



Effective measures to accelerate market introduction of Biofuels

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The PREMIA project



- Towards an effective market introduction of BIOFUELS & HYDROGEN
- **Specific Support Action** in 6th Framework Programme of the European Commission
- Assess effectiveness of measures to support AMF
 - EU-25
 - Based on international experiences
 - In relation to market maturity of AMF
 - short term: biofuels
 - mid/long term: hydrogen
 - In national context

June 2004 – May 2007



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Flemish Institute for Technological Research



JRC-IPTS
European Commission - Joint Research Centre,
Institute for Prospective Technological Studies



CERTH-HIT
Centre for Research and Technology Hellas,
Hellenic Institute for Transport



VTT
Technical Research Centre of Finland



SETRF
South-East European Transport Research Forum





AMF prerequisites

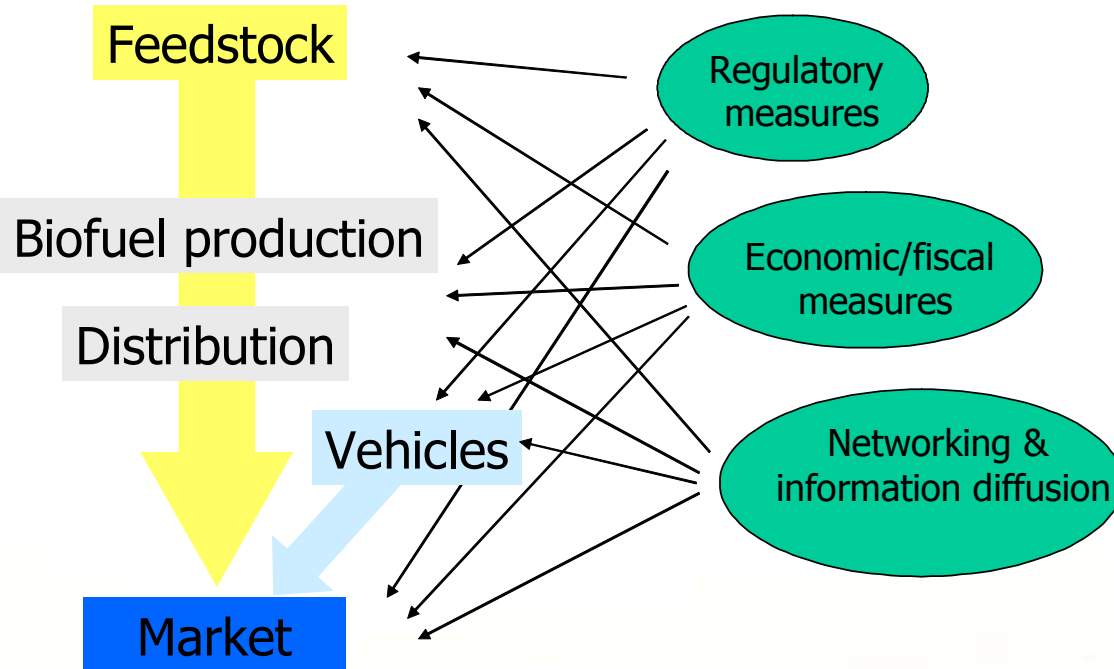


- availability of suitable raw material and other feedstock for fuel production,
- infrastructure to support the storage and distribution of the fuel,
- engines or other energy conversion devices compatible with the given fuel.





