



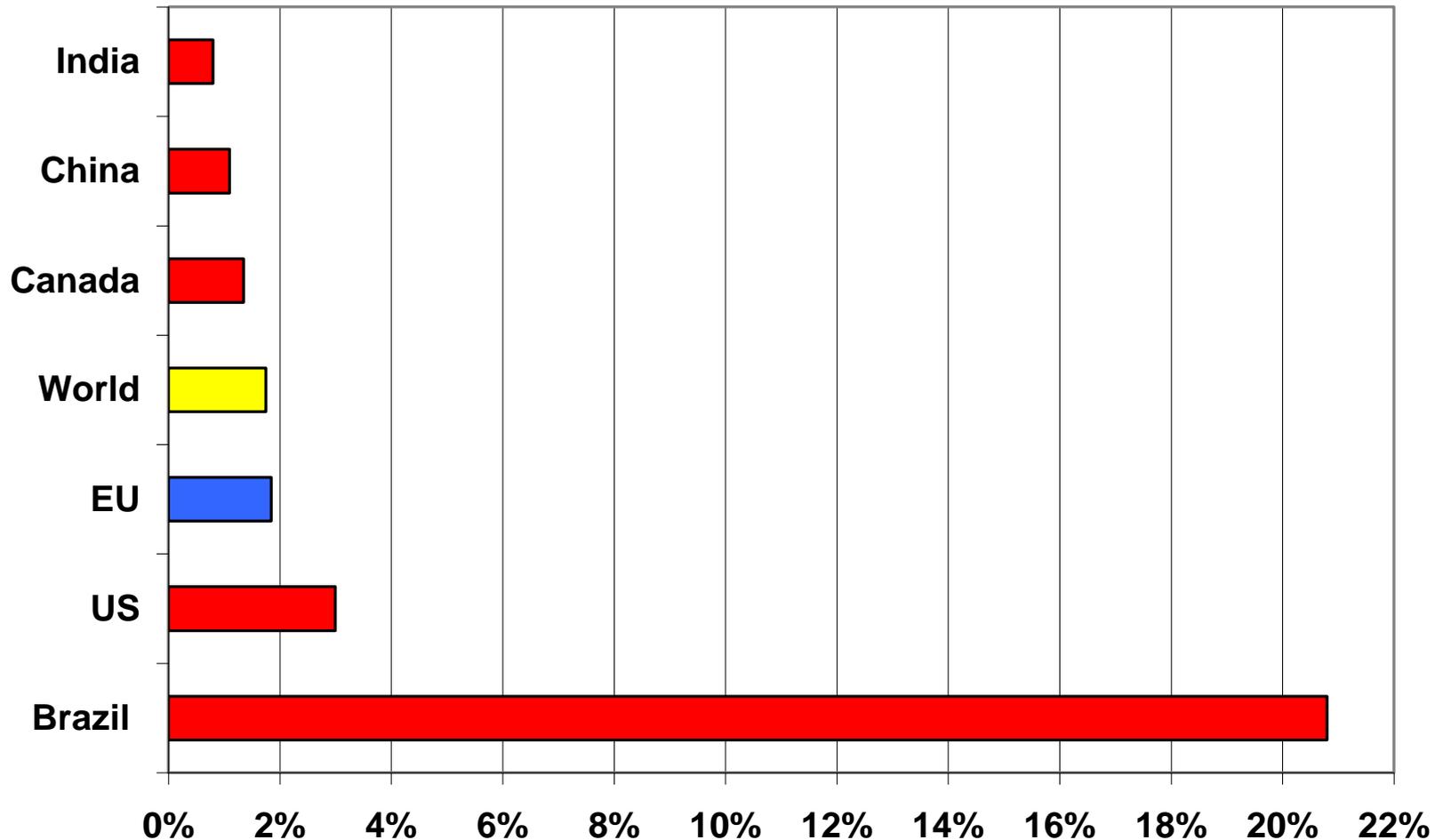
Prospects and impediments for biofuels in Europe with special focus on Austria

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- Introduction
- Biofuels production
- Land resources and land use
- Cost of biofuels
- Conclusions

