

Biofuels for the future: towards the revision of the Directive 2003/30

Seminario Iefe

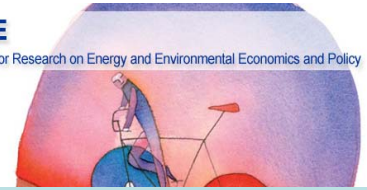
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Presentazione complessiva del rapporto per la Commissione UE

- Art. 4, par. 2, Direttiva 2003 /30 on the promotion of the use of biofuels or other renewable fuels for transport:
- “ By 31 December 2006 at the latest, and every two years thereafter, the Commission shall draw up an evaluation report for the European Parliament and for the Council
- on the progress made in the use of biofuels and other renewable fuels in the Member States. “

PIETRO LANZINI

BIOFUELS FOR THE FUTURE: TOWARDS THE REVISION OF THE DIRECTIVE 2003/30/EC

Aspetti trattati:

- Progressi nell'uso dei biocarburanti in EU27
- Barriere
- Land competition
- CO₂ savings (LCA)

Quadro di riferimento:

- **Direttiva 2003/30/EC** : Obiettivo 5.75% biofuel nei trasporti al 2010 (non vincolante)

- **Proposta di Direttiva** (votata dal P.E. a Dicembre): Obiettivo 10% rinnovabili (tra cui biofuel) nei trasporti al 2020, vincolante e per ogni Stato Membro



Si passa a target vincolanti



Si fa riferimento a rinnovabili, e non più solo ai biocarburanti (settore trasporti)

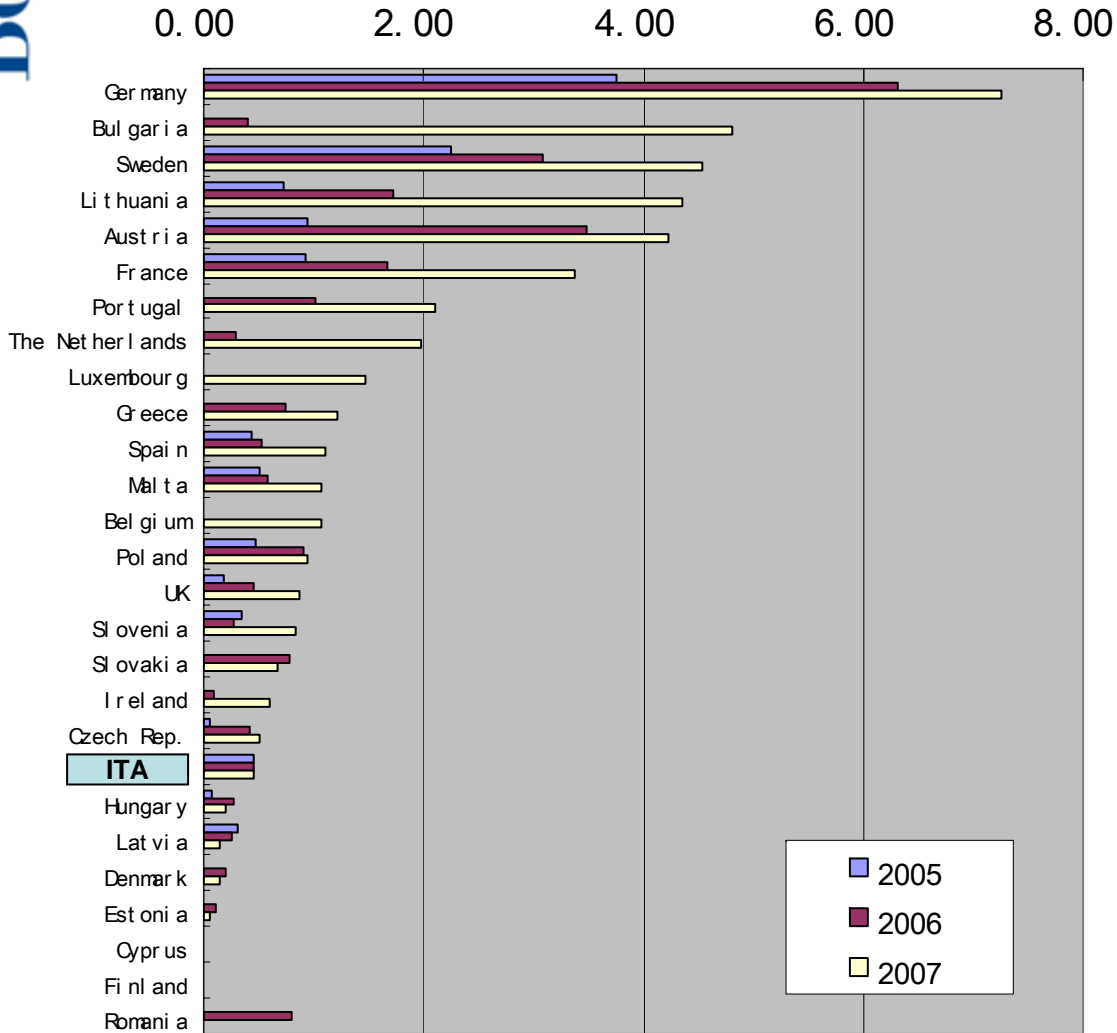


Solo i biofuel con certificazione valgono per raggiungimento quote (-35% GHG, no aree ad alto valore biodiversità, etc)