Policy measures



Effectiveness of measures in relation to maturity of biofuel market is important



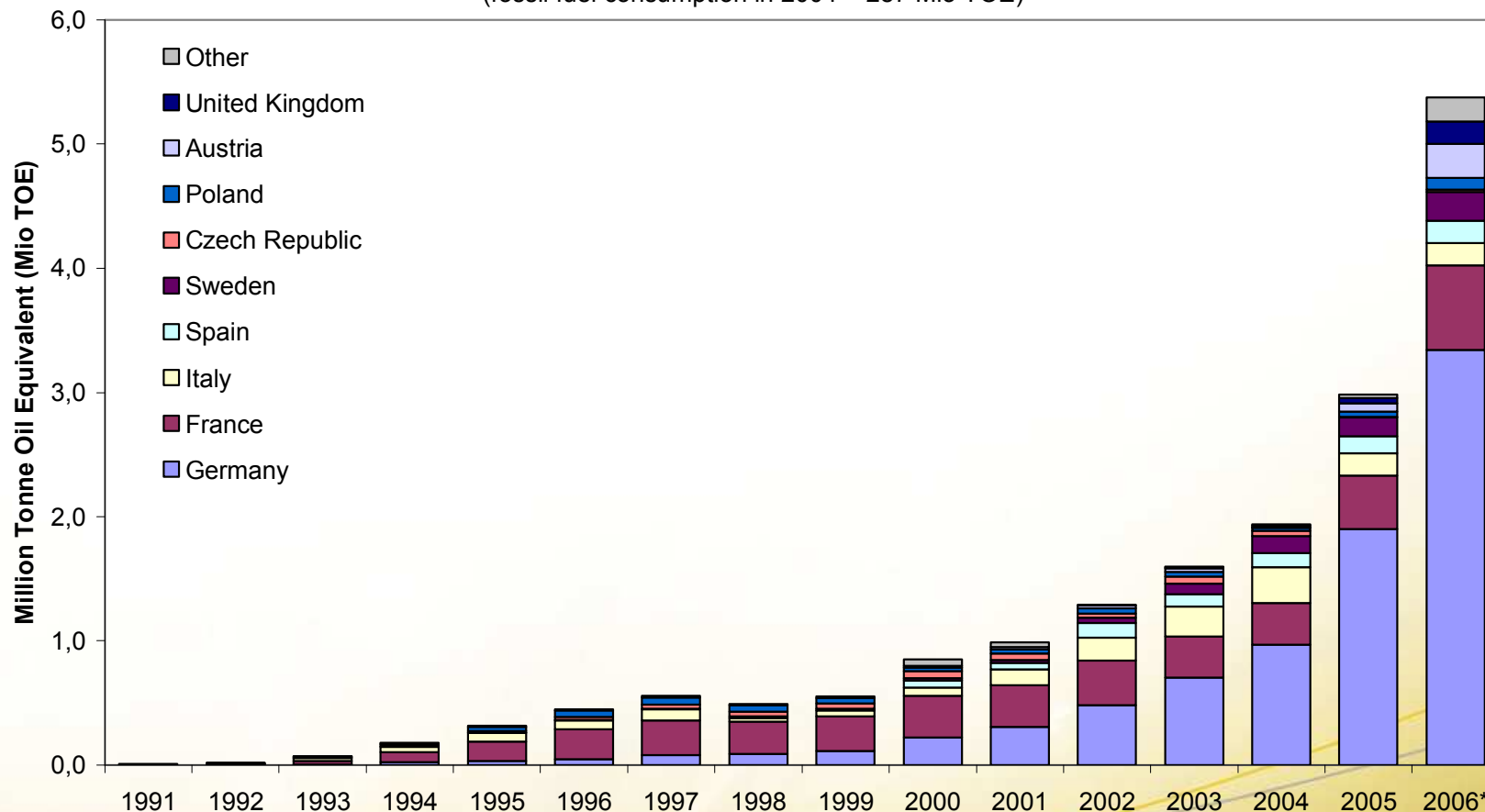


Biofuels in the EU



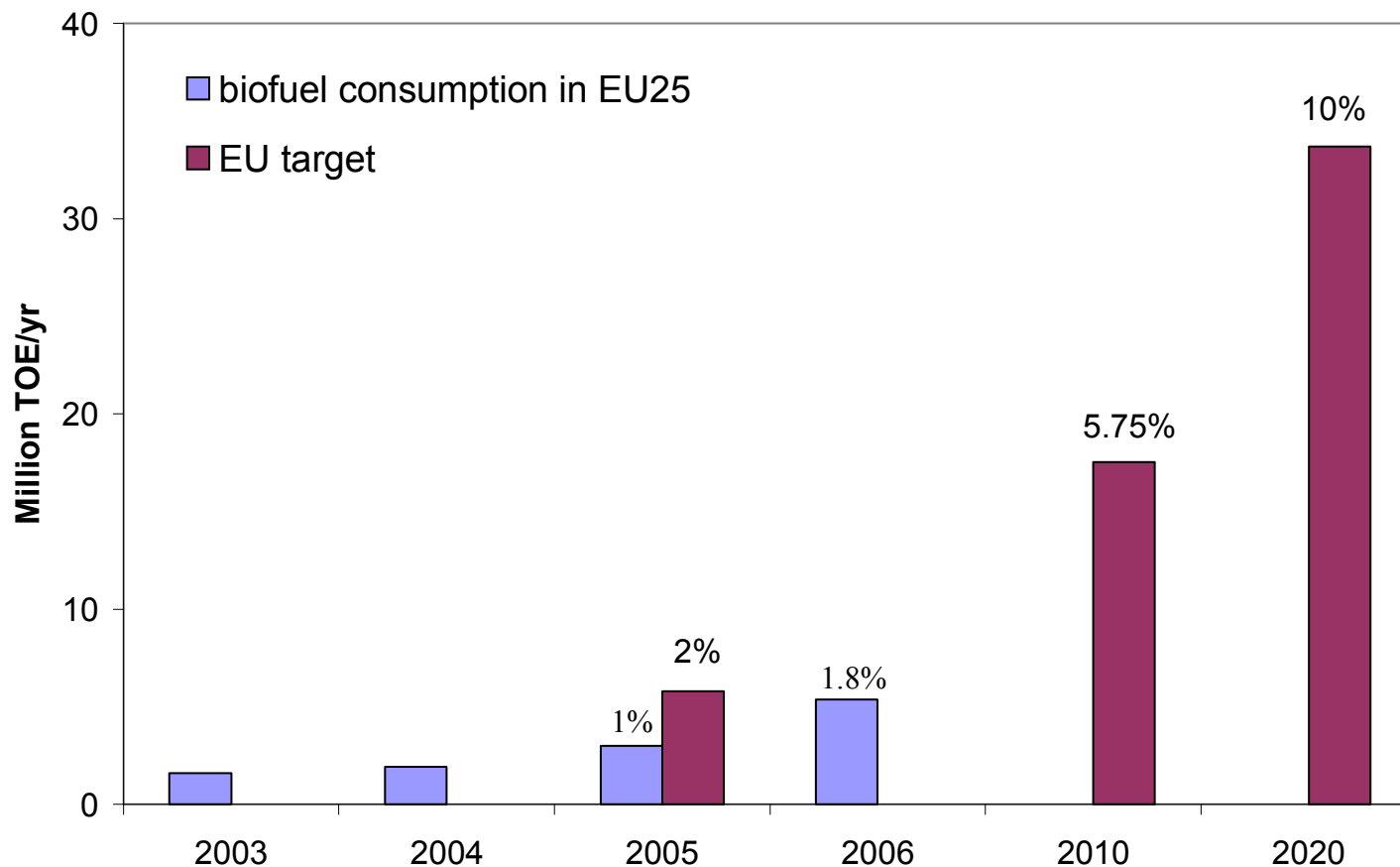
Evolution of biofuel consumption in EU25