INTRODUCTION

Share of biofuels



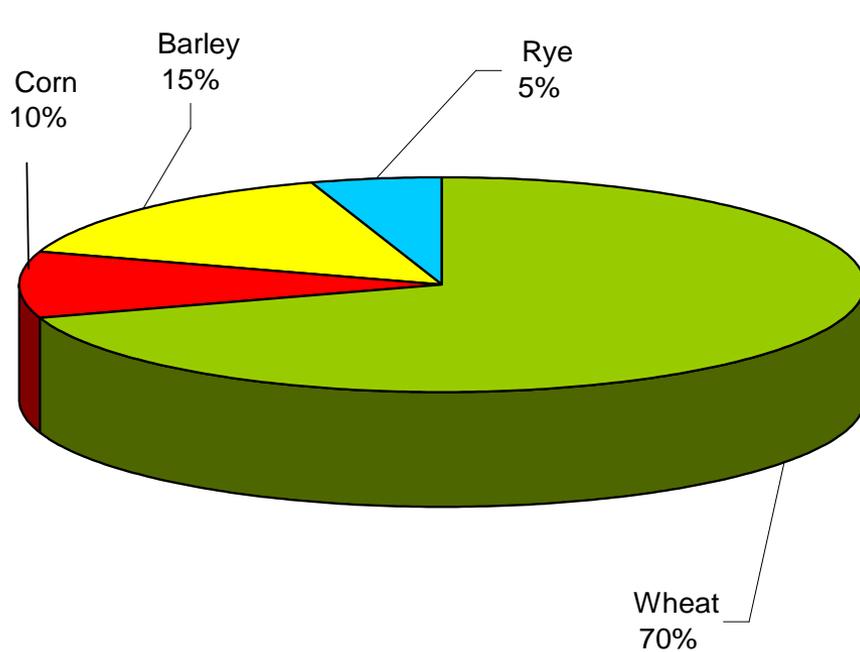
Share of biofuels in total road-fuel consumption in energy terms, 2007
(Source: F.O.Licht, IEA)

Country	2010 Target (%)
EU Target	5.75
Austria	5.75
Cyprus	5.75
Czech Republic	5.55
France	7
Germany:Ethanol	3.6 mandate
Germany:Biodiesel	6.17 mandate
Greece	5.75
Italy	2.5
Latvia	5.75
Lithuania	5.75
Luxembourg	5.75
Netherlands	5.75 mandate
Poland	5.75
Slovakia	5.75
Slovenia	5
Sweden	5.75
United Kingdom	3.5

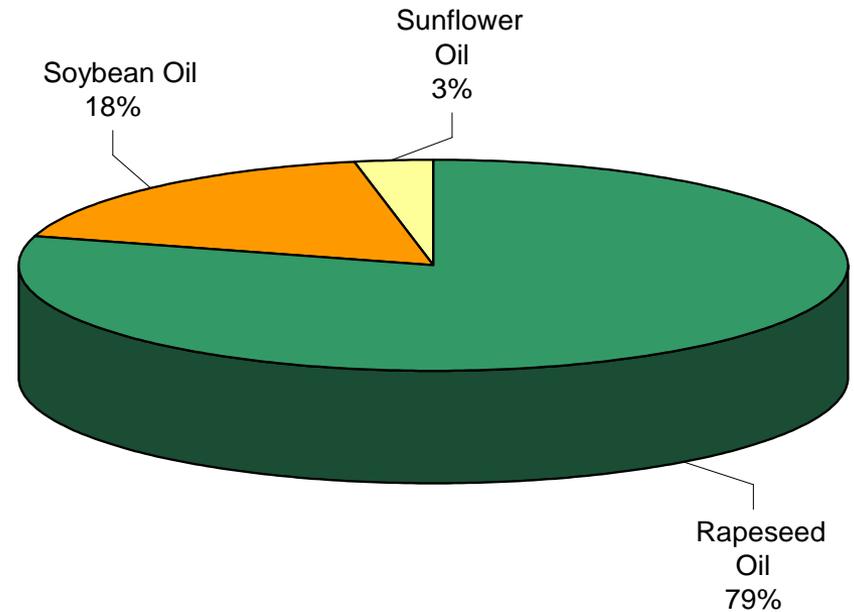
EU Member States Biofuel Targets

A survey on biofuels

Classification	Feedstock		Biodiesel	Ethanol	FT-Diesel	Bio-DME	Bio-SNG
1st	Oil crops	Rapeseed	x				
		Sunflower	x				
	Sugar crops	Sugar beet		x			
		Sugar cane		x			
	Starch crops	Wheat		x			
		Maize		x			
		Triticale		x			
		Sweet sorghum		x			
	Organic waste	Used oils/fats	x				
Residues from agriculture	Digestible		x			x	
2nd	Lignocellulosic crops	Woody plants		x	x	x	x
		Herbaceous plants		x	x	x	x
	Residues from agriculture	Non-digestible (straw)		x	x	x	x
	Residues from forestry			x	x	x	x
	Residues from wood industry			x	x	x	x