Advanced biofuels valgono doppio (lignocellulosico, waste, no food)

Biofuel nel settore trasporti 2005-2007



EU27: 1.8% nel 2006



2.6% nel 2007

- Germania mantiene "primato", ma rallenta tasso crescita

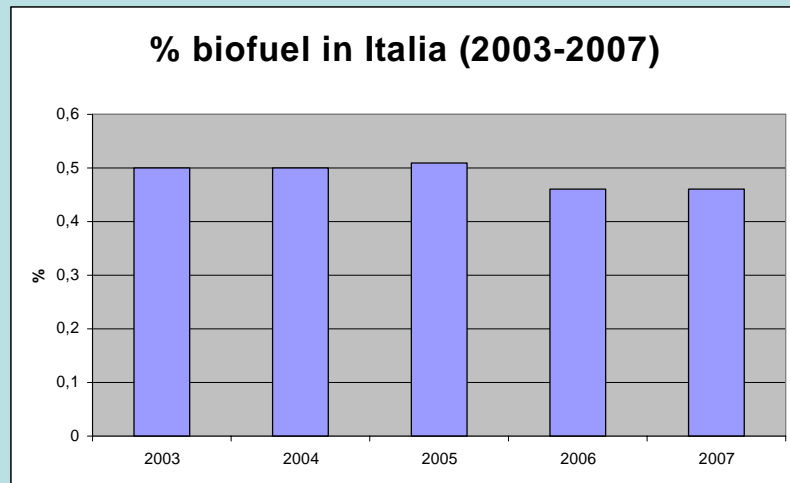
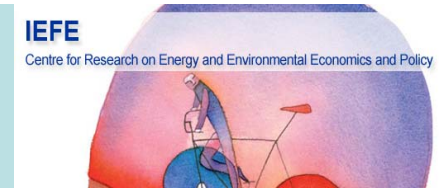
- Balzo di Paesi dell'est (Bulgaria, Lituania), ma anche Francia, Olanda e Portogallo

- In Italia situazione statica →





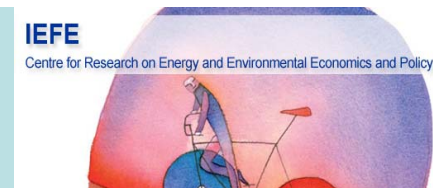
Il caso Italiano:



	2007 (.000t)	%
Benzina	11.000	31,1%
Diesel	26.000	68,4%
Biodiesel	180	0,5%
Etanolo	0	0%

Pertanto, relativamente all'anno 2007, il rapporto tra biocarburanti e carburanti di origine fossile (benzina e gasolio), è risultato essere circa lo 0,53% in peso. In termini di potere energetico la quota di biocarburanti immessi in consumo nel territorio nazionale è risultata, nel periodo di riferimento, circa lo 0,46% del quantitativo complessivo di benzina e gasolio.

BIODIESEL PRODOTTO / CONSUMATO (Ktoe)



	Biodiesel produced			Δ Produced - Consumed		
	2005	2006	2007	2005	2006	2007
Austria	75.12	108.70	235.96	-6.19	-183.82	-106.96
Belgium	0.88	22.09	146.70	0.88	21.08	55.44
Bulgaria	0.00	3.53	7.95	0.00	-4.92	-38.38
Cyprus	0.88	0.88	0.88	0.88		
Czech Republic	117.54	94.56	53.91	114.74	68.40	21.25
Denmark	62.74	70.70	75.12	62.74	70.70	75.12
Estonia	6.19	0.88	0.00	6.19	0.23	-0.50
Finland	0.00	0.00	34.47	0.00	0.00	34.47
France	434.80	656.61	770.61	109.15	98.98	-378.24
Germany	1474.95	2352.49	2553.98	-305.29	-817.00	-1143.36
Greece	2.65	37.12	88.37	2.65	-10.25	7.89
Hungary	0.00	0.00	6.19	0.00	-0.33	6.19
Ireland	0.00	3.53	2.65	-1.06	1.59	-18.35
Italy	349.96	395.03	320.79	173.21	218.28	144.05
Latvia	4.42	6.19	7.95	1.86	4.76	6.22
Lithuania	6.19	8.84	22.98	-0.61	-4.96	-18.82
Luxembourg	0.00	0.00	0.00	0.00	-0.58	-34.10
Malta	1.77	1.77	0.88	1.07	0.93	-0.73
Netherlands	0.00	15.91	75.12	-2.36	-24.29	42.15
Poland	88.37	102.51	70.70	73.26	31.52	-96.25
Portugal	0.88	80.42	154.65	0.74	36.23	110.47
Romania	0.00	8.84	31.81	0.00	-5.12	-10.41
Slovakia	68.93	72.47	40.65	68.93	68.36	27.61
Slovenia	7.07	9.72	9.72	2.11	-45.87	-250.86
Spain	64.51	87.49	148.47	40.68	35.90	-14.04
Sweden	0.88	20.33	55.67	-7.71	4.00	-91.87
UK	45.07	169.68	132.56	19.06	36.47	-139.37
EU 27	2813.80	4330.28	5048.75	354.93	-399.70	-1811.40

← Bilancia negativa

← Bilancia positiva



← Bilancia negativa
(positiva nel
2005!!)