(fossil fuel consumption in 2004 = 287 Mio TOE)





Biofuels in the EU



Policies need to be efficient to reflect higher market volumes





Overview of applied measures (1/2)



Stage	Measure	Application
Feedstock	Support to agriculture (energy crop subsidy / set aside land)	EU15, CZ
Production	RD&D funding	EU + country level
	Loans and subsidies for biofuel production facilities	FR, DE, PL, ES, SWE, ...
	Producer tax incentives for biofuel production	CZ
	Authorised quota system for biofuel producers, related to tax reduction	FR, IT, BE*

* Only recently introduced





Overview of applied measures (2/2)



Stage	Measure	Application
Distribution	Standards (biofuel & normal fuel)	AT, DE, FR, SWE, IT, EU-level (2003)
	Tax differential (tax reduction for biofuels)	DE, FR, AT, ES, SWE, ... EU (Energy Taxation Directive)
	Substitution mandate for fuel distributors	AT, FR, SL*, DE*, NL*, UK**, ...
	AMF mandates for fuel stations	SWE
	Loans and subsidies for filling stations	DE
Market	Funding of demonstrations	EU + country level
	Procurement methods (green proc., common procurement)	SWE, FR, AT
	User incentives (tax incentives biofuel vehicles, free parking, exemption of congestion charge or other road tax, ...)	SWE

* Only recently introduced

** announced





Biofuels in Germany



- Tax exemption
 - Focus on pure biofuels (biodiesel, PPO) until 2004
 - From 2004 also tax exemption for blended biofuels, incl ethanol
 - Ecotax increase between 1999-2003 => very high tax exemption
- Cooperation with vehicle manufacturers (warranty)
- Early biodiesel standard & focus of fuel quality
- ⇒ High success, both as pure biofuel and blended
- ⇒ German biofuel consumption 2/3 of EU25
- From 2007 obligation system for blended biofuels, decreasing tax reduction for pure biodiesel and PPO
- Price differential decreases (no price advantage from 2008-09)
- Support programmes for BTL (biomass-to-liquid) from cellulose

