BIOFUELS DEMAND FORECASTS

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SQUARECO

1.0 SUMMARY

Introduction to the new version

This is the first draft of our new version of the Biofuels Demand Forecasts, the result of an intense work during the past months to represent the reality of the European biofuels market more accurately and exhaustively. Ahead of the crucial deadline of 2020 when the RED and FQD targets shall be mandatory, this new version allows to track more precisely where each country stands and what it would take in terms of Fame, HVO, ethanol and other renewable alternatives' volumes to reach them.

All the tables have been re-designed to display a unique level of details about the products and their feedstocks used on the European biofuels market.

They are the result of a complete reworking of our forecast model. In order to consolidate our numbers with more coherency, we have designed a version of it applicable to all countries that allows us to make sure that all feedstocks, their corresponding GHG performance and their eventual caps, are considered.

Please bear in mind that this is a first draft that will be improved in the coming months, with the following objectives:

- Add new feedstocks including Technical Corn Oil for HVO
- Add Starch Slurry into the single counted section, as some countries like France do not consider it as a DC waste
- Improve our LPG, CNG, bionaphta and biomethane numbers thanks to new sources
- Integrate renewable electricity used by road cars
- Integrate a section for maritime and aviation renewable fuels
- Consider the future impact of the Brexit
- Include data about UERs certificates as soon as they are available
- Improve the accuracy of GHG savings values for each country
- Provide more transparency about GHG savings values
- Provide more transparency about conversion units (densities and energy contents)

Comments about new methodology

General

- All figures are expressed in kilo metric tons (KT)
- “BIODIESEL” includes Fame blend, B100 generating tickets, HVO blend and HVO generating tickets
- “ETHANOL” includes ethanol blend, ethanol in ETBE and ethanol in E85/ED95 generating tickets
- “FAME” section includes the pure vegetable oil (relevant for Austria mainly) and “off-road biodiesel” (UK)
- “HVO” section includes all diesel from biological origin
- All the biomethane used in Europe is assumed to be made from feedstocks listed at the Annex IX Part A of the ILUC Directive, thus accounting against the advanced sub-targets
- Our numbers for LPG and CNG are based on a study by AEGPL Europe (2016) and the European Alternative Fuels Observatory (2018), respectively. We’ll gain more visibility about the these outlets in the coming months.

Feedstocks

- Brown grease is included within “UCO”
- Waste pressings are included within “other minor wastes”
- Triticale and rye are included within “wheat”
- Biopropane (residue of HVO production used in the UK) is included within “biomethane”
- The feedstock mix of ethanol is based on (1) historical data when available (mostly Top 15 countries) or, (2) EU average estimation published by Epure

GHG values

- As several markets still rely on default values, we assumed it would be more relevant to use a benchmark for actual values seen in the market as they will be more widely used in 2020, when the FQD target shall constitute a driver for several countries (see below)
- Obviously the most adapted benchmark is the German one as it is the most advanced in terms of reporting (BLE data)
- We will work more specifically for each country in the coming months thanks to cross-check of various sources and market comments

Conjunctural features

- The current investigation about the fake POS used for UCOME by a Dutch producer has yet to provide hard facts. Neither the magnitude of the fraud or the actions to be taken by authorities (withdraw or not of the certificates) are known. Consequently, we did not take any bet on the outcome of this massive fraud, which is not reflected into our numbers

Comments about new methodology

- The application of the FQD 6% GHG reduction remains highly uncertain in a number of countries where no penalty has been set in case of non-compliance. We assumed the FQD target would be a demand driver only in the countries where the regulatory frame work is constringent (Germany, Czech R, UK, etc) and/or where operators are reportingly getting ready to hit it (Italy)
- As it remains extremely difficult to anticipate the availability of UERs certificates from next year, we display for now anticipated GHG reductions without the use of these certificates. We'll provide more transparency about the UERs role as soon as the outlook gets less blurry
- Note that we updated our numbers only for the main markets (Top 15) from the latest update
- The final numbers for 2018 (based on final official data to be soon available) and our analysis of the 2019+2020 figures will be published in our next issue (Q4)

Warning

We built our model to answer, for each country, the following question: what volumes of each kind of biofuels are needed to reach the blending mandate given the infrastructure constraints? We continue to work on the supply side with the medium-term objective to integrate more data about capacity and production in our models.

The volumes displayed in our publication are those shown to national institutions to prove compliance. For example, if an obligated distributor shows tickets of RME, but blend physically SME, that volume will appear in our numbers under RME. That is because it is simply impossible to track exact physical volumes due to the mass balance system. That said, we believe that when numbers are consolidated on a national level, the spread between tickets and physical reality remains small.

The type of our methodology is bottom-up: we work on national models with very specific data and then consolidate the numbers to have the global European picture.