ETANOLO PRODOTTO / CONSUMATO (Ktoe)



	Bioethanol produced			Δ Produced - Consumed		
	2005	2006	2007	2005	2006	2007
Austria						-18.029
Belgium						0.000
Bulgaria						-66.160
Cyprus						
Czech Republic	0.00	7.52		0.000		-0.180
Denmark				0.000	-8.407	-6.025
Estonia				0.000	-0.215	-0.013
Finland	6.52	0.00	0.00	6.520	0.000	0.000
France	72.23	146.96	289.91	-3.380	-3.941	15.191
Germany	82.76	216.18	197.62	-61.312	-89.543	-98.548
Greece				0.000	0.000	0.000
Hungary	17.56	17.05	15.05	14.689	5.398	5.867
Ireland				-0.010	-1.910	0.000
Italy	4.01	39.12	30.09	4.013	39.123	30.095
Latvia	6.02	6.02	9.03	5.589	4.821	9.028
Lithuania	4.01	9.03	10.03	3.215	3.128	-15.463
Luxembourg				0.000	0.000	-0.865
Malta				0.000	0.000	0.000
Netherlands	4.01	7.52	7.02	-23.588	-46.045	-38.636
Poland	32.10	80.75	77.74	32.101	80.754	77.744
Portugal				0.000	0.000	
Romania				0.000	-0.767	-10.430
Slovakia	0.00	0.00	15.05		-0.176	14.243
Slovenia				-113.822	-115.396	-112.640
Spain	151.98	198.62	174.55	7.524	36.113	-30.095
Sweden	76.74	70.22	35.11		55.125	-62.178
UK	0.00	0.00	10.03	-42.634	-47.650	-67.211
EU 27	457.94	799.01	871.24	-171.096	-89.586	-374.304

← Bilancia positiva



← 8 Bilancia negativa



Biofuel immessi sul mercato:

	Fossil fuel (Ktoe)	Biodiesel (Ktoe)	Vegetable oil (Ktoe)	Ethanol (Ktoe)	Biofuel (Ktoe)	Share (%)	Total fuel (KToe)
2005 (EU25)	292876	2277	182.4	552	3011	1.02	295901
2006 (EU27)	303125	4082	648	881	5611	1.82	308751
2007 (EU27)	306295	6091	768	1246	8105	2.58	314400

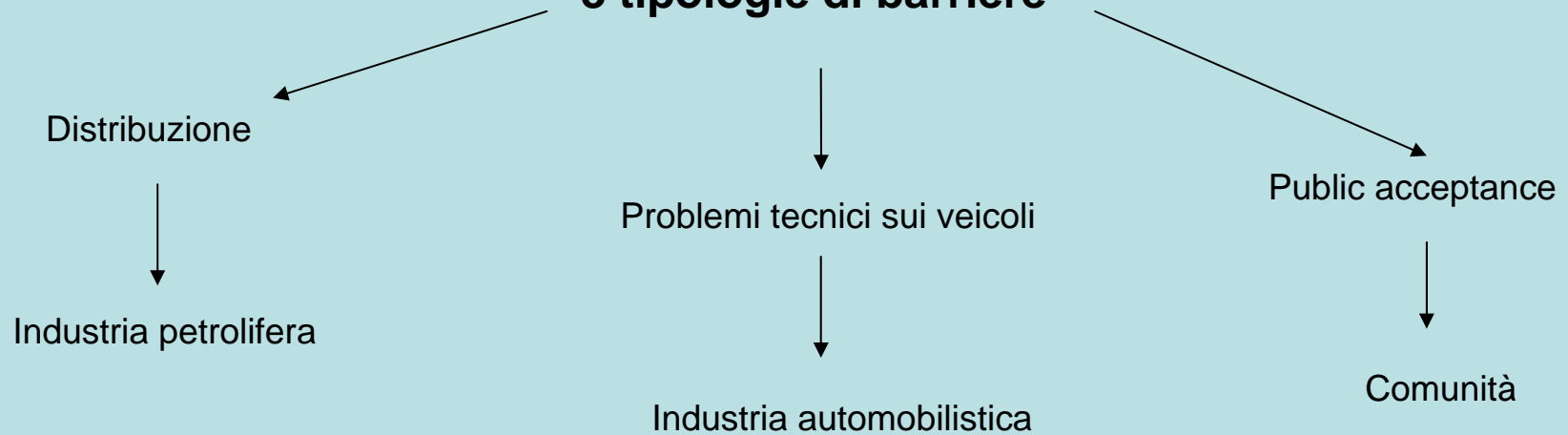
Alcune osservazioni:

