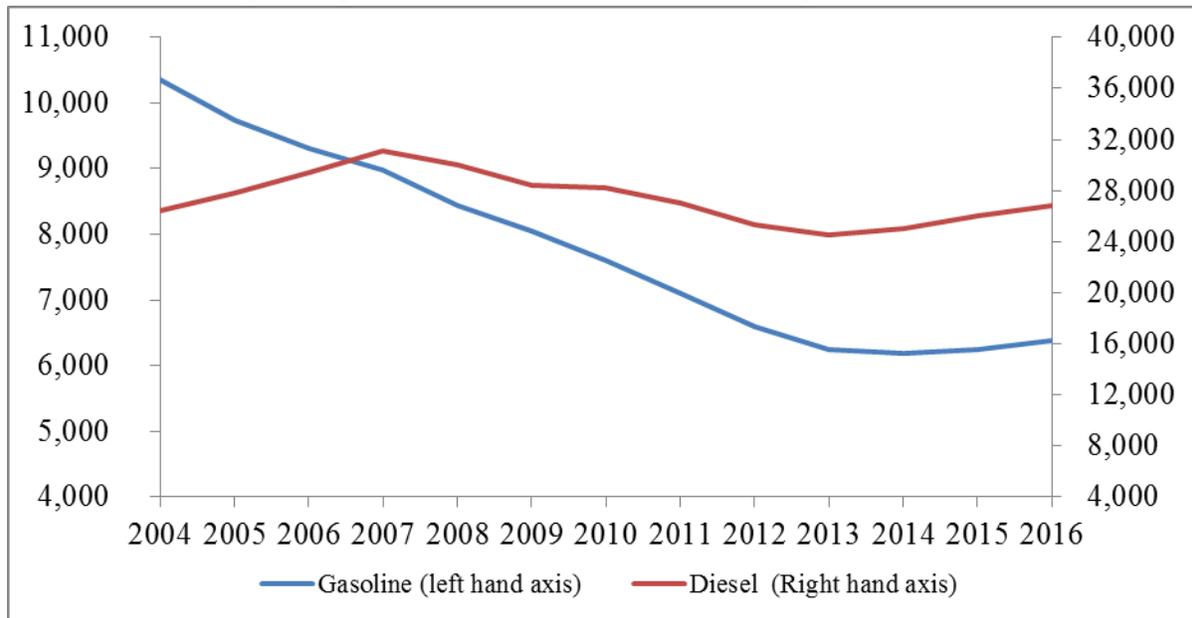
Source: Global Trade Atlas (GTA)

- **Consumption and Marketing**

In the absence of a bioethanol specific target since **2016**, consumption of bioethanol depends on its price competitiveness and petrol's companies need to observe volumetric blending limits. The potential market size is defined by gasoline demand and overall mandate value.

As in the large majority of EU Member States, diesel is the main transport fuel in Spain. However, while the EU diesel-gasoline average ratio is 2:1, in Spain it is 3:1, which means that the potential for ethanol and gasoline to contribute to meeting the RED 10 percent goal is less than is the case in the EU-wide fuel market. Conventional fuel consumption has followed a steady downward trend since **2007** coinciding with the beginning of the economic slowdown. Since **2015** up to present, statistical data (**Graph 5** and **Table 9**) show how gasoline has started to recover.

Graph 5. Spain's Conventional Fuel Consumption (1,000 m³)



Source: FAS Madrid based on CORES and FAS Madrid estimates.

Table 9. Spain's Conventional Fuel and Bioethanol Consumption for Road Transport

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017e
Gasoline (1,000 m³)	8,059	7,610	7,104	6,599	6,249	6,196	6,240	6,382	6,445
Bioethanol (1,000 m³)	299	468	445	396	337	371	375	253	265

Source: CORES, CNMC and FAS Madrid estimates.

