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Spain's Bioethanol Standing Report

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Report Highlights:
This report provides an overview of Spain’s bioethanol sector including Member State specific policy, production supply and demand data. Spain is among the four top EU-27 Member States in terms of bioethanol production capacity and consumption but it has a structural shortfall in bioethanol raw materials.

Disclaimer: This report provides an overview of Spain's bioethanol sector including MS specific policy, production supply and demand data. 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-27 consolidated report.

Executive Summary:

Bioethanol production capacity installed in Spain has not changed in the last five years. However, capacity use rates have declined in the last two years (2012 and 2013). Spain biofuel producers face a declining internal demand driven by lower fuel consumption and the downward revision of mandates. As a result, companies are forced to seek new markets outside Spain, which, in most cases require sustainability compliant bioethanol. Future challenges for the sector include first generation capping and the ILUC factor implementation, currently under debate.

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Abbreviations used in this report

Bioethanol: Ethanol produced from agricultural feedstock used as transport fuel

DDG : Distillers Dried Grains

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

GHG: Green House Gases

ILUC: Indirect Land Use Change

ePURE: European Renewable Ethanol Association
APPA: Spain's Renewable Energies Association
CNE: Spanish National Energy Commission
CORES: Spanish Corporation of Strategic Reserves of Oil-based Products
IDAE: Spanish Institute for Energy Diversification and Saving
MINETUR: Ministry of Industry, Energy and Tourism
MAGRAMA: Ministry of Agriculture, Food and Environment
GOS: Government of Spain
EC: European Commission
EU: European Union
MS: Member State
CAP: Common Agricultural Policy

HS: Harmonized System of tariff codes
MY: Marketing Year
CY: Marketing Year
MT: Metric tones
VAT: Value Added Tax
Q: Quarter of the year (Q1, Q2, Q3, Q4)
N/A: Not available

Energy content and Conversion rates:

Gasoline = 43.10 MJ/kg = 43.1 GJ/MT
Ethanol = 26.90 MJ/kg
1 Toe = 41.87 GJ
1 MT Gasoline = 1,342 Liters = 1.03 Toe
1 MT Ethanol = 1,267 Liters = 0.64 Toe
Bioethanol density = 0.789 MT/m^3

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

Production Capacity

Total bioethanol production capacity installed remains unchanged since 2009. No further production capacity increases are anticipated in the near future (**Table 1**).

Table 1. Spain's Bioethanol Plants

Plant	Location	Company	Bioethanol Prod. Capacity		DDG (MT)	Grain consumption (MT)	Start of Operation
			(MT)	(Million liters)			
Ecocarburantes Españoles	Cartagena (Murcia)	Abengoa 95% IDAE 5%	118,000	150	110,000	300,000	2000
Bioetanol Galicia	Texeiro (La Coruña)	Abengoa 90% XES Galicia 10%	154,000	195	130,000	340,000	2002
Biocarburantes Castilla y León	Babilafuente (Salamanca)	Abengoa	158,000	200	120,000	585,000	2006
			~~Pilot project* 4,000~~	5	-	~~Straw. Enzimatic hydrolisis of glucose.~~	~~2009~~
			Pilot project 25,000	1.5	-	25,000 (Urban Solid Waste)	2013
Bioetanol de la Mancha	Alcazar de San Juan (Ciudad Real)	Acciona - Uriel investments	34,000	33	-	None. Operates on wine alcohol	2006
Total			**464,000**	**583**	**360,000**	**1,225,000**	**-**

Source: FAS Madrid and Industry Sources

*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.

However, a decline in capacity use was registered in 2012 (it only amounted to 65 percent) due to increased competition of imports, Acciona's plant running at lower capacity utilization rate, maintenance operations that the Abengoa's bioethanol plant in Salamanca went through in early spring and in the summer. The impact of these two later factors is anticipated to be lower in 2013. The ample grape crop in 2014 would likely allow for increased production by the Acciona's plant.