- L'Italia è esportatrice sia di etanolo che di biodiesel, seppure in quantitativi modesti
- L' EU27 è importatrice di etanolo e, dal 2006, anche di biodiesel
- L'import non sembra sufficiente ad assicurare il raggiungimento del 5.75% al 2010 (si stima che si arriverà al 4.2%)

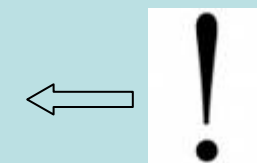
Principali barriere

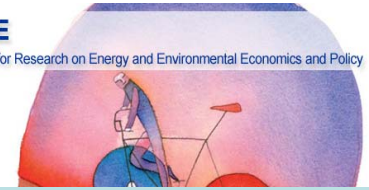
Fonti: - Questionari inviati a esperti nazionali, ed ai vari MS
 - Prima Public Consultation (2006)
 - MS Reports

3 tipologie di barriere



Rilevanza barriere (bassa/alta)					
(n)					
	B	MB	M	MA	A
Distribuzione	4	0	8	0	1
Veicoli	2	0	3	1	6
Public acceptance	4	0	8	0	1





Altre barriere:

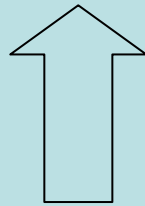
- Rischio incremento prezzi agricoli e **competition for land**
- Mancanza standard internazionali (certificazione)
- Costi di produzione non competitivi (importanti supporto pubblico e prezzo del petrolio)
- **Benefici ambientali** incerti (CO₂)



Ponendo di raggiungere effettivamente l'obiettivo del 10% al 2020

Quanta "terra" servirebbe?

COMPETITION FOR LAND



In competizione



Produzione agricola utilizzabile come:

- Derrate alimentari
- Mangimi
- Prodotti industriali (e.g: tabacco)
- Prodotti energetici (BIOCARBURANTI)



Possibili implicazioni:

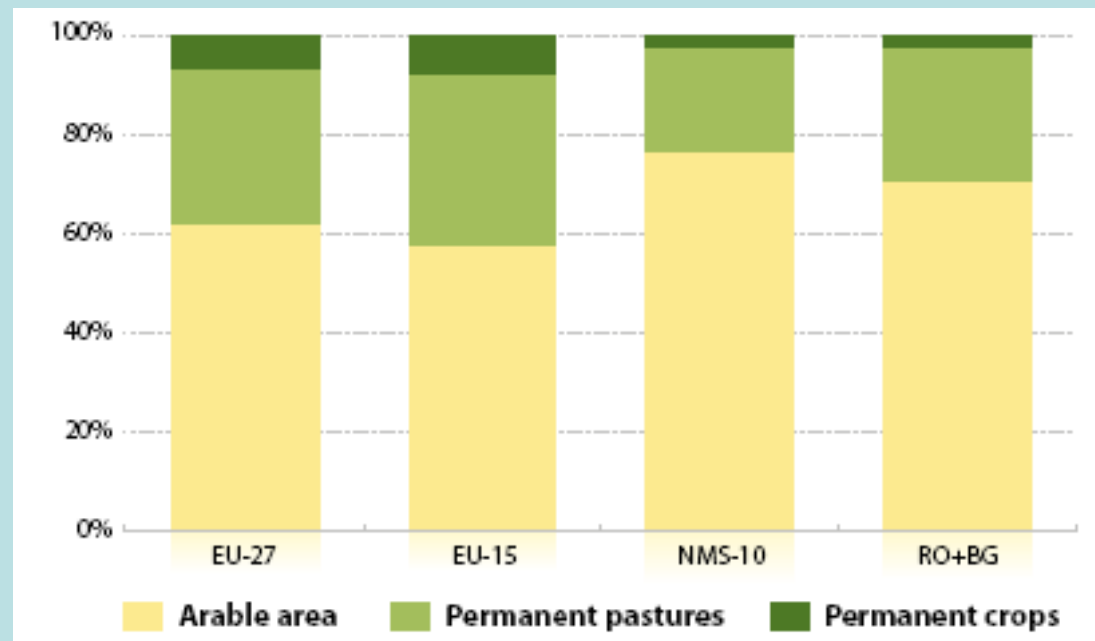
- ✓ rialzo prezzi
- ✓ opere di disboscamento
- ✓

Terreni disponibili in Europa:

Estensione EU27: 432 milioni di ettari

Terreni agricoli: circa 160 milioni di ettari

Terreni arabili: circa 105 milioni di ettari



Terreni necessari da dedicare a biocarburanti:

Non vi è opinione uniforme
- doomsayers vs ottimisti



EC DG Agriculture, 2007:



Servono circa 17.5 milioni di ettari di terreno

(15% terreni arabili)



