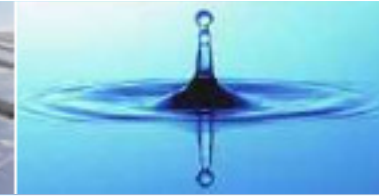




WIP



The Bioethanol Market Situation in EU27

4F Crops Workshop 'Market Needs of Non-food Crops'

17 September 2008, Bologna, Italy

Dr. Rainer Janssen
WIP – Renewable Energies, Munich





Content

- **Potential benefits and drawbacks of biofuels**
- **The New EU Energy Policy – (Draft) RE Directive**
- **Global Biofuels Production**
- **EU Bioethanol Production and Consumption**
- **Bioethanol in Selected EU Countries**
- **Raw Material and Feedstock Use**
- **Measures to Promote EU Bioethanol Market**



Potential Benefits of Biofuels

- Reduction of **GHG Emissions**
- Reduction of air pollution (CO, SO₂, PM)
- Improvement of **energy security**
- Reduction of oil imports, **diversification** of energy sources and technologies
- Development of new agricultural markets, income generation in rural areas



Potential Drawbacks of Biofuels

- **Higher fuel production costs**
- Increase of some pollutant emissions (NO_x , aldehyde)
– compliance with emission norm EURO 4
- Vehicle/fuel system modifications – **technical limits** to blending (B/E5), limits on the vapour content of petrol
- Higher crop and crop product prices (**food-fuel competition**)
- **Negative environmental impacts**



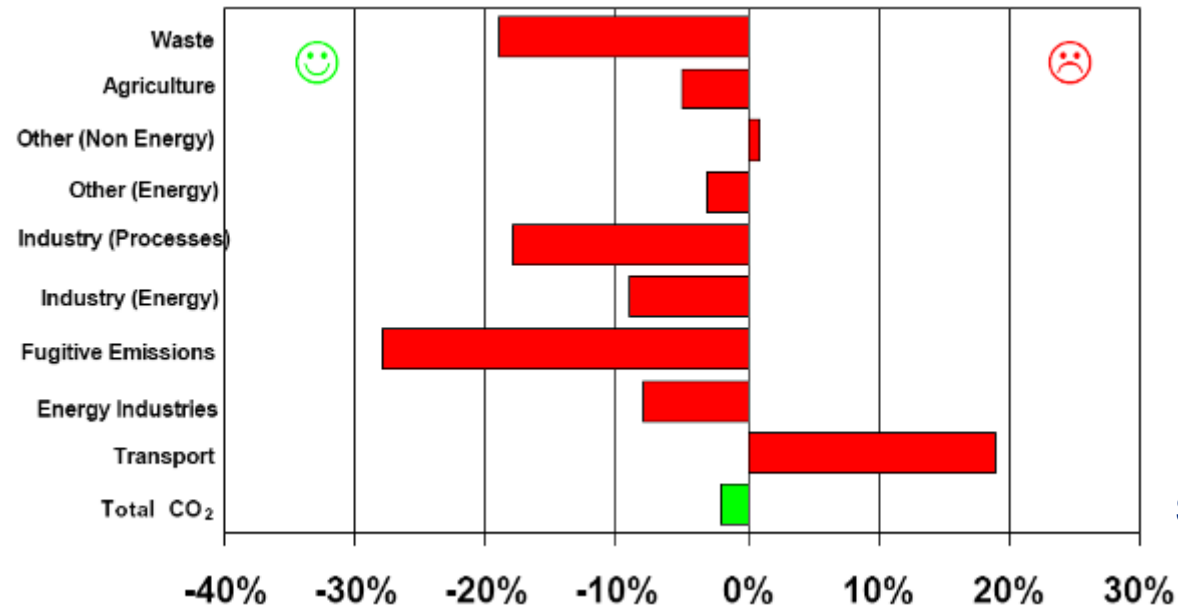
Cleaner Transport – The Wider Context

- 1997 – **EU White Paper, Energy for the future: Renewable sources of energy**
 - Increasing the contribution of RE sources from 6% to 12% of EU gross energy consumption by 2010
- 2000 – **EU Green Paper on the security of energy supply**
 - Europe imports 50% of its total energy needs
 - Import dependence of the transport sector: 80%
 - Target of 20% substitution of conventional fuels by biofuels, natural gas and hydrogen by 2020