Graph 1. Spain's Bioethanol Plants Location

Source: FAS Madrid

Feedstock

On average, about 95 percent of bioethanol in Spain is produced out of grains and the remaining 5 percent 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.

The bioethanol industry consumes over one million metric tons of grains per year and the type of grain used can vary, as the three plants that produce bioethanol out of grains can easily adapt to different feedstocks. While official data are yet to be released, industry contacts indicate that the large majority of the bioethanol was produced out of corn in 2012 and 2013. In 2013 a limited amount of wheat has also been used to produce bioethanol in the inland grain plant.

The Acciona's plant, located in Spain's largest wine producing region, Castile-La Mancha, produces bioethanol out of raw alcohol from produced by domestic distilleries out of residues from winemaking (wine pomace and lees). Due to the low wine production and hence low volume distilled in 2012 and 2013, Acciona's plant has run at low capacity those two years. In 2013, the decline of domestic supplies was offset to a certain extent by alcohol imports originated in Pakistan. The sizeable grape crop anticipated in Spain MY2013/14 would allow for an increase in capacity use rate.

The distillation of by-products of winemaking is currently 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. As set out by Royal Decree 548/2013, the support to winemaking by-products distillation will still apply in the period 2014-2018.

Table 2. Raw material used in Bioethanol produced in Spain*

Year	2009	2010	2011	2012e	2013e	2014f
Corn* (%)	51	44	65	82	92	95
Wheat* (%)	27	36	25	-	4	-
Barley* (%)	14	15	5	-	-	-
Wine Alcohol (%)	8	5	5	4	4	5

Source: CNE and FAS estimates

*Percentage of the bioethanol produced in Spain.

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. Production levels projected for 2013 (**Table 3**) are expected to be somewhat higher compared to the previous year, although additional maintenance needed has prevented from reaching previous years' production levels.

Table 3. Spain's Bioethanol Production

Year	2006	2007	2008	2009	2010	2011	2012	2013e	2014f
Production (1,000 MT)	317	275	250	367	372	365	301	335	340

Source: ePURE, Industry sources and FAS estimates.

Bioethanol production in Abengoa's inland plant (Babilafuente) is entirely sustainable and therefore intended for exports to EU countries. The other two Abengoa-owned plants in port locations supply refineries with ethanol for ETBE production, which at present, does not need to be certified sustainable to meet mandates. When margins are favorable, these plants can also produce sustainable bioethanol to be exported to other countries.

Advanced Biofuels

In the Renewable Energy Directive 2009/28/EC, second generation biofuels will get double credit. This means that biofuels made out of ligno-cellulosic, non-food cellulosic, waste and

residue materials will count double towards the 10 percent target for renewable energy in transport in 2020. However, while the RED has been transposed to National Regulation, no provision on double counting has been specified yet. This will likely be subject of clarification by a Resolution signed by the Undersecretary for Energy within the Ministry of Industry, Energy and Tourism.

At present, experience on advanced bioethanol in Spain is limited to the experimental plants. The experimental barley and wheat straw based pilot plant in Babilafuente (Salamanca), property of Abengoa Bioenergy, has been recently adapted to try Waste to Biofuels technology and the straw-based technology is being implemented at a commercial stage in Hugoton (Kansas).

Consumption and Marketing

After peaking in 2007, total conventional fuel consumption continues to shrink due to the continuing economic crisis. In addition to this ongoing tendency, gasoline consumption, which barely represents 20 percent of fuel for road transport in Spain, continues to lose market share in favor of diesel (**Table 4**).

The combination of these two factors result in lower gasoline use in 2012 compared to 2011, which allowed for mandate compliance with lower consumption of bioethanol (-9 percent) (**Table 6**).