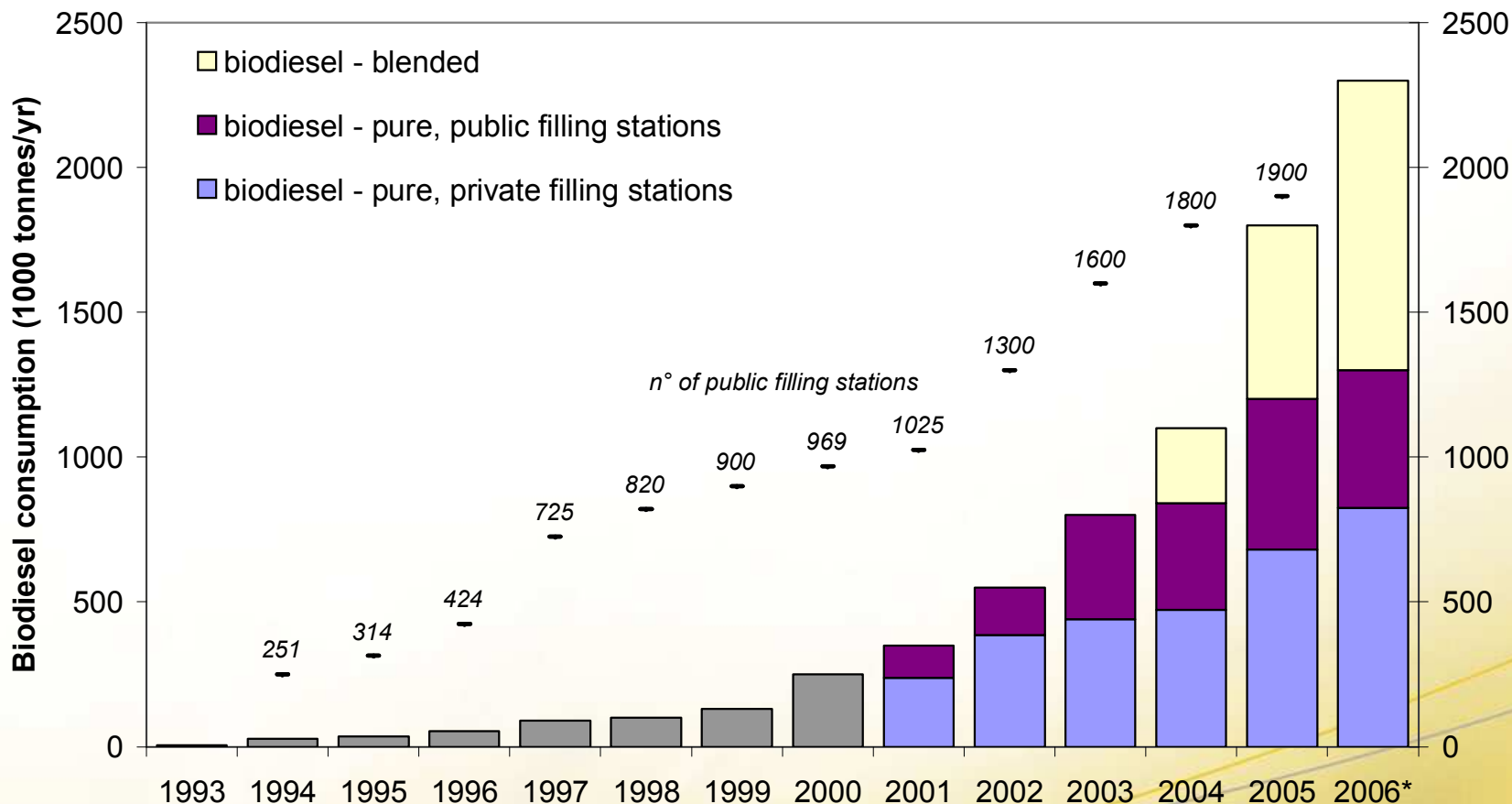




Biodiesel in Germany



Biodiesel consumption in Germany

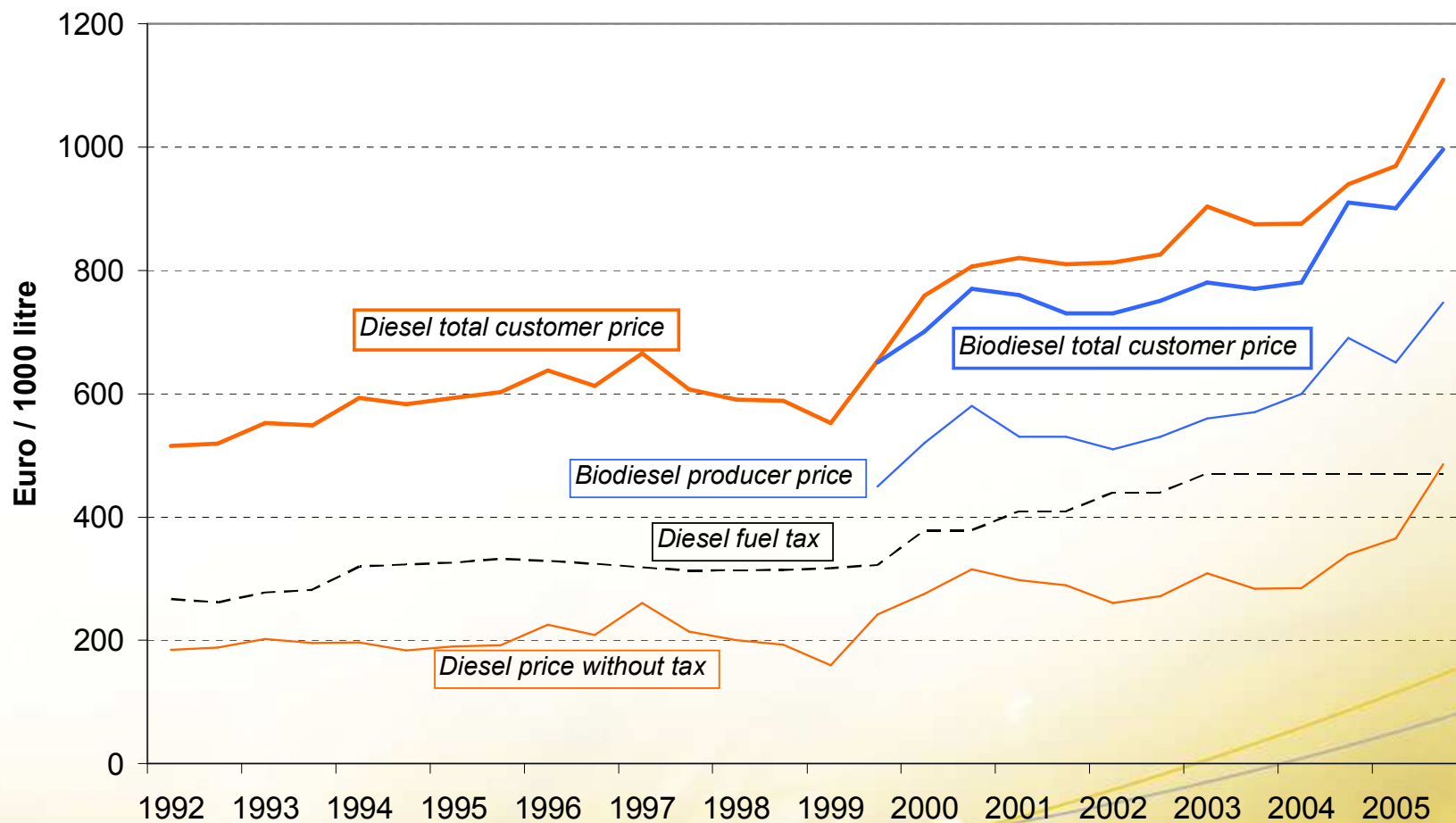




Biodiesel in Germany



Evolution of diesel and biodiesel price in Germany





Biofuels in France



- Tax reduction
 - Focus on low blends of biodiesel and ETBE
 - Accreditation system (quota) for biofuel producers;
 - Quota determined by government
- Cooperation agriculture – biofuel producers – oil industry
- Fast build-up of biofuel production from 1994
- From 2005 (target 7% in 2010)
 - increase of accreditation quota up to 2010
 - introduction of biofuel target for fuel distributors,
 - with penalty tax system (TGAP ~ obligation)
 - together with (lower) tax reduction





Biofuels in Sweden



- Tax exemption from 1992
 - for all biofuels (pure & blended)
 - high blends (ethanol, biogas, biodiesel) in focus, but recently low blends create the volumes
- Procurement systems
 - Common procurement initiated the FFV market
 - Public procurement of 'environment friendly vehicles' in public fleets
- User incentives (vehicle tax, free parking, exemption of toll)
- Support programmes for ethanol from cellulose