1.1 FRANCE

MANDATES		2018	2019	2020
Biofuels		-	-	-
Diesel bio substitutes	% e.c	7.7%	7.9%	8%
Gasoline bio substitutes	% e.c	7.5%	8%	8.2%
Advanced sub-target	% e.c	-	-	0.1% (diesel)
Obligation GHG		-	-	-

FOSSIL FUELS	2018	2019	2020
Diesel fossil	36 318	35 929	35 748
Gasoline fossil	7 208	7 445	7 577
LPG	80	80	80
CNG	0	0	0

BIODIESEL		2018		2019		2020	
		Fame	**HVO**	**Fame**	**HVO**	**Fame**	**HVO**
Single counted		**2 754**	**343**	**2 684**	**367**	**2 649**	**367**
Crop SC	Rapeseed	1 747	0	1 659	0	1 659	0
	Soybeans	616	0	607	0	590	0
	Palm	312	343	317	367	299	367
	Sunflower	70	0	92	0	92	0
By-prod/wastes SC	PFAD	0	0	0	0	0	0
	Tallow C3	9	0	9	0	9	0
	Wastes (issues certif)	0	0	0	0	0	0
Double counted		**158**	**0**	**196**	**0**	**194**	**0**
Annex IX Part B DC	UCO	144	0	179	0	176	0
	Tallow C1/C2	13	0	18	0	18	0
Other wastes DC	Acids oils	0	0	0	0	0	0
	SBE	0	0	0	0	0	0
	Food wastes	0	0	0	0	0	0
	Other minor wastes	0	0	0	0	0	0
Advanced DC		**0**	**0**	**0**	**0**	**22**	**0**
Annex IX Part A DC	POME/EPFB	0	0	0	0	22	0
	Tall oil/Forest residues	0	0	0	0	0	0
	Crude Glycerine	0	0	0	0	0	0
	Tire pyrolysis oil	0	0	0	0	0	0
Total	**All feedstocks**	**2 912**	**343**	**2 880**	**367**	**2 864**	**367**

2018

- Customs have yet to release the final TGAP accounts for biofuels obligations so there is no new data to integrate in our models
- In the absence of official data for the ethanol feedstock mix (newly integrated in our models), we applied EU average estimates made by the ethanol industry
- Some starch slurry, which is not double counted in France, is used but the structure of our model has yet to reflect that specificity
- Note that we'll further adapt our models in November to separate starch slurry SC and DC

2019

- Sales of B100 have reportedly increased this year
- Although the lack of information about the market size makes the bet highly uncertain, we decided to include a small demand of 5 KT per month of RME into our numbers
- Otherwise, no new development was included in our assumptions compared to the latest update

1.1 FRANCE

ETHANOL		2018	2019	2020
Single counted		**590**	**664**	**690**
Crop SC	Corn	262	295	307
	Wheat	197	221	230
	Barley	0	0	0
	Sugarbeet	99	111	115
	Sugarcane	32	37	39
Double counted		**0**	**0**	**0**
Other wastes DC	Starch slurry	0	0	0
	Food wastes	0	0	0
	Whey Permeate	0	0	0
Advanced DC		**38**	**43**	**47**
Annex IX Part A DC	Bagasse	0	0	0
	Grape Marcs/wine lees	38	43	47
	Straw	0	0	0
	Cellulosic	0	0	0
Total	**All feedstocks**	**628**	**708**	**738**

OTHER BIOFUELS	2018	2019	2020
B100 (not generating tickets)	0	0	0
HVO100 (not generating tickets)	0	0	0
Bionaphta	84	87	90
Biomethanol	0	0	0
Biomethane	0	0	0

COMPLIANCE		2018	2019	2020
Diesel bio share	% e.c	7.71%	7.86%	7.91%
Gasoline bio share	% e.c	6.42%	6.89%	7.05%
Advanced (Annex IX Part A)	% e.c	0.10%	0.11%	0.21%
Overall bio share	% e.c	7.48%	7.68%	7.74%
Crop share	% e.c	6.03%	6.02%	6.00%
Annex IX Part B	% e.c	0.52%	0.65%	0.64%
Diesel GHG reduction	%GHG	4.86%	4.94%	4.96%
Gasoline GHG reduction	%GHG	4.72%	5.04%	5.16%
Fuels GHG reduction excl. UERs	%GHG	4.13%	4.26%	4.29%

2020

- Like for the majority of EU countries, we decided to ignore the FQD obligation
- Local sources report that it is unlikely that the 6% GHG reduction will be legally binding; in this regard, no penalty should apply
- The main change is the indirect mandate for advanced biodiesel (0.1% e.c) that should be covered through small (22 KT) quantity of POME ME
- We worked with the assumption that B100 sales would progress further to 7 KT/month
- The ethanol consumption will continue to grow fast with the development of E10 sales and the increase of the mandate to 8.2% e.c

1.2 GERMANY

MANDATES		2018	2019	2020
Biofuels		-	-	-
Diesel bio substitutes		-	-	-
Gasoline bio substitutes		-	-	-
Advanced sub-target	% e.c	-	-	0.05%
Obligation GHG	% GHG	4%	4%	6%