*Conversione terreni a
set-aside*

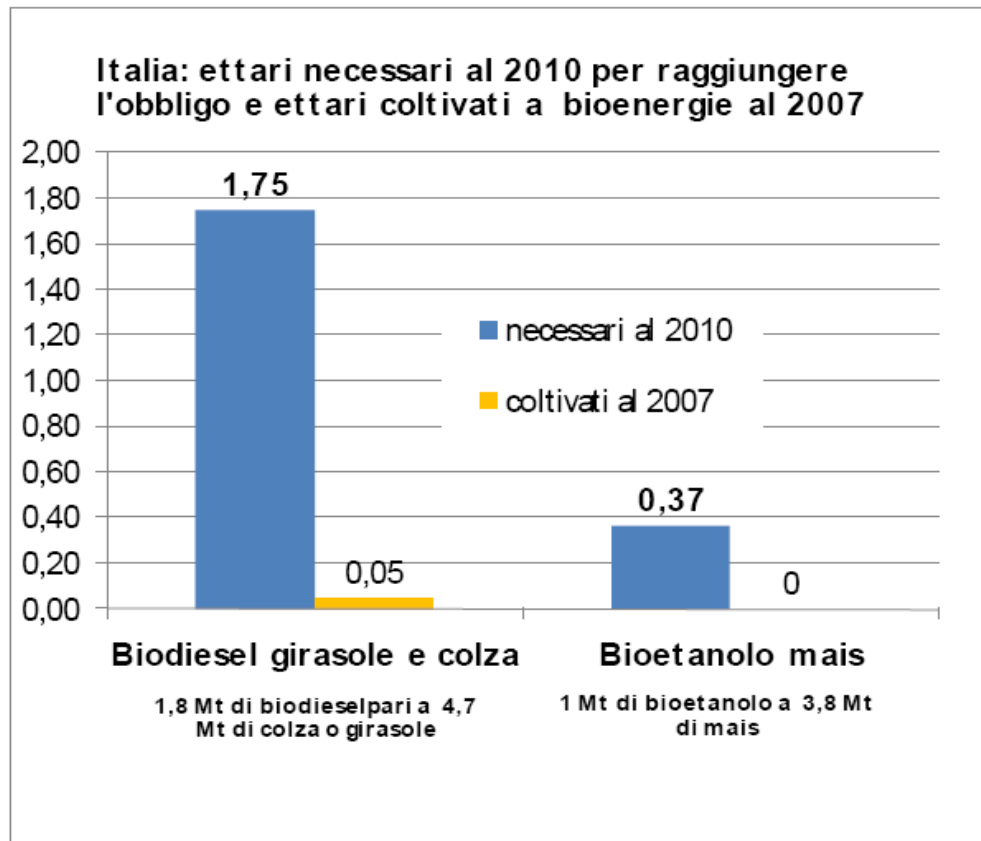
Il “set aside” in Europa

- quasi 7 milioni di ettari, di cui 2.8 volontari (al 2007)
- regime introdotto 20 anni fa per limitare eccedenze pdzn cereali
- inizialmente porzione da dedicare a set aside variava annualmente, poi dal '92 è stata fissata al 10%
- deroghe per colture destinate a scopi energetici
- Regime sospeso dalla scorsa stagione

(.000ha)	2007-08	2008-09	Differenza
Set-aside obbligatorio	3881	0	-3881
Set-aside volontario	2818	4836	+2018 (molto)
Totale superfici non coltivate	6699	4836	-1863

- Contro le attese

- Possibile causa: aumento costi input pdtv (carburante, fertilizzanti etc)



Per raggiungere l'obiettivo del **5.75%** sono necessari più di 2,1 milioni di ettari di superficie agricola. Il potenziale teorico è di 0,6 milioni, oltre tre volte più basso.



Necessario ricorrere ad import

Dati Nomisma Energia

Terreni coltivati a feedstock biofuel nel 2007: 35.000 ettari (dati Assocostieri)

77% girasole, restante colza

CO₂ savings

Situazione attuale

Ipotesi di raggiungimento del
target 5.75% al 2010

Metodologia:

- Coefficienti Proposta RES Directive 2008 per diversi feedstock
- Dati su produzione biofuel con disaggregazione per feedstock ex MS Reports e specifico questionario (proxy ove mancano dati specifici)
- Calcolo CO₂ spazzata a livello nazionale ed Europeo (media ponderata)

Biofuel	CO ₂ reduction (%)
Ethanol from sugar beet	61
Ethanol from Maize	56
Ethanol from wheat	69
Ethanol from sugar cane	71
Ethanol from barley	62*
Ethanol from rye (segale)	62*
Ethanol from triticale (ibrido segale/frumento)	62*
Biodiesel from rapeseed	45
Biodiesel from sunflower	58
Biodiesel from oil and/or fat recycled	88
Biodiesel from soybean	40
Biodiesel from palmoil (process not specified)	36

→ Media cereali

Esempio: FRANCIA

Aggregating domestic production and imports, France places on the market around 1.815.000 tons of biofuel.