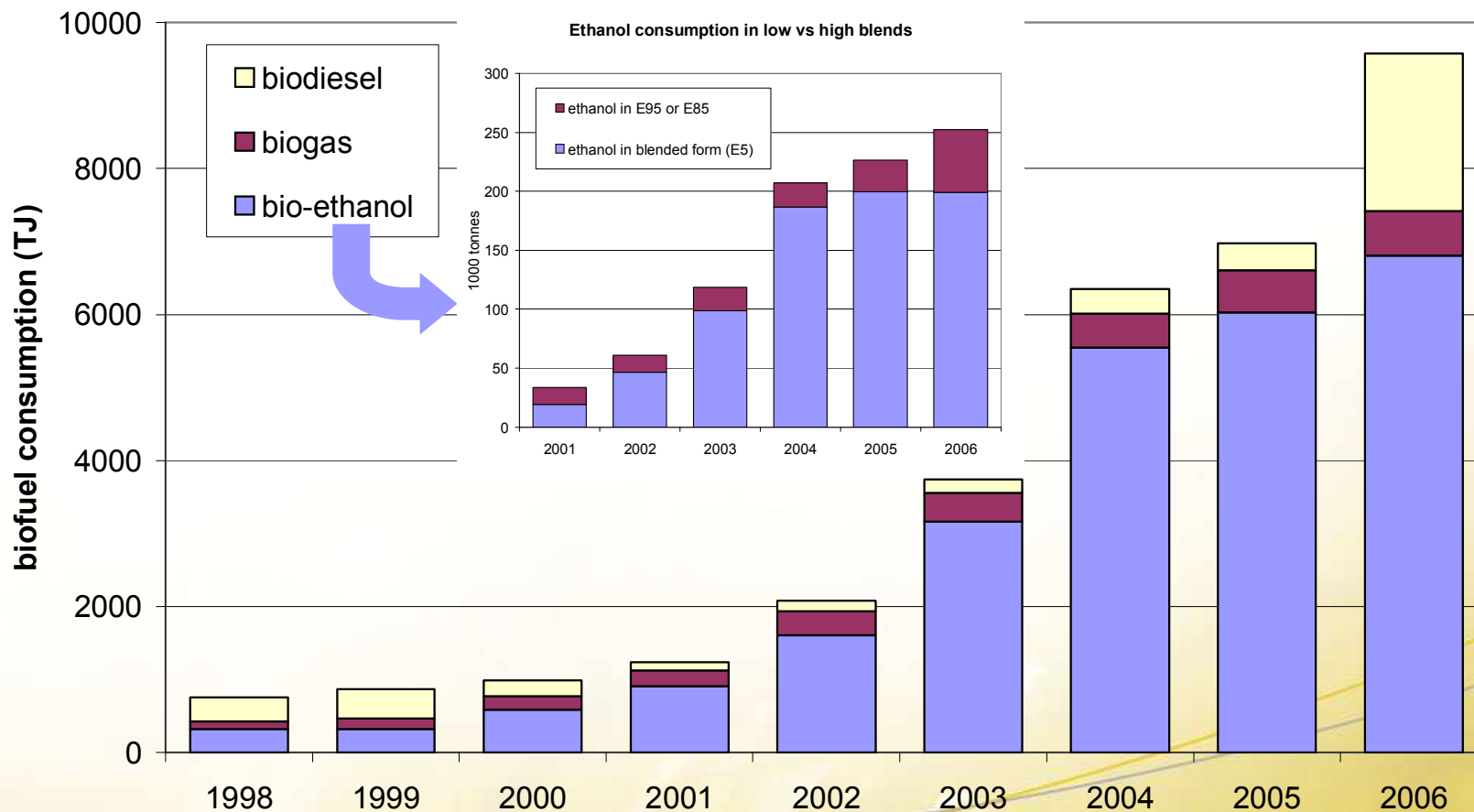




Biofuels in Sweden



Evolution of biofuel consumption in Sweden (total transport fuels ~ 3 million TJ)





Main measures for current market phase



- tax reduction
 - compensate higher production cost
 - take into account lower energy content per litre
- substitution mandate for fuel distributors
 - generally on overall sales
 - penalty for non-compliance (higher than extra cost)

other complementary measures may still be necessary,
to increase availability of feedstock,
to assure sustainability & CO2 performance of different biofuels,
to stimulate new developments towards better yields and CO2 performance,
to incentivise the market (in case of dedicated vehicles),

...





Tax exemption (partial or total) Pros and Cons



- ☺ Policy has proven successful
 - well suited to initiate an 'infant' market
- ☺ Can be differentiated to e.g. environmental efficiency
- ☺ Suitable to bring pure/high blends into the market
 -
- ☹ Important direct revenue losses for the government:
 - 2005: 900 Mio EUR Germany (biodiesel); 200 Mio France, 160 Mio Sweden, 90 Mio in Spain
 - Costs carried by society as a whole
- ☹ Impact depends on tax levels and oil prices – difficult to predict
- ☹ Risk of over- and undercompensation
 - ☹ Leaves high degree of freedom to the market
 - => might be insufficient to reach high market shares





Obligations - Pros and Cons



- ☺ Guarantees that targets will be met
(if fines for non-compliance are high enough & no alternatives)
- ☺ Stable investment framework,
can be applied to mature markets too
- ☺ No revenue losses for the government
many Member States changed recently
- ☹ / ☺ Costs carried by fuel suppliers but likely to be passed on
to the final transport users
Increase in final (fossil) fuel price very limited with blends
'Polluter pays' principle
Potentially lower transport fuel demand
- ☹ Limited experiences so far
Difficult to implement (reluctance, control)
- ☹ Not suitable for high blends or for infant markets





Obligations - Pros and Cons



☹ / 😊 Lowest cost fuels will be used (particular with tradable certificates)

- higher share imports, less support to domestic agriculture
- less incentives for innovation (2nd generation biofuels)
- potentially lower CO2 emissions mitigation
- likely to favor low-blend fuels

Efficient instrument, but accompanying measures needed to promote certain types of biofuels