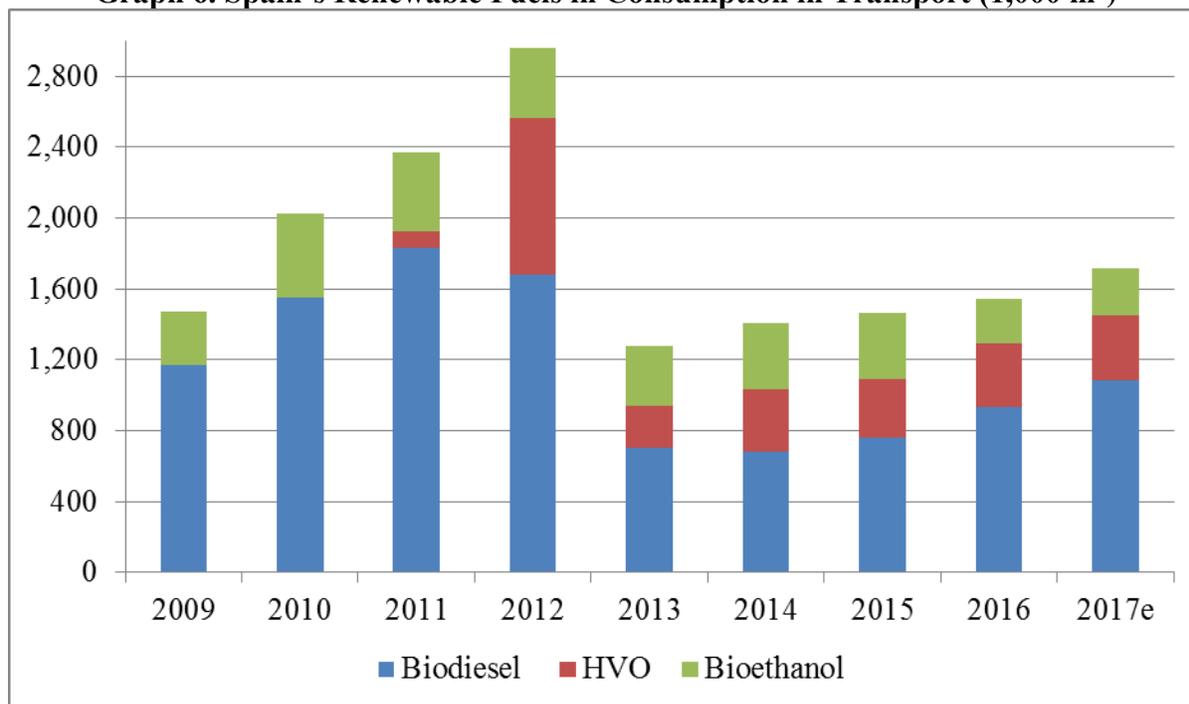
The downward revision of consumption mandates at the beginning of **2013** (**Table 1**) contributed to a bioethanol consumption reduction, which registered its lowest value since **2009** (**Table 9**). However, bioethanol use has ramped up throughout **2014** and **2015**. In **2016**, when fuel-specific mandates for bioethanol was terminated bioethanol hit bottom again.

Industry sources feared that the specific target phase-out may further reduce marketing opportunities for bioethanol producers, as blenders may opt for meeting mandates to a larger extent with biodiesel or HVO, which does not count against the 7 percent blending limit for labeling purposes, but it is eligible for mandate compliance.

Contrarily, statistical data available for the first months of **2017** show a higher bioethanol consumption volume, most likely due to the slight recovery of total gasoline sales and the increase in the overall mandates.

Currently, biodiesel is the main biofuel consumed in Spain and represents nearly 65 percent of the total liquid biofuels consumption in transport, followed by HVO and bioethanol, which account for 20 and 15 percent respectively (**Graph 6**).

Graph 6. Spain's Renewable Fuels in Consumption in Transport (1,000 m³)



Source: FAS Madrid based in CNMC data

In Spain, the large majority of the bioethanol is marketed as ETBE. In **2016**, according to the CNMC's Annual Statistical Release, ETBE represented over 88 percent of the bioethanol sales (See **Table 10**).

Table 10. ETBE Share (%)

Year	2010	2011	2012	2013	2014	2015	2016
ETBE(%)	94.51	89.27	90.79	89.63	84.90	88.24	88.25

Source: CNMC.

The remaining percentage of bioethanol consumption was carried out with direct blending. Only blends with over five percent of bioethanol have to be labeled. Only a small number of petrol stations market this type of blends (**Graph 7**).

Bioethanol labeled⁷ blends presence in petrol stations and summer blending is rather small as, although permitted by [Commission Decision](#) dated November 8, 2013, temperatures negatively affected volatility.

⁷ Blends with volumetric bioethanol content over 10 percent, or volumetric bioethanol content over 5 percent and over 2.7 of oxygen content in terms of mass, should be labeled indicating the biofuel content. In addition, the following disclaimer should be present: "Before using this product, please make sure it is suitable for your engine".

Graph 7. Petrol Stations Marketing Bioethanol Labeled Blends



Source: www.geoportalgasolineras.es

- **Trade**

According to the CNMC latest statistical release, in **2016**, the majority of bioethanol consumed in Spain in was produced domestically (90 percent).