- 1997 – **Kyoto Protocol** on the reduction of GHG emissions (entered into force on 16 February 2005)
 - EU Commitment: 8% reduction of annual GHG emissions by 2010 (compared with the 1990 level)
 - Transport sector: 28% of Europe’s CO₂ emissions

EU GHG Emissions (1990-1999)



Source:EEA



Energy Policy for Europe – Jan/March 2007

- **3 Energy Challenges: Climate Change -- Security of Supply -- Competitive EU Economy**
- **Targets and Objectives**
 - Reducing **GHG emissions by 20% by 2020** compared to 1990
 - Improving **Energy Efficiency by 20% by 2020**
 - Raising the share of **RE to 20% by 2020**
 - Increasing the level of **Renewable Fuels (incl. biofuels) in transport to 10% by 2020**
 - **National Action Plans** (Energy mix decided by MS)



EU Biofuels Directive

- Directive on the promotion of the use of biofuels or other renewable fuels for transport (2003/30/EG) – 8 May 2003
- Directive restructuring the Community framework for the taxation of energy products and electricity (2003/96/EG) – 27 October 2003

 Legislative framework for Member States to promote biofuels (e.g. tax exemption, biofuel obligations)

 Indicative Targets

- **2% by 2005**
- **5,75% by 2010**



Biofuels Progress Report (Jan. 2007)

Failure of directive's target is **not 'justified'**
(1% in 2005 ↔ Target: 2%)

- ➔ Signal of determination to reduce its dependence on oil and move to a low carbon economy
- ➔ Set **minimum standards** for the share of biofuels in 2020 (10%) – binding target
- ➔ Discourage poor-performing biofuels, **encourage biofuels with good environmental** and supply security performance



Proposal for RE Directive (23 January 2008)

Directive on the Promotion of the Use of Energy from Renewable Sources

- National Targets for the share of RE in 2020; EU-wide: 20% (e.g. Germany: 15%, Slovenia: 25%, Sweden: 49%, UK: 15%)**
- Member States shall introduce appropriate measures to reach national targets**
- Each Member State shall ensure that share of renewable sources in transport in 2020 is at least 10% of final consumption of energy in transport (only petrol and diesel)**



Directive Art. 15 – Environmental Sustainability Criteria

Biofuels will only count to national targets, renewable energy obligations, or be eligible for financial support, if:

- ➔ GHG emission savings shall be at least 35%**
- ➔ Biofuels shall not be made from raw material obtained from land with recognised high biodiversity value (e.g. undisturbed forest, highly biodiverse grassland)**
- ➔ Biofuels shall not be made from raw material obtained from land with high carbon stock (e.g. wetlands, cont. forested areas)**
- ➔ Agricultural raw materials cultivated in the EU shall comply with good agricultural and environmental conditions**



RE/Biofuels Directive – On-going Discussion

- The RE Directive is currently under negotiation at MS level
- Heavy criticism of the 10% target is triggered by high food prices (food-fuel competition)
- Criticism includes the ‘low’ requirements of GHG savings, and the failure to include social criteria