=> combination with sustainability requirements (UK, NL, DE)

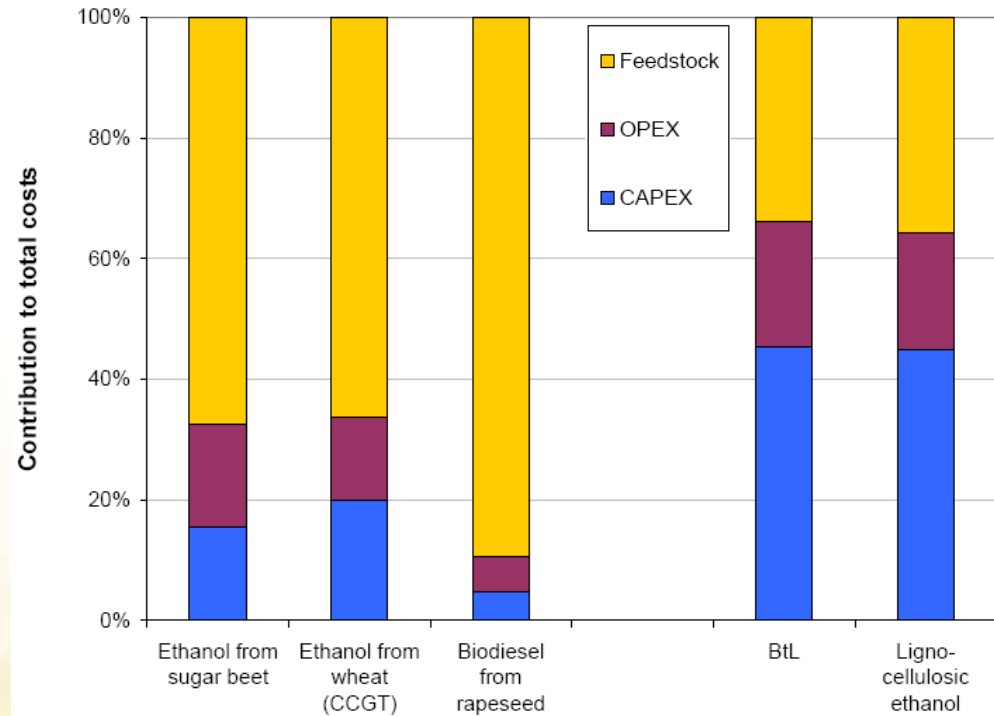




Investment subsidies Pros and Cons



- ☹️ Only complementary to mandate/tax exemptions as limited impact on fuel price
- 😊 This may change for 2nd generation biofuels
- 😊 Can steer investment





Feedstock subsidies Pros and Cons



- ☹️ Loss of revenue for governments
- ☹️ Only complementary measure (current energy crop premium):
 - impact on biodiesel cost 0.03-0.04 ct/l
 - bioethanol 0.01-0.02 ct/l
- ☹️ Can draw away crops from food production and increase their price
- 😊 Direct support to farmers
- 😊 Can be used to influence the sort of crops grown (and reflect environmental impacts)





Overview



	Biofuel share (%)		Tax reduction	Obligation
	2005	2006		
Austria	0.93	3.54		from Oct. 05
Belgium	0.00	0.01	Quota from Oct 06	proposed
Bulgaria	n.a.	n.a.	?	
Cyprus	0.00	n.a.		
Czech Rep.	0.05	0.30		
Denmark	0.00	0.10	CO ₂ tax	
Estonia	0.00	0.12		
Finland	0.00	0.02		From 2008
France	0.97	1.75	Quota	TGAP from 2005
Germany	3.75	6.50		From 2007
Greece	0.04	n.a.	?	
Hungary	0.07	0.26		
Ireland	0.04	0.09	Projects	From 2009
Italy	0.51	0.46	Quota	?

	Biofuel share (%)		Tax reduction	Obligation
	2005	2006		
Latvia	0.33	0.22		
Lithuania	0.72	1.72		From 2006
Luxembourg	0.02	0.02		proposed
Malta	0.52	0.58		
Netherlands	0.02	0.29	in 2006	From 2007
Poland	0.47	0.92		From 2008
Portugal	0.00	1.02		
Romania	n.a.	n.a.		
Slovakia	n.a.	n.a.		From May06
Slovenia	0.35	0.27		From 2006
Spain	0.44	0.53		
Sweden	2.23	3.10		AMF obl. fuel stations
UK	0.18	0.45		From 2008