Bioethanol exports⁸ occur mainly at the EU level. The production halt of the grain-based inland plant (Babilafuente), whose production was normally intended for direct blending, and consequently exported to other EU countries, resulted in a sharp reduction of bioethanol exports in **2016** (See **Table 11**).

Table 11. Bioethanol Trade (1,000 m³)

Year	2010	2011	2012	2013	2014	2015	2016
Imports (1,000 m³)	265	198	165	109	100	97	25
Exports (1,000 m³)	227	201	152	200	200	213	99

Source: FAS Madrid calculations based on CNMC data.

⁸ As of January 2012, ethanol for fuel uses is traded under HS code 2207 (220710 is for undenatured ethanol and 220720 for denatured ethanol). Other blends of bioethanol could still be traded under other codes depending on the proportion of the blend. The large majority of imports under HS 2207 to Spain are originated in other EU Member States.

Spain imports consist primarily on ETBE originated in other EU Member States or Brazil. (Table 12). A significant imports reduction took place in 2016 due to competition by alternative renewable fuels, such as biodiesel or HVO as the aftermath of the elimination of the bioethanol specific targets.

Trade actions imposed at the EU level reduced in late 2013 the entrance of extra EU bioethanol to the European market (See GAIN Report NL3034). On June 9, 2016, the EU’s General Court (ECJ) ruled that the anti-dumping duty was invalid (Additional information can be found in GAIN Report E16025). The European Council on July 18, 2016 voted in favor of appealing against the European Court of Justice's (ECJ) decision to annul the definitive Anti-Dumping duty on imports of bioethanol from the United States. Regardless of the final outcome of this case, U.S and other non-preferential trade agreement suppliers to the EU would continue to face hurdles that place them at a competitive disadvantage.

Table 12. Spain’s main ETBE suppliers (1,000 m³)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
EU-28	21	107	261	151	227	135	112	171	25
United States	0	0	189	153	49	0	0	0	0
Brazil	0	29	79	116	89	57	64	39	13
Others	0	32	0	7	5	0	0	0	0
Total	21	109	529	428	371	192	175	211	39

Source: GTA and FAS Madrid estimates.

Future Perspectives

With all other incentives phased out, consumption mandates are the sole drivers for the Spanish biofuel market. The overall consumption targets established for the period 2016-2020 set the pace of growth of the biofuel sector in Spain in the coming years.

Most of the factors create greater opportunities for biodiesel/HVO than for bioethanol. Given the smaller size of the gasoline pool compared to the diesel pool, and the absence of specific targets, the potential for Bioethanol/Bio-ETBE and gasoline to contribute to meeting the RED 10 percent goal is smaller than in the case of biodiesel.

Consequently, consumption of bioethanol will depend on its price competitiveness and petrol’s companies need to observe volumetric blending limits. Trade barriers in place combined with the transposal to national law of Directive 1513/2015 will determine biofuels’ consumption and production dynamics in Spain as of 2018.

Going forward, the future of biofuel in EU is currently under discussion for the 2021-2030 time frame. The Spanish biofuel industry fears the negative effects of a switch towards a GHG emission system.

This could negatively impact their first generation assets' use optimization by limiting crop based biofuels. Second generation biofuels at a commercial stage are not sufficiently developed in Spain.

Related Reports

Report Title	Date Released
<u>EU-28 Biofuels Annual Report 2017</u>	06/28/2017
<u>Biofuels Mandates in the EU by Member State -2017</u>	06/09/2017
<u>EU-28 Biofuels Annual Report 2016</u>	07/04/2016
<u>Biofuels Mandates in the EU by Member State -2016</u>	06/29/2016
<u>Portugal Biofuels Standing Report 2015</u>	08/13/2015
<u>EU-28 Biofuels Annual Report 2015</u>	07/22/2015
<u>Biofuels Mandates in the EU by Member State</u>	07/16/2015
<u>EU-28 Biofuels Annual Report 2014</u>	07/08/2014
<u>Spain's Biodiesel Standing Report 2013</u>	12/13/2013
<u>Spain's Bioethanol Standing Report 2013</u>	11/29/2013
<u>EU-27 Biofuels Annual Report</u>	08/13/2013
<u>Arable Crops Hold Potential despite Record Precipitation</u>	04/26/2013
<u>Spain's Bioethanol Standing Report 2012</u>	09/24/2012
<u>Spain's National Sustainability Scheme</u>	09/03/2012
<u>Spain Enacts Biodiesel Production Quota System</u>	04/24/2012
<u>Spain's Biodiesel Standing Report 2011</u>	11/22/2011