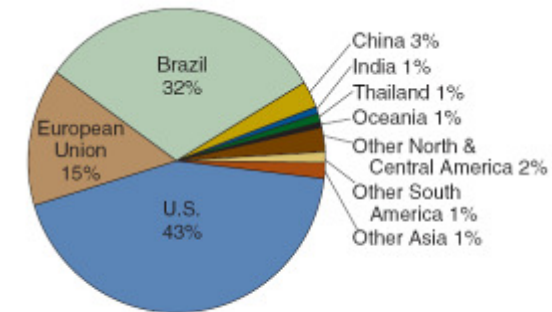
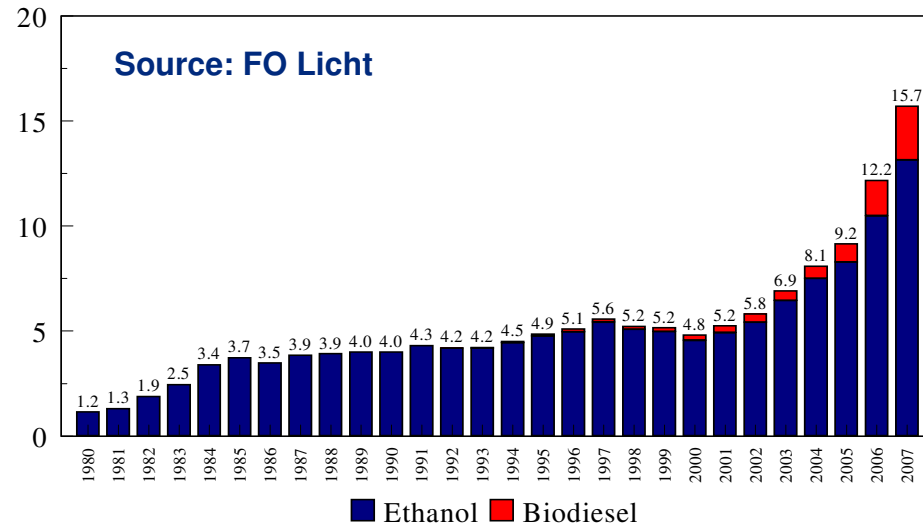
➔ Green MEPs (and several NGOs) have called on the Commission to place a **moratorium on the 10% biofuel target**

➔ The Dutch Minister Cramer (Environment) demands **stricter criteria for biofuels** than those set by the EC (e.g. GHG reductions of 50% or even 60%)