Country grouping on common characteristics, related to biofuel introduction

Economy	Agriculture	Energy Demand
<ul style="list-style-type: none">• GDP (Absolute value)• GDP (PPS)• Presence of industry• Import tradition	<ul style="list-style-type: none">• Agricultural area / fallow area / forest area• Arable land per capita• Average yields for energy crops (oilseeds / cereals)• Employment in agriculture• Share of agriculture in Gross Value Added	<ul style="list-style-type: none">• Energy demand per capita• CO₂ emissions per capita• Oil import dependency• Transport energy demand per capita• Number of road vehicles per capita• Diesel / gasoline ratio

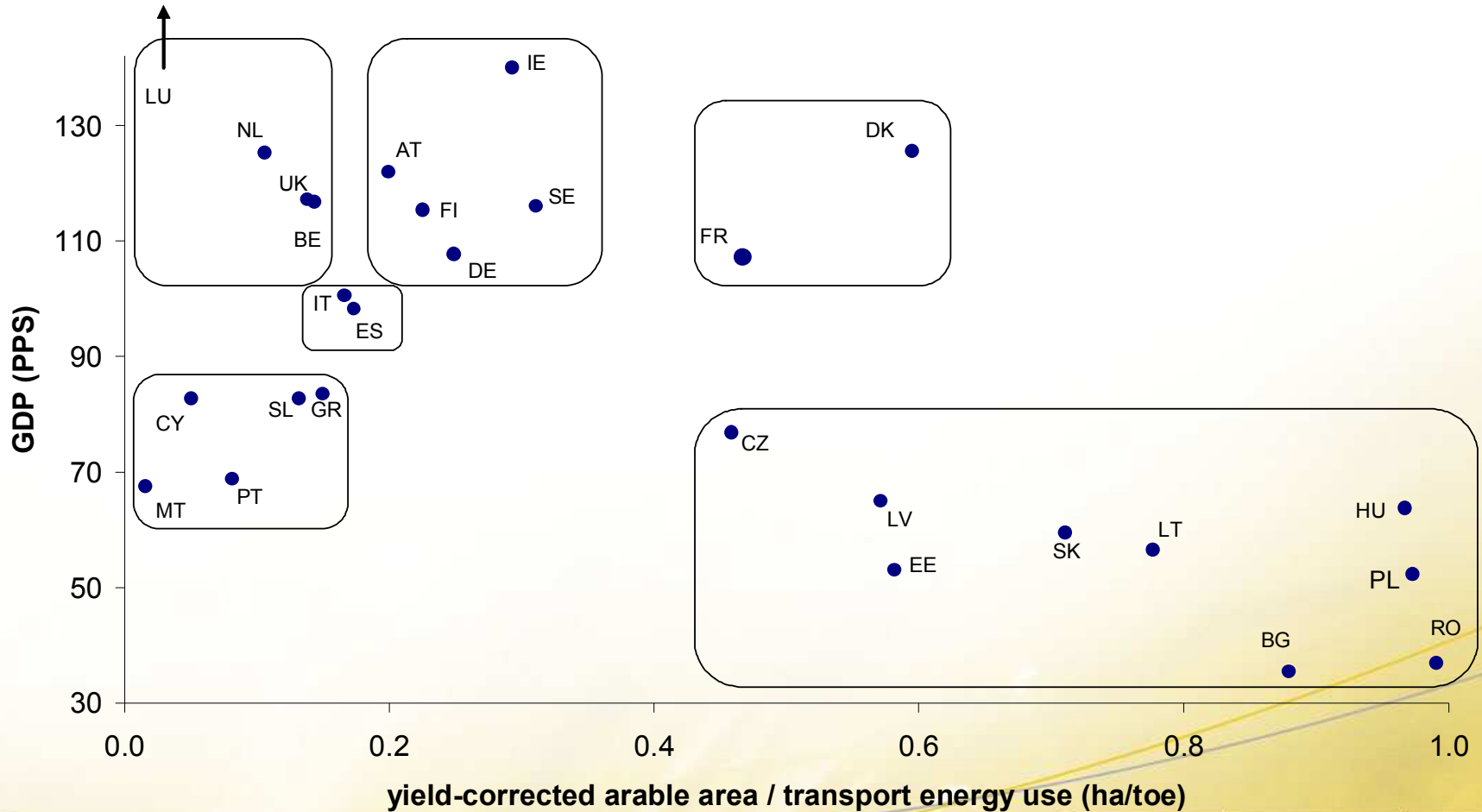




Clustering



relation between GDP and arable area / transport energy





Experience so far



- Countries from the clusters with low economic strength (most new member states), and the ones with low agricultural potential (Benelux, UK) tend to lack in comparison with the rest as far as biofuels production and consumption is concerned.
- However, actual success on the biofuels sector also depends on:
 - Level of industrialization & size of the economy
 - Role of agriculture in the economy
 - Existence and role of sector associations / lobby groups
 - Willingness of the Government to support biofuels
 - Political drivers like energy security, greenhouse gas emissions, ...





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