In regards to 2013, on one hand, as bioethanol prices remain competitive, petrol companies are opting for higher blends (average monthly blend throughout 2013 up to August amounted to 6.05 percent). On the other hand, the ongoing decline of gasoline consumption (**Table 4**), the downward revision of consumption mandates (**Table 5**) along with the obligation to keep protective petrol pumps in petrol stations and the low demand for labeled blends force consumption down (**Table 6**). Additionally, the exception to the hydrocarbons tax does not apply to biofuels since January 2013. In 2012 the hydrocarbon tax used to serve as a bigger incentive than the mandate breach fines (0.401 Euros/liter compared to 0.177 Euros/liter), however, according to Resolution by the Secretary of State dated July 8, 2013, since 2013 the mandate breach adds up to 0.386 Euros/liter.

Table 4. Spain's Conventional Fuel Consumption for Road Transport

Year	2006	2007	2008	2009	2010	2011	2012	2013e
Gasoline (1,000 MT)	6,931	6,688	6,288	6,005	5,670	5,293	4,917	4,700

Source: CORES and FAS Madrid estimates.

Table 5. Spain's Bioethanol specific mandate (percentage in terms of energy)

Year	2008	2009	2010	2011	2012	2013
Bioethanol specific mandate (%)	1.9	2.5	3.9	3.9	4.1	3.9
Overall mandate (%)	1.9	3.4	5.83	6.2	6.5	4.1

Source: Orden ICT/2877/2008. Ministry of Industry, Tourism and Trade and Royal Decrees 1738/2010 and 459/2011 and Royal Decree-Law 4/2013.

Table 6. Spain's Bioethanol Consumption for Road Transport

Year	2008	2009	2010	2011	2012	2013e
Bioethanol (1,000 MT)	144	236	354	356	323	320

Source: Based on CORES data and FAS Madrid Estimates.

The large majority of the bioethanol marketed in Spain is ETBE (over 89% according to the 2011 CNE's Annual Report). E5 (99%) is the main bioethanol blend, being other blends (E10 or E85) practically negligible. Bioethanol labeled blends presence in petrol stations is rather small and summer temperatures limit blending possibilities as gasoline volatility is negatively affected. According to CNE, in 2012, bioethanol labeled blends only represented 0.16 percent to total bioethanol sales in volume.

Trade

With a fixed production capacity, provided that production projections are fulfilled, the reduced consumption incentive will result in an increased exportable supply of bioethanol in 2013 (**Table 7**). In general, it can be assumed that all ethanol produced for export meets the sustainability criteria laid out in the RED.

Table 7. Trade balance (1,000 MT)

Year	2008	2009	2010	2011	2012	2013e
Production (1,000 MT)	250	367	372	365	301	335
Consumption (1,000 MT)	144	236	354	356	323	320
Net Trade (1,000 MT)	106	131	18	9	-22	15

Source: FAS Madrid calculations based on production and consumption data.

Bioethanol exports occur mainly at the EU level as the market for bioethanol in Spain is limited

and consist mainly on undenatured ethyl alcohol, with Italy and the United Kingdom being the main destinations.

On the contrary, imports to Spain consist primarily on ETBE originated in Brazil or the United States. In 2012 extra EU imports declined significantly in favor of EU imports, which gained quota (**Table 8**).

As of January 2012, ethanol for fuel uses is imported under HS code 2207 (220710 is for undenatured ethanol and 220720 for denatured ethanol). Other blends of bioethanol could still enter 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.

Trade actions imposed at the EU level have reduced the entrance of extra EU bioethanol to the European market. For instance, on February 23, 2013, the EC imposed an anti-dumping duty on bioethanol imports from the United States. For more information on anti-dumping duties imposed by the EU, see GAIN Report NL3034.