FOSSIL FUELS	2018	2019	2020
Diesel fossil	34 734	34 152	32 368
Gasoline fossil	16 392	16 508	16 341
LPG	420	420	420
CNG	65	65	65

BIODIESEL		2018		2019		2020	
		Fame	HVO	Fame	HVO	Fame	HVO
Single counted		**1 406**	**33**	**1 355**	**33**	**1 620**	**250**
Crop SC	Rapeseed	766	0	805	0	995	0
	Soybeans	57	0	30	0	35	0
	Palm	568	33	505	33	575	250
	Sunflower	15	0	15	0	15	0
By-prod/wastes SC	PFAD	0	0	0	0	0	0
	Tallow C3	0	0	0	0	0	0
	Wastes (issues certif)	0	0	0	0	0	0
Double counted		**914**	**0**	**805**	**0**	**1 000**	**380**
Annex IX Part B DC	UCO	914	0	805	0	1 000	380
	Tallow C1/C2	0	0	0	0	0	0
Other wastes DC	Acids oils	0	0	0	0	0	0
	SBE	0	0	0	0	0	0
	Food wastes	0	0	0	0	0	0
	Other minor wastes	0	0	0	0	0	0
Advanced DC		**0**	**0**	**0**	**0**	**0**	**0**
Annex IX Part A DC	POME/EPFB	0	0	0	0	0	0
	Tall oil/Forest residues	0	0	0	0	0	0
	Crude Glycerine	0	0	0	0	0	0
	Tire pyrolysis oil	0	0	0	0	0	0
Total	**All feedstocks**	**2 320**	**33**	**2 160**	**33**	**2 620**	**630**

2018

- The BLE official data is not ready yet so we kept all our figures and conclusions unchanged from the previous forecast

2019

- Interviews of local players suggest many obligated parties are now likely to cut part of the big surplus of tickets accumulated during the past years as they won't be allowed to use them in 2020
- The Q1 BAFA figures, together with market comments about the weakness of the German market, also suggest the market will contract significantly
- Consequently, we sharply decreased our numbers for both Fame and ethanol consumption to reflect the switching fundamentals
- Our model now shows a 3.82% GHG compliance, that would cut the ticket surplus by 1/3
- The scenario according to which biofuels blending would crash further into the second half of the year if obligated parties decide to use more tickets remains very possible
- The development of the B100 market is reportedly under-going but sources confirmed this is a slow process; we assumed an average of 5 KT per month would be sold in average this year, jumping to 10 KT per month in 2020 (and thus pushing back the Fame blend wall by 120 KT, decreasing the need for HVO)

1.2 GERMANY

ETHANOL		2018	2019	2020
Single counted		**1 214**	**1 098**	**1 264**
Crop SC	Corn	577	527	606
	Wheat	481	439	505
	Barley	72	61	71
	Sugarbeet	48	31	37
	Sugarcane	36	40	45
Double counted		**0**	**0**	**0**
Other wastes DC	Starch slurry	0	0	0
	Food wastes	0	0	0
	Whey Permeate	0	0	0
Advanced DC		**2**	**2**	**3**
Annex IX Part A DC	Bagasse	2	2	3
	Grape Marcs/wine lees	0	0	0
	Straw	0	0	0
	Cellulosic	0	0	0
Total	**All feedstocks**	**1 216**	**1 100**	**1 267**

OTHER BIOFUELS	2018	2019	2020
B100 (not generating tickets)	0	0	0
HVO100 (not generating tickets)	0	0	0
Bionaphta	0	0	0
Biomethanol	0	0	0
Biomethane	55	55	65

COMPLIANCE		2018	2019	2020
Diesel bio share	% e.c	7.74%	7.24%	11.85%
Gasoline bio share	% e.c	4.33%	3.91%	4.52%
Advanced (Annex IX Part A)	% e.c	0.24%	0.24%	0.29%
Overall bio share	% e.c	6.80%	6.32%	9.61%
Crop share	% e.c	3.60%	3.43%	4.11%
Annex IX Part B	% e.c	2.59%	2.31%	2.92%
Diesel GHG reduction	% GHG	4.54%	4.28%	6.70%
Gasoline GHG reduction	% GHG	3.83%	3.45%	4.01%
Fuels GHG reduction excl. UERs	% GHG	4.15%	3.87%	5.69%

2020

- The anticipated availability of UERs certificates remains a major uncertainty to forecast the German market next year
- A broad consensus emerged to highlight the clear deficit compared to the 1.2% cap
- We decided to take a bit more aggressive approach with the share of UERs being decreased to 0.4% in our model
- The fact that the 6% GHG reduction must be achieved without tickets is a very bullish driver for high GHG savings biofuels next year
- We assume the B7 blend wall will be hit (2.46 million mt)
- We increased the GHG savings assumption for HVO, as a big share of it will be waste based to offer a high GHG performance
- Since no tallow is allowed in Germany, there is a non-negligible impact on the foreseen UCO demand (+ 400 KT at least)
- We assumed the 0.05% target would be largely covered with the waste based ethanol already used since several years