Global Biofuels Production 2007

Billion gallons

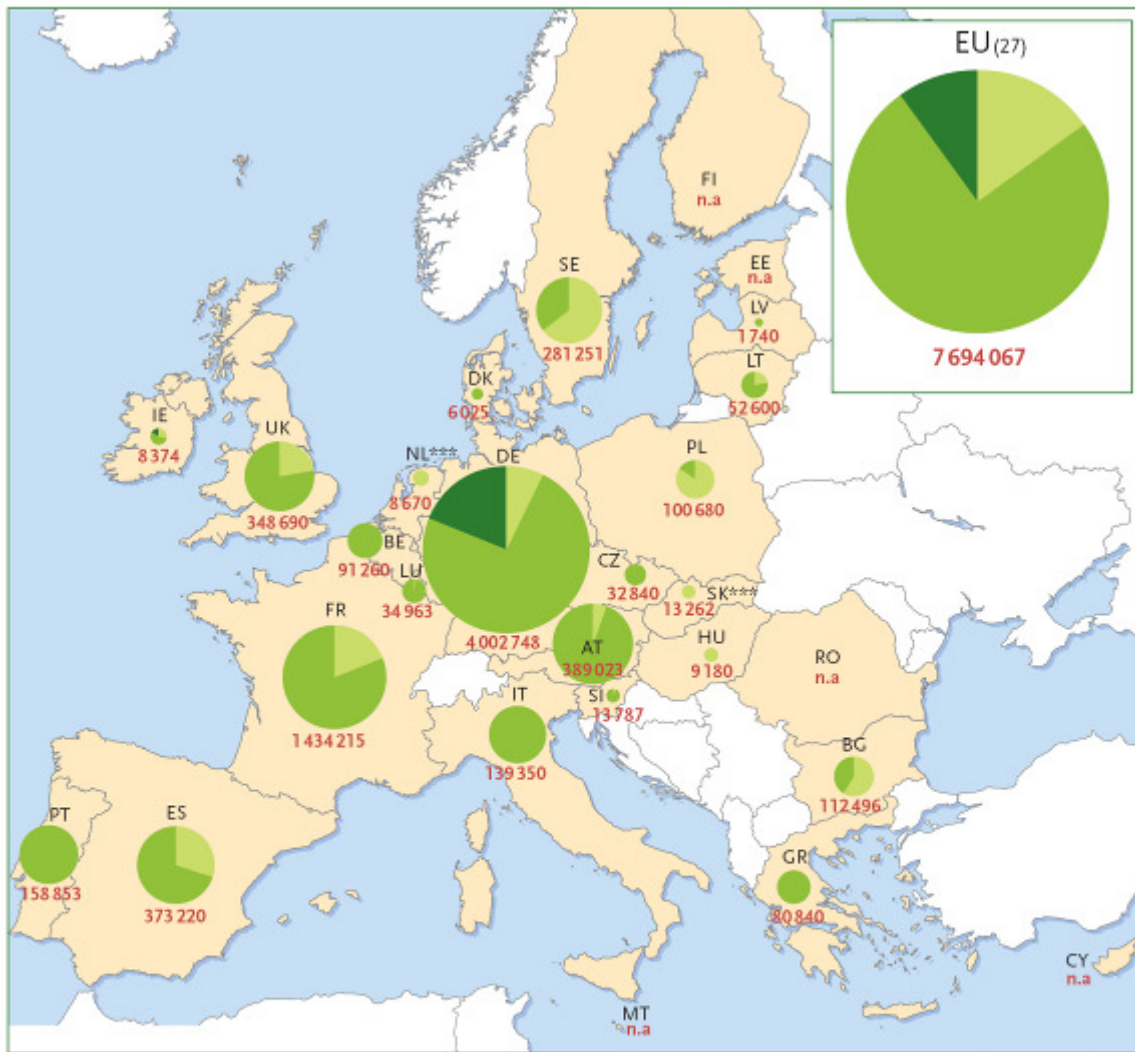


Source: FO Licht, includes only ethanol for fuel.

Global Biofuels Production

- **Total Biofuels Production (2007): 59.4 billion litres (15.7 billion gallons)**
- **Total Bioethanol Production: ~ 50 billion litres**
 - **USA: ~24.5 billion l (49%)**
 - **Brazil: ~21.3 billion l (including 2.5 billion l for export) (42%)**
 - **EU: ~1.7 billion l (3%); China: ~1.8 billion l**

CONSOMMATION DE BIOCARBURANTS DESTINÉS AU TRANSPORT DANS L'UNION EUROPÉENNE EN 2007*
BIOFUELS CONSUMPTION FOR TRANSPORT IN EUROPEAN UNION IN 2007*



LÉGENDE/KEY

Biofuels consumption in TOE

Consommation de biocarburants destinés au transport dans l'Union européenne en 2007 (en tep)*, avec les parts respectives de chaque filière/Biofuels consumption for transport in European Union in 2007 (in toe)* with respective shares of each sector.

Source: EurObserv'ER

- Bioéthanol/Bioethanol
- Biodiesel/Biodiesel
- Autres/Other

Les chiffres en rouge indiquent la consommation totale/Red figures show total consumption

Biofuels Consumption in the EU 2007

- Biodiesel
- Bioethanol
- Other (Biogas, PVO)
- Total EU in 2007: 2.6% (energy content)

T2

CONSUMMATION DE BIOCARBURANTS DESTINÉS AU TRANSPORT DANS L'UNION EUROPÉENNE EN 2007 (EN TEP)*
BIOFUELS CONSUMPTION FOR TRANSPORT IN EUROPEAN UNION IN 2007 (IN TOE)*