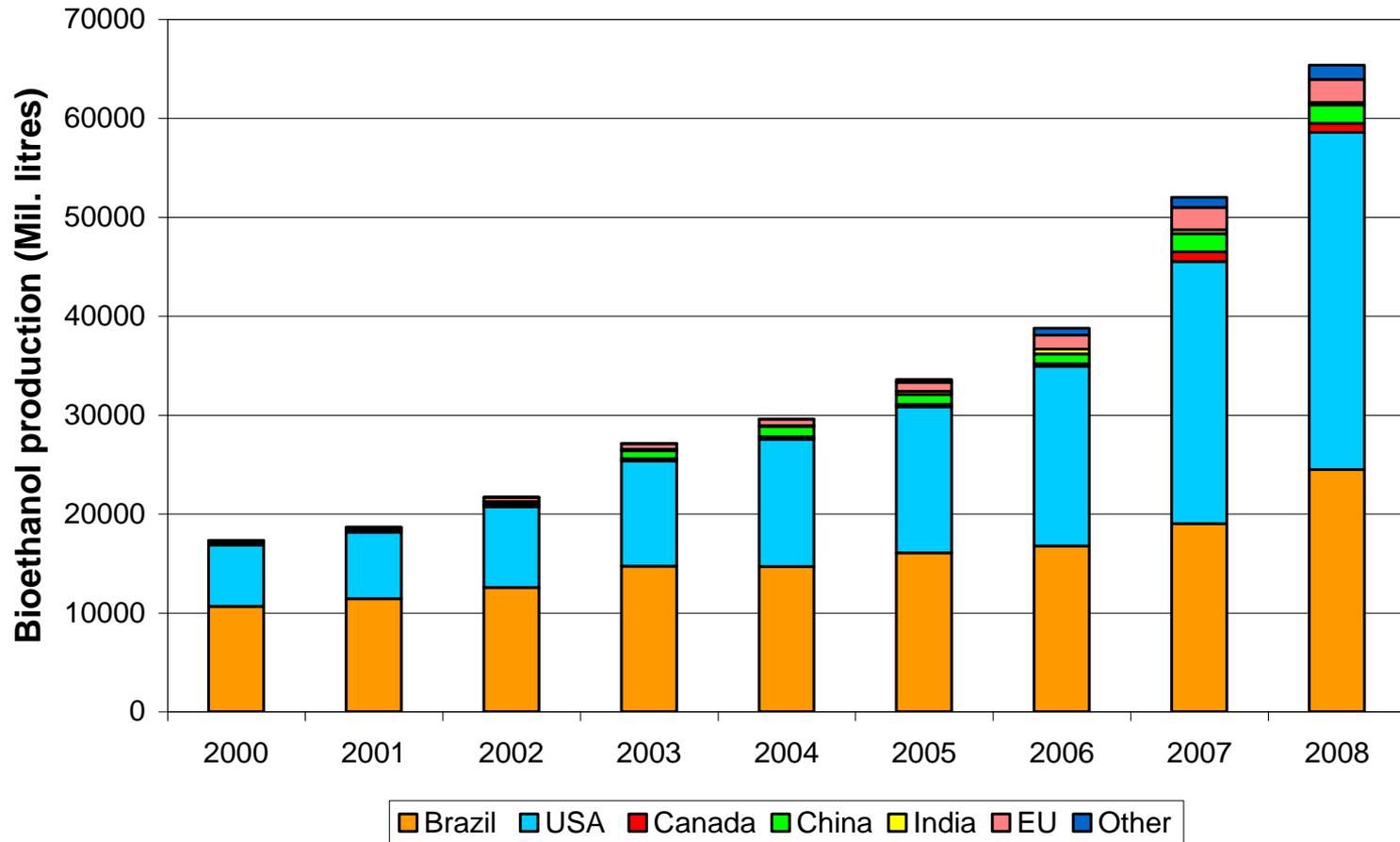


EU-25: Feedstock use in ethanol production in 2008
(Source: FAPRI, 2008)