The data gathered through the questionnaire provides the following disaggregation per feedstock:

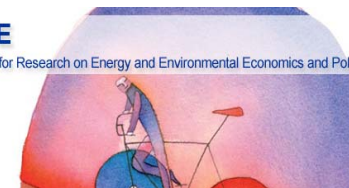
- RME 54%
- Sunflower 7%
- Soybean 16% (*)
- Palmoil 3%
- Wheat 10%
- Sugarbeet 10%

(*) We assume that biodiesel imported from the US is produced from soybean, the most significant feedstock for the production of biodiesel in America

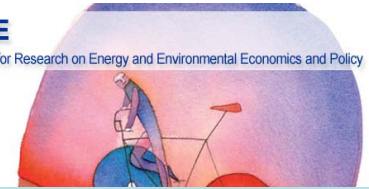
- GHG savings among biofuels: 48,84 %
- Overall GHG savings: $0,4884 \times 3,37\% = 1,65\%$
- GHG savings if the 5.75% target is met: 2,81%

Member State	Biofuel Share	GHG savings among biofuel	Overall GHG savings	GHG savings in 5.75% scenario
Austria	4.23	47.59	2.01	2.74
Belgium	1.07	45	0.48	2.59
Bulgaria	4.82	62.41	3.01	3.59
Cyprus	-	-	-	-
Czech Rep.	0.50	45	0.22	2.59
Denmark	0.14	62	0.09	3.70
Estonia	0.06	45	0.03	2.59
Finland	0.02 (2006 data)	36	0.0072	2.07
France	3.37	48.84	1.65	2.81
Germany	7.26	46.68	3.39	N.A..
Greece	1.21	58	0.70	3.33
Hungary	0.20	62.36	0.12	3.59
Ireland	0.59	45	0.27	2.59
ITALY	0.46	45.30	0.21	2.60
Latvia	0.14	45	0.06	2.59
Lithuania	4.35	51.46	2.24	2.96
Luxembourg	1.46	45	0.66	2.59
Malta	1.07	66.5	0.72	3.82
Poland	0.94	60.71	0.57	3.49
Portugal	2.10	58	1.22	3.34
Romania	0.79	52.64	0.48	3.03
Slovakia	0.67	56	0.38	3.22
Slovenia	0.83	45	0.37	2.59
Spain	1.11	56.39	0.63	3.24
Sweden	4.53	58.44	2.65	3.36
The Netherlands	1.98	52.05	1.03	2.99
UK	0.87	49.71	0.43	2.86
EU 27	2.6	49	1.27	2.82





<i>Risultati</i>	
Emissioni benzina	2.38 kg CO ₂ /litro
Emissioni diesel	2.65 kg CO ₂ /litro
Litri benzina risparmiati (mio) <small>Dati 2007</small>	1593.1
Litri diesel risparmiati (mio) <small>Dati 2007</small>	7729.9
Emissioni spiazzate	11.9 mio T CO ₂ (26.3 in ipotesi 5.75%)



Conclusioni:

<h3>Progressi nell'uso dei biocarburanti</h3>	<ul style="list-style-type: none"> - 1.8% nel 2006 e 2.6% nel 2007 in EU27 - In Italia situazione statica (0.5%) - Difficile raggiungere 5.75% al 2010 (4.2%?) - Pochi MS virtuosi (Germania, Francia, Svezia, Austria)
<h3>Barriere</h3>	<ul style="list-style-type: none"> - Rischio land competition e aumento prezzi food - Timore limitati vantaggi ambientali - Costi non competitivi - Problematiche tecniche (veicoli)
<h3>Land competition</h3>	<ul style="list-style-type: none"> - Necessari 16-18 mio ha (15% terreni arabili) per raggiungere 10% al 2020 in EU27 - Fattibile, puntando su incrementi rese e sfruttamento set-aside - In Italia, per raggiungere 5.75% al 2010 servirebbero oltre 2 mio ha (potenziale teorico 600.000); Import
<h3>GHG savings</h3>	<ul style="list-style-type: none"> - Nel 2007, l'uso di biocarburanti ha risparmiato emissioni di CO2 pari a 11.9 milioni di tonnellate in EU27 (1.27%) - Il mix Europeo di biofuel ha un risparmio medio del 49% di CO2 rispetto ai combustibili fossili

General features of measures of support

- Main reason: production costs of biofuels higher than production costs of oil products (everywhere except Brazil)
- Main objectives (external economies):
 1. environmental benefits;
 2. security of supply;
 3. support to farmers' income
- Main condition: supports have to be temporary

Instruments

Main instruments:

- Tax relief
- Obligations to blend (10 % = Fuel Quality Directive)

Instruments: tax relief (reduction in excise)

- When: mainly 2005-2006 (old).
- Where: all European countries adopt it in that period, except Finland.
- Why: They are easy to plan and to implement: what Governments have to know is only the amount of the gap between before tax costs of provision of fossil fuels and before tax costs of provision of biofuels, allowing different indirect tax rates to fill the gap for consumers, who will go on paying the same price.
- Problem: cost for public budget

Instruments: obligations to blend

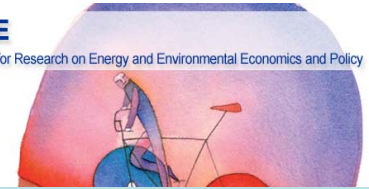
- When: few cases in 2005-2006, more abundant in 2006-2007 (new)
- Where: now in 16 of 25 countries
- Why: unsuccess of tax relieves; easier to implement (who: distributors); **reduction of cost for public budget**