Pays/ Countries	Bioéthanol/ Bioethanol	Biodiesel/ Biodiesel	Autres/ Other**	Consommation totale/ Total consumption
Allemagne/Germany	293 078	2 957 463	752 207	4 002 748
France/France	272 937	1 161 277	0	1 434 215
Autriche/Austria	21 883	367 140	0	389 023
Espagne/Spain	112 640	260 580	0	373 220
Royaume-Uni/UK	78 030	270 660	0	348 690
Suède/Sweden	181 649	99 602	n.a.	281 251
Portugal/Portugal	0	158 853	0	158 853
Italie/Italy	0	139 350	0	139 350
Bulgarie/Bulgaria	66 160	46 336	0	112 496
Pologne/Poland	85 200	15 480	0	100 680
Belgique/Belgium	0	91 260	0	91 260
Grèce/Greece	0	80 840	0	80 840
Lituanie/Lithuania	11 600	41 000	0	52 600
Luxembourg/Luxembourg	865	34 098	0	34 963
Rép. tchèque/Czech Rep.	180	32 660	0	32 840
Slovénie/Slovenia	794	12 993	n.a.	13 787
Slovaquie/Slovakia	13 262	n.a.	0	13 262
Hongrie/Hungary	9 180	0	0	9 180
Pays-Bas/The Netherlands	8 670	n.a.	0	8 670
Irlande/Ireland	2 352	4 612	1 410	8 374
Danemark/Denmark	6 025	0	0	6 025
Lettonie/Latvia	1 738	2	0	1 740
Malte/Malta	n.a.	0	0	0
Finlande/Finland	n.a.	n.a.	n.a.	n.a.
Chypre/Cyprus	n.a.	n.a.	n.a.	n.a.
Estonie/Estonia	n.a.	n.a.	n.a.	n.a.
Roumanie/Romania	n.a.	n.a.	n.a.	n.a.
Total UE/EU	1 166 243	5 774 207	753 617	7 694 097

* Estimation/Estimation.

[2.3 billion l]

** Huile végétale consommée pure pour l'Allemagne, l'Irlande et les Pays-Bas et biogaz pour la Suède/Vegetable oil consumed as such in Germany, Ireland and The Netherlands, and biogas for Sweden.

n.a. : Non disponible/Not available.

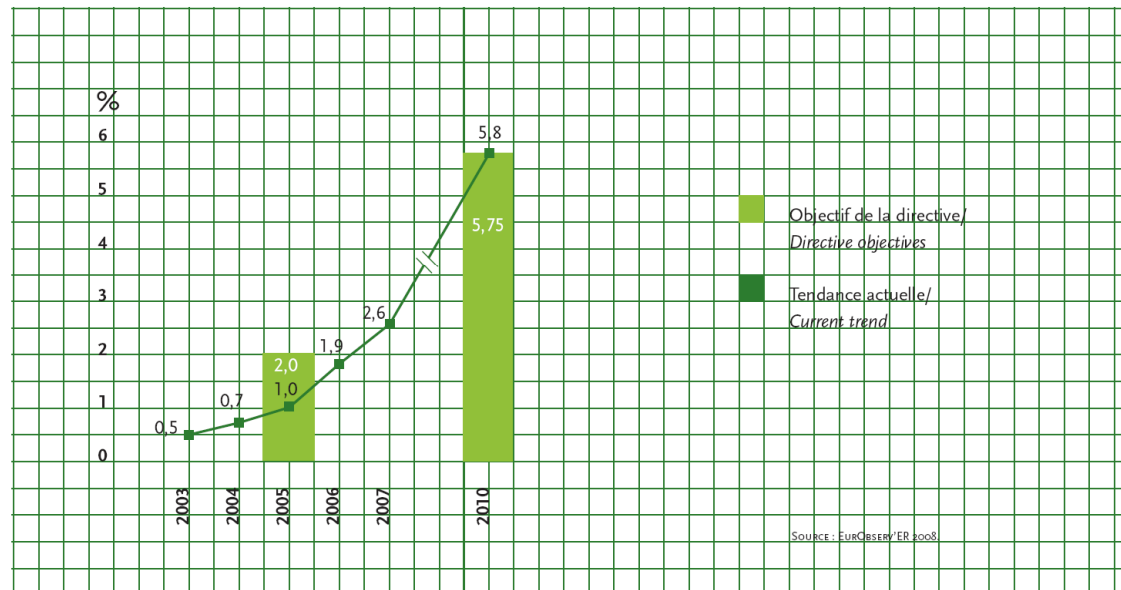
SOURCE : EUROBSERV'ER 2008.