Table 8. Spain's main ETBE suppliers (1,000 MT)

Year	2008	2009	2010	2011	2012	S1 2012	S2 2013
EU-28	16	54	196	113	158	102	32
United States	0	0	142	115	37	8	0
Brazil	0	22	59	87	72	33	14
Others	0	6	0	5	4	4	0
Total	**16**	**82**	**397**	**321**	**271**	**148**	**46**

Source: GTA

Spain Specific Policy for Biofuels

Since January 2013 the legal incentive for biofuels consumption in Spain is only based in a consumption mandate, as the tax exemption for biofuels expired. The hydrocarbon tax reduction in 2012 represented a higher incentive for blending since it amounted to 0.401 Euros/liter – applicable to the share of bioethanol contained in the blend - and the cost mandate breach adds up to 0.177 Euros/liter in the case of bioethanol. However, according to Resolution by the Secretary of State dated July 8, 2013, since 2013 the mandate breach adds up to 0.385 Euros/liter. Consumption mandates were revised down at the beginning of 2013. The downward revision of consumption targets has contributed to the reduction of Spain's bioethanol market size.

Other governing regulation in the biofuel sector includes the Fuels Technical Specifications that establishes the technical conditions to place biofuels blends in the Spanish market.

- **Biofuel use targets**

Biofuel use targets for 2013 were revised down by Royal Decree-Law 4/2013 to support entrepreneurs and boost economic growth and job creation. As a consequence, the overall energy based mandate for biofuel use has been moved from 6.5 percent to 4.1 and the bioethanol specific mandate from 4.1 to 3.9 as shown in **Table 9**. This downward revision of mandates has reduced Spain's biofuels market size in 2013. Consumption targets will remain stable in coming years unless otherwise specified.

Table 9. 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

Source: Orden ICT/2877/2008. Ministry of Industry, Energy and Tourism and Royal Decrees 1738/2010 and 459/2011 and Royal Decree-Law 4/2013

* According to MINETUR Resolution dated January 7th, 2011

CNE, Spain's independent regulator of the energy markets, is responsible for mandate monitoring and control through a certificate system. Since 2013, fines of 763 Euros are imposed per certificate/metric ton of oil equivalent that the obliged party failed to market, which equals to 0.386 Euros/liter in the case of bioethanol. Latest available data on mandate compliance are shown in **Table 10**.

Table 10. Mandate Compliance (percent in terms of energy)

Year	Overall		Bioethanol specific		Biodiesel specific	
	Mandate	Consumption	Mandate	Consumption	Mandate	Consumption
2008	1.9	1.94	-	1.4	-	2.07
2009	3.4	3.43	2.5	2.49	2.5	3.67
2010	5.83	4.87	3.9	3.88	3.9	5
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	N/A	3.9	N/A	4.1	N/A

Source: CNE

*Based on provisional data up to December 2012

The Canary Islands, Ceuta and Melilla are granted with a territorial exemption which translates into no biodiesel-specific mandate and reduced targets as shown in **Table 11**.

Table 11. Territorial Exemption on Biofuel Consumption (percent in terms of energy)

Year	Overall mandate	Bioethanol specific mandate
2011	4.7	3
2012	5.5	3.4
2013	5.7	3.8

Source: Order IET/631/2012. Ministry of Industry, Energy and Tourism

- **Technical fuel specifications**

The EU adopted Directive 2009/30 in April 2009 enabled fuel operators to market B7 and E10. Royal Decree 1088/2010 released in September 2010, transposed the mentioned Directive into national regulation and increased accordingly the biodiesel content allowed from 5% to 7% and the bioethanol content permitted from 5% to 10%.

Blends with volumetric biodiesel content over 7 percent, or 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”. In the case of diesel blends, HVO content does not count against the 7 percent limits for labeling purposes, but it is eligible for mandate compliance.

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 5 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. This regulation limits the quantities of bioethanol that can be marketed until the end of 2013.

- **Transposition of the RED into national regulation**

Royal Decree 1597/2011, prepared by the former Ministry of Industry, Tourism and Trade (current Ministry of Industry, Energy and Trade), transposed sustainability criteria to national regulation, defined Spain’s National Scheme for verification of compliance and transposed those provisions in the Directive related to double credit for certain biofuels.