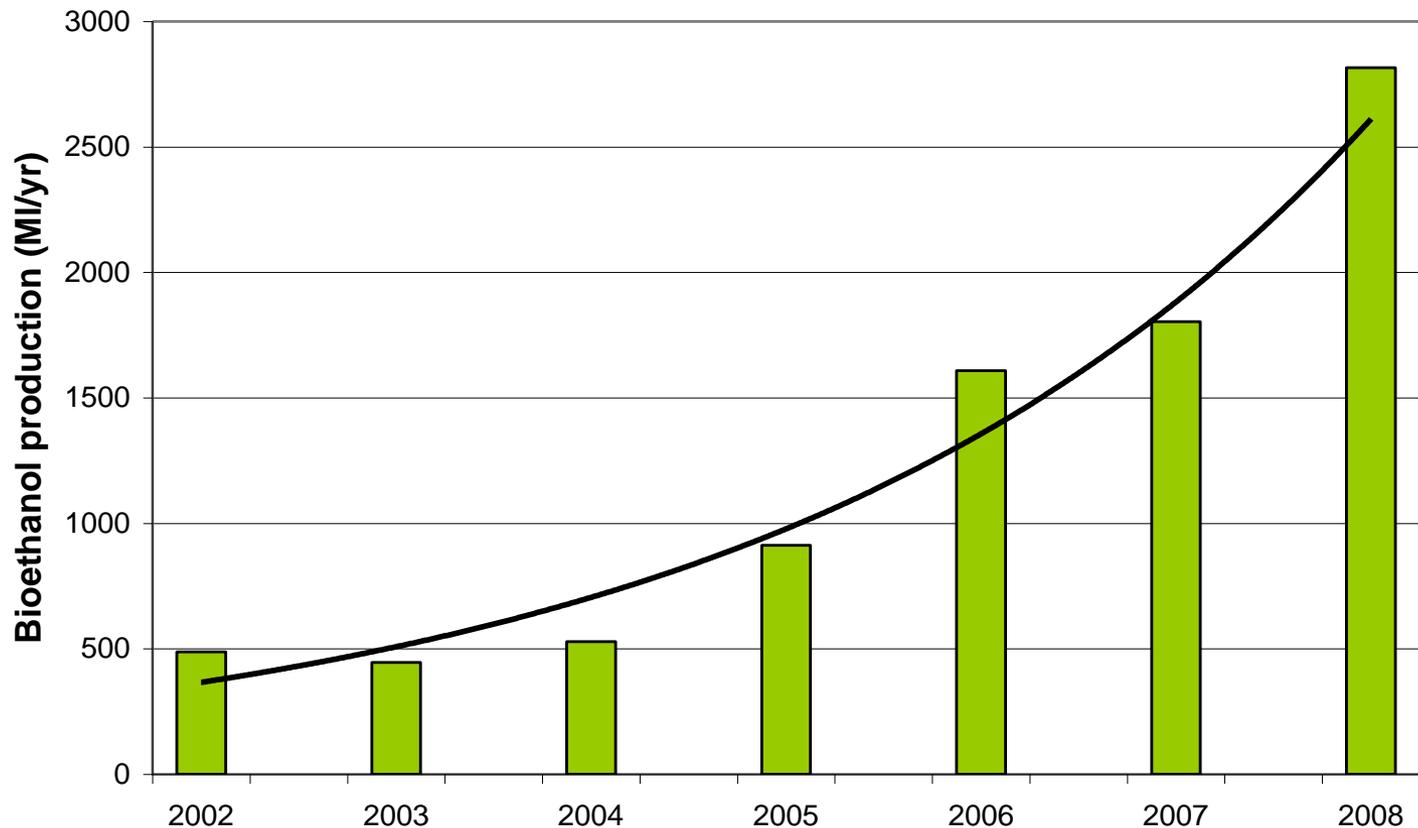


EU-25: Feedstock use in biodiesel production in 2008
(Source: FAPRI, 2008)

BIOFUELS PRODUCTION