BE: 1 TOE = 1960 l; BD: 1 TOE = 1282 l



Achievement of Directive Targets

G2 COMPARAISON DE LA TENDANCE ACTUELLE AVEC LES OBJECTIFS DE LA DIRECTIVE (2003/30/EC)
COMPARISON OF CURRENT TREND WITH THE DIRECTIVE OBJECTIVES ON BIOFUELS OBJECTIVES (2003/30/EC)



- **Optimism: France, Germany, Austria move ahead of objective**
- **Predictions EurObserv'ER: 17.5 M TOE in 2010 (5.8% incorporation rate)**

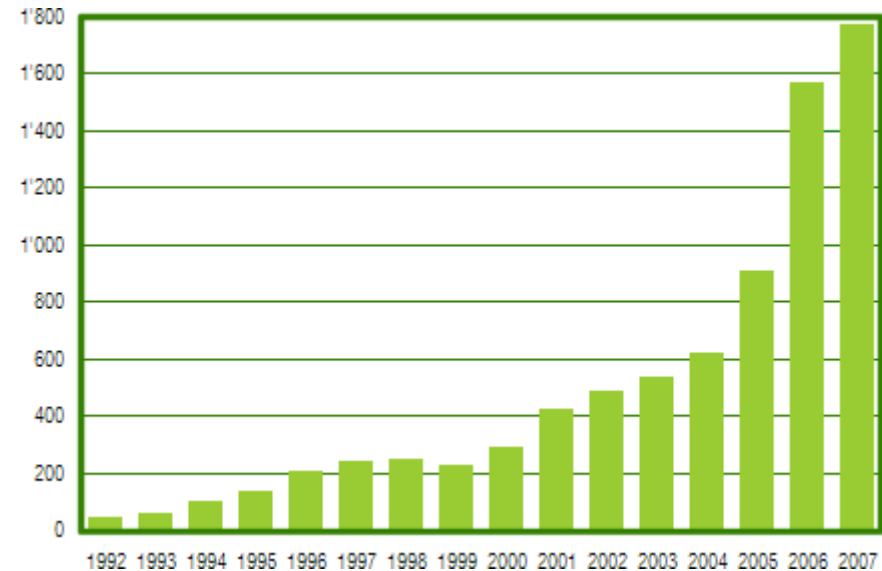


EU Bioethanol Production

T5 PRODUCTION DE BIOÉTHANOL CARBURANT DE L'UNION EUROPÉENNE EN 2006 ET 2007
 (EN MILLIONS DE LITRES) SELON EBIO
 BIOETHANOL PRODUCTION IN THE EUROPEAN UNION IN 2006 AND 2007
 (MILLION OF LITERS) ACCORDING TO EBIO

Pays/Countries	2006	2007*
France/France	293	578
Allemagne/Germany	431	394
Espagne/Spain	396	348
Pologne/Poland	161	155
Suède/Sweden	140	70
Italie/Italy	78	60
Rép. tchèque/Czech Rep.	15	33
Slovaquie/Slovakia	0	30
Hongrie/Hungary	34	30
Pays-Bas/Netherlands	15	14
Lituanie/Lithuania	18	20
Royaume-Uni/UK	0	20
Lettonie/Latvia	12	18
Total	1 593	1 771

* Estimation/Estimation.
 SOURCE : EBIO 2008.



- **Strong slowdown in growth (+ 13% in 2007; + 73% in 2006, + 47% in 2005)**
 - Increase in price of cereals
 - EU refining structure (deficit in diesel, excess in petrol)
 - Rise in imports of BE (Brazil, South Africa, Pakistan, Ukraine)



Bioethanol **Import**/Export 2007

Country	Production (million l) Source: EBIO	Consumption (million l)
France	578	574
Germany	394	534
Spain	348	220
Sweden	70	356
UK	20	152
TOTAL EU27	1.771	2.285



Bioethanol Market - Germany

- Law on Biofuels (Biokraftstoffquotengesetz, Jan. 2007)
 - **Partial detaxation with quotas**
 - **2007: BE: 1.2%; BD: 4.4%** (energy content)
 - **Increase of BE quota (2% in 08; 2.8% in 09; 3.6% in 2010)**
 - **Combined quota for biofuels (6.25% in 09; 8% in 2015)**
 - **Degressive tax incentives for 2nd generation biofuels, fuel biogas and E85 until 2015**
- **E10 project terminated (technical incompatibilities with 3.3 million cars)**
- **Bioethanol consumption decreased by 3.8% in 2007**