Problems: prices for consumers

- sanction (GTAP en France)
- Trading of certificates
- Quota mechanism

Specific measures

- Supply: agriculture (in 2007, involved areas : set-aside 30% energy crop aid 64 %, no support 6 %)
- Supply: industry/distribution / industry
- Demand: purchases of specific cars; programs of public procurement



The report: tax relieves vs obligations to mixture

MS Report	Country	Period	Tax relieves	Timing reference	Obligations to mixture	Timing reference
2008	Austria	2005/07	x	Jan05-june07	x	Oct05-oct08
		2007/08	x ↑	From July 07 (BD) – Oct (BE)	x	(yearly increasing obligations, up to 5.75 %, already reached
					

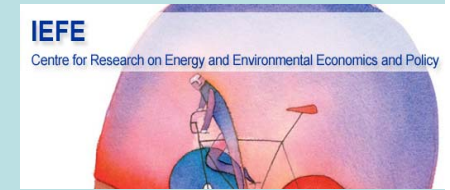
Degree of success of the evolution of measures with respect to the dynamics of consumption

1. To adopt obligations to blend and tax relieves coming from tax relieves alone
2. To keep on tax relieves alone
3. To keep on both measures
4. To adopt obligations to blend alone, coming from tax relieves

Policy measures: pros and cons

Policy measures (direct impact on agricultural production)	Strengths	Weaknesses
Tax exemptions (the agricultural product increases, according to variations in relative prices)	<ul style="list-style-type: none"> •Easy to implement; •Few market risks; 	<ul style="list-style-type: none"> •Loss of fiscal revenues; •Risks of overcompensation (proposal of to high tax reduction); •Strongly dependent on the initial levels of the excise: it is effective where these levels are significantly high
Blending obligations (the agricultural product increases, independently from variations in relative prices)	<ul style="list-style-type: none"> •It injects certainty in the agricultural sector; (unless the subsequent increase in prices significantly penalize the agricultural supply) •It does not involve additional costs for public budget; 	<ul style="list-style-type: none"> •Higher prices for taxpayers; •No incentive to innovate; •Higher prices variability; •Difficult to implement and monitor

Cost of support



- General cost of support = excise exemption + aid for energy crops

The report: cost of the support (2007)

MS Report	Country	Product	Eligible consumption 000 litres	a) Euros achieved through reduced excise 000 euros	b) Euros which could have been achieved through regular excise 000 euros	c) = b – a Difference: cost of support 000 euros	Support million euros
2008	Austria	Ethanol	21567	9317	9504	188	
		Biodiesel	217530	75570	95866	20296	
		Total	239097	84887	105370	20483	20.5
...							



Costs of the support policies for biofuels in EU 25

	2006	2007
Support costs, € millions	2978	2124
Energy crops, € millions	58.5	90
TOTAL SUPPORT, € millions	3036	2214
Consumption of biofuels, million litres	7652	10905
Euro / consumed litres of biofuels	0.397	0.203
Avoided oil products (mill litres)	6562	9323
Average industrial price of petrol, EU 25, euro/1000 lt	472.3	484.5
Average industrial price of gasoil, EU 25, euro/1000 lt	511.6	512.4
Value of displaced oil products, € millions	3312	4733
Support/Value of avoided oil product	0.917	0.468
Support for Biofuel / State Aids	4.55	3.51
CO2 Avoided (Mton)		11.4
Support for Biofuels / tCO2 avoided (€/t)		194
		32

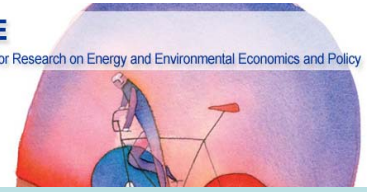
Conclusions on the costs of the policies

- Passing from 2006 to 2007 the expenditure for promotion of biofuels has shrunk, while their consumption increased.

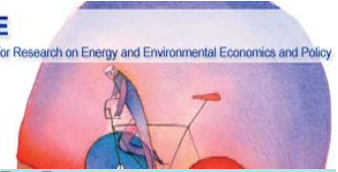
EU 25 MSs were able to save euros:

- for each litre of consumed biofuels,
- for each litre of avoided oil,
- for each euro of reduced dependence from imported oil,
- finally for each tonne of CO₂ equivalent saved

The Steenblik critic on the cost of the support policy for biofuels is partially denied



Security of supply



Short term vs long term security of supply

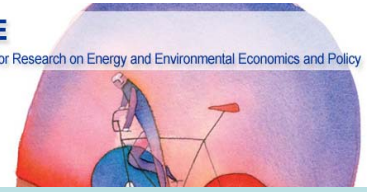
- Short term: oil stocks
- Long term: “own” oil import dependency is high and should increase in every scenarios (oil import / oil consumption)
- What matters is net oil imports /energy consumption: will biofuels be able to reduce it ?