Initially, sustainability was projected to be required as of January 2013. However, in early 2013 the GOS established a delay *sine die* in the implementation. The date for sustainability requirements will be established by a Resolution that will be provided with at least an eight months grace period prior to its enforcement, and then a transitory period will be observed until the verification system is fully in place **(Table 12)**.

During the current interim period, prior to the transitory period, obliged parties are only requested to provide the CNE - which will eventually oversee sustainability compliance under the national scheme - with information regarding the type of biofuel marketed, the feedstock used, its origin and the place where the biofuel was produced. While not mandatory until the transitory period begins, GHG reduction and soil use can be optionally reported. Once the verification system is fully in place, those producers who decide to abide by the national scheme rules, as opposed to using private schemes, will have their Responsible Declarations verified by Spain's verification entity, the CNE.

In the absence of a national scheme, to certify that their production is sustainable, the biofuel industry has opted for EC approved company schemes to export sustainability-compliant bioethanol to third countries markets.

Table 12. 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)	Obliged parties must give information on: • type of biofuel • origin • feedstock • origin Optionally: • GHG reduction • Soil use
February 2013	Royal Decree-Law 4/2013	Establishes a *sine die* 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.	
Pending	Resolution by Under Secretary of Energy	Beginning of a 8 months **grace period**	
8 months after Resolution by Under Secretary of Energy	-	Beginning of a **transitory** period (to allow for the progressive adaptation of the verification system)	Obliged parties must give information on: • type of biofuel • origin • feedstock • origin • GHG reduction • Soil use

			Sustainability compliance is accredited using private schemes or Responsible Declaration.
Undetermined		**S**ustainability verification system fully in place	Obliged parties must give information on: • 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

Future Perspectives

Investment decisions in the biofuel sector where taken under a different price stability scenario and a different regulatory framework. Until now, the Spanish bioethanol sector has managed to cope with price volatility, competition from imports and the reduction of the domestic market size by adjusting production and seeking new markets.

The main challenges faced by the Spanish bioethanol producer include regulatory changes in regards to consumption targets, taxation and side effects of pieces of regulation currently under discussion such as ILUC or capping of first generation biofuels.

During a few years the internal demand has been driven by consumption mandates and was further incentivized by the hydrocarbon tax exemption. With no tax incentives for biofuels consumption, the only measure in place to boost consumption is the consumption target. Consumption mandates, which are critical to define the size of the domestic market, are expected to remain flat in the coming years, until further notice.

Other regulatory measures that would affect the biofuel sector are the capping of first generation biofuels and the implementation of an ILUC factor.

Setting a too restrictive cap for crop-based biofuels that can count towards targets would represent a challenge for renewable fuels use in transport compliance. Second generation bioethanol industry in Spain is not developed enough yet. Meeting targets under restrictive conditions for first generation biofuels would not be possible unless favorable accountability methods for non-crop based biofuels or alternative energy sources for transport are put in place.

The Spanish industry defends that the positive side effects of first generation biofuel production, as increased protein availability for feed use, should be taken into consideration before setting a limit for their contribution to meet the 2020 goals.

The introduction of ILUC factor is currently under discussion in Brussels. The Spanish domestic industry vegetal oil and biofuel industry is opposed to its implementation both for reporting and for accounting in regards to GHG savings, arguing that more research is needed so that a higher predictability of results is obtained.

Related Reports

Report Title	Date Released
EU-27 Biofuels Annual Report	8/13/2013
Arable Crops Hold Potential despite Record Precipitation	4/26/2013
Spain’s Bioethanol Standing Report 2012	9/24/2012
Spain’s National Sustainability Scheme	9/3/2012
Spain Enacts Biodiesel Production Quota System	4/24/2012
Spain’s Biodiesel Standing Report 2011	11/22/2011