Bioethanol Market - France

- **Incorporation target of 7% in diesel and petrol in 2010**
- **New tax (TGAP: “General Tax on Polluting Activities”) on petrol and diesel – reduced in proportion to the biofuel incorporation rate**
- **Tax exoneration system for excise tax on consumption to compensate for higher production costs of biofuels**
- **Bioethanol consumption has risen by 84.7% in 2007**



Bioethanol Market - Spain

- Total tax exemption planned up to Dec. 2012
- **Mandatory incorporation** of biofuels in transport fuels
 - 2008: Non-obligatory target of 1.9%
 - **2009: 3.4%**
 - **2010: 5.83%**
- **Bioethanol consumption remained stable in 2007**



Bioethanol Market – United Kingdom

- RTFO (Renewable Transport Fuel Obligation) since April 2008
- **Obligation of distributors** to incorporate transport fuels from renewable sources
 - **2.5% of sales in 2008/2009**
 - **3.75% in 2009/2010**
 - **5% in 2010/2011**
- **Bioethanol consumption has risen by 61.1% in 2007**



Main Bioethanol Producers in EU

T7 PRINCIPAUX PRODUCTEURS DE BIOÉTHANOL EN EUROPE EN 2007 (EN MILLIONS DE LITRES)
 MAIN BIOETHANOL PRODUCERS IN EUROPE IN 2007 (IN MILLION OF LITERS)

Entreprises/ <i>Firms</i>	Pays/ <i>Countries</i>	Nombre d'unités/ <i>Plants number</i>	Capacité de production <i>Total capacity</i>	Matières premières/ <i>Raw materials</i>
Tereos	France/France	7	740	Betterave sucrière, blé/Sugar beet, wheat
Abengoa Bioenergie	Espagne/Spain	3	520	Céréales, alcool vinique/Cereals, wine alcohol
VERBIO AG	Allemagne/Germany	2	330	Céréales (seigle, blé, orge)/ Cereals (rye, wheat and barley)
CropEnergies AG	Allemagne/Germany	1	300	Blé, betterave sucrière/Wheat, sugar beet
Cristanol	France/France	3	290	Betterave sucrière, alcool vinique/ Sugar beet, wine alcohol
Agrana Bioethanol GmbH	Autriche/Austria	1	240	Blé, maïs/Wheat, maize
IMA (Bertolino Group)	Italie/Italy	1	200	Alcool vinique/Wine alcohol
SEKAB	Suède/Sweden	1	100	Alcool vinique/Wine alcohol
Akwawit	Pologne/Poland	1	100	Céréales (blé, maïs, orge, seigle), mélasse/ Cereals (wheat, maize, barley, rye), molasses
Saint Louis Sucre	France/France	1	90	Betterave sucrière, mélasse/Sugar beet, molasses

SOURCE : EUROBSERV'ER 2008 (D'APRÈS FBIO)

- Ethanol production (other than food industry ethanol) serves production of biofuels, pharmaceuticals, cosmetics, and paracheicals



Main Bioethanol Producers in EU

TEREOS (French industrial group)

- Beat ethanol in 5 French units, and 1 Czech unit
- Wheat ethanol in 2 units
- Sugarcane ethanol in 5 Brazilian units
- TEREOS turnover increased by 4% in 2007 (2378 million €)

ABENGOA

- 3 production units in Spain, 1 in France
- Production capacities in US and Brazil
- Turnover increased from 476 mio € in 2006 to 614 mio € in 2007

VERBIO

- 3 production units in Germany
- Bioethanol production decreased from 168.628 (06) to 123.751 tons (07)
- Turnover decreased from 446 mio € (2006) to 408 mio € (2007)