Oil Import dependency %

	2006	2020 Primes	2020 Primes
		Baseline scenario high oil price Biofuels share = 10.4 %	Baseline scenario low oil price Biofuels share = 7.4 %
with	33.3	34.2	35.9
without	33.6	36.5	37.5
			36

Conclusions on security of supply

- The scanty amount of biofuel consumed in the EU in 2006 modifies the oil import dependency in a negligible way.
- In the “worst” future the biofuel penetration is not able alone to overturn the tendency towards an increase of the oil import dependency. So it is not a sufficient policy in order to improve security of supply.
- However it is an useful policy, because in absence of biofuels the oil import dependency is expected to increase more than 2 % with respect to the case where the 10 % target is achieved.



Agricultural markets

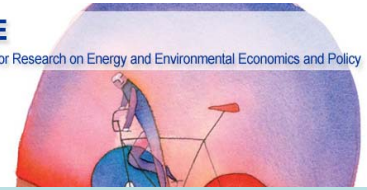
Impact on agricultural market prices

Agreement on the thesis that food price increase in 2007/2008 is the complex outcome of seven factors:

- reduction of supply of the food product i , caused by drought and other natural disasters in the largest producing countries;
- increase of demand of i , due mainly to the sharp increase of demand from fast growing large countries like China and India (due to growing income per capita, population and diet);
- increase of demand of i , due to sharp requirements for biofuels;

- increase in the supply cost of i , due to the consequences of the high price of oil on fertilizers and transport costs;
- increase in the demand of i for speculative purposes, due to excess of liquidity in the financial markets and linked to the devaluation of US dollar against euro;

- reduction of the supply of j , another food product not required for biofuels, to give room to future production of i (competition for land): if demand for j is unchanged, even the price of j increases;
- reduction of the international availability of i, j and other products, due to the export restriction decided by the Governments of main exporting Countries, in order to avoid internal political difficulties stemming from riots of poor people being used to have cheap food products.



Explanations by DG-AGRI

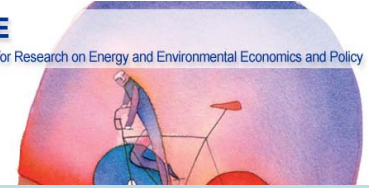
- supply (mainly weather) factors played a major role in the recent increase of prices in food grains (namely wheat and rice) and in the dairy sector;
- supply response in several sectors (meats, cotton, sugar) is stronger than demand pressures, and explains why price increases in these sectors were more moderate;
- demand factors explain upward price pressures in maize and vegetable oils;
- the annual increase in maize and soybean meal production appears to be twice as high than the implied increase in feed use stemming from the annual increase in meat consumption;
- the increase in energy, fertilizer, and in some cases land prices, is stronger than output prices, complicating farmers supply response;
- the appreciation of the US dollar limits price increases in many exporters' currencies, thus mitigating to some extent the required supply response;
- finally, **bio-energy policies have an impact on the prices of maize (ethanol use in the US) and vegetable oils (biodiesel use in the EU), which are accentuated by parallel effects from other factors (feed demand for maize, decline of US soybean oil use).**

All Primary Commodities

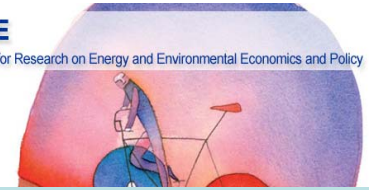
	Non-Fuel		Industrial inputs:				Energy Total	
			Edibles		Agricultural	Metals		Petroleum
2006	121,2	123,7	110,7	136,9	109,2	156,8	119,7	120,9
2007	130,4	135,8	122,6	149,1	110,4	177,1	127,2	128,8
2008								
Q1	158,4	148,4	150,1	146,7	106,9	175,4	164,2	165,1
2008								
Q2	184,3	151,9	157,4	146,3	107,6	174,3	203,2	206,1
2008								
Q3	182,7	147,2	153,8	140,6	109,2	163,2	203,5	201,0

Source: IMF

2005 = 100, in DSP



Some conclusions



Prospettive (con molte incertezze)

- Non vi è dubbio che il proseguimento dello sviluppo dei biocarburanti in UE avverrà ma in modi molto diversi da prima
- Riforma della CAP: non c'è più il set-aside, non ci saranno più gli energy crops → sarà quasi impossibile produrre in UE senza effetti sui prezzi agricoli
- Meccanismi di certificazione ambientale e di biodiversità: se funzioneranno, cambiamenti profondi nell'approvvigionamento

Non risolto il problema del conflitto con il food: logicamente c'è, ma non sappiamo quanto

- Potrebbe esserci poco spazio ulteriore per i biocarburanti di I generazione
- Biocarburanti di II generazione: problemi tecnologici e commerciali non risolti, incertezza sulle quantità disponibili e sul raggio di azione, elevatissimi sunk costs (a differenza di quelli di I generazione)

- Biocarburanti potrebbero inserirsi: in nicchie o mercati captive, in un clima di elevati prezzi dei prodotti petroliferi (ma l'esperienza scorsa ci ha detto che non basta!), alghe
- E' comunque tale l'ampiezza dei loro obiettivi (sostituiamo "farmers" con "PVS") che continua ad essere un tema di grande interesse