Raw Material for ethanol production

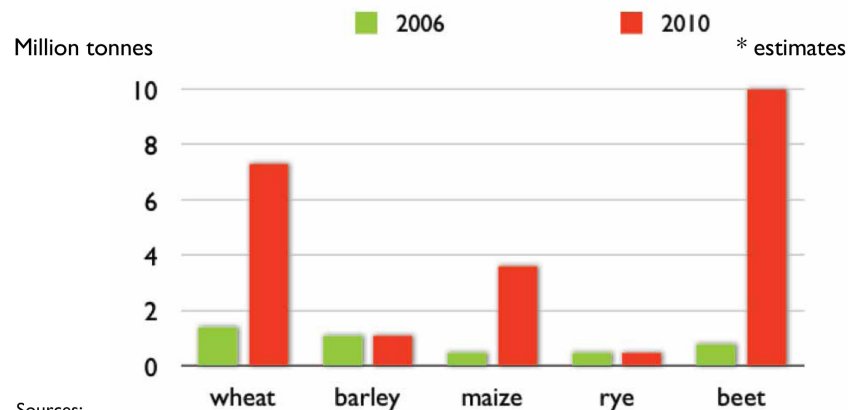
2007 Agricultural ethanol production in 1000 hl

	Traditionnal	Fuel ethanol	Total
Sugarbeet/molasses	6.380	6.412	12.792
Starch	5.317	8.933	14.250
Wine alcohol	2.100	1.370	3.470
Other	325	315	640
Total	14.122	17.030	31.152

Source: UEPA

[1.7 billion l]

Feedstock Use

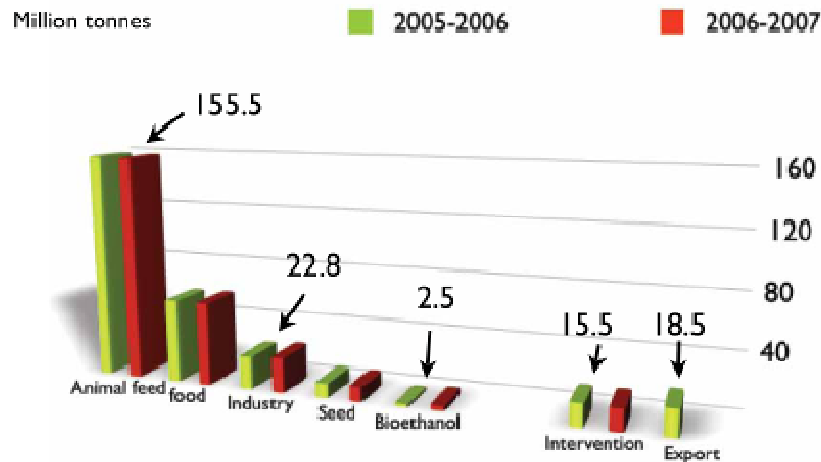


Sources:
 2006: European Commission, Management Committee on Cereals
 2010: Tallage (for cereals); eBIO for sugar beet

Source: EBIO



EU Cereal End Use – Food-fuel Competition



Source: European Commission, Management Committee on Cereals

Source: EBIO

Reasons for price increase of agricultural raw materials

- Adverse climatic conditions in producer countries (low stocks)
- Increased demand for food (especially meat) in emerging economies
- Increased raw oil prices
- Speculations on the raw agricultural product market
- Land use competition for biofuels production



Promotion of Bioethanol Market in Europe

EU Biofuels Policy

- Binding targets beyond 2010 (10% in 2020)
- Separate mandates/obligations for petrol and diesel
- High non-compliance penalties/buy-outs

Changes to Fuel Quality Directive

- Removal of 5% blending limit
- Introduction of vapour pressure waiver; higher oxygenate level

Coherent Trade Policy

- Creation of identical CN code for all fuel ethanol (E5,10,85) entering EU
- Only undenatured ethanol (CN 2207 10) for fuel use (EBIO)

Increase R&D in 2nd generation bioethanol

- Target for production/use of bioethanol from ligno-cellulose (EBIO: 1 billion litres by 2012)



Summary

- The new RE Directive includes a **binding target for biofuels in transport of 10% in 2020**
- Many EU countries implement **biofuel promotion policies**
- **Strong slow-down in growth** of EU bioethanol production in 2007
- **Increase of bioethanol imports** (from Brazil) to UK, Netherlands, Scandinavia
- On-going discussion on **biofuels sustainability criteria** (level of GHG reductions, environmental and social criteria)
- **Minor contribution of biofuels to recent increase in food prices**
- Increased efforts on **bioethanol production from ligno-cellulose**



THANK YOU for your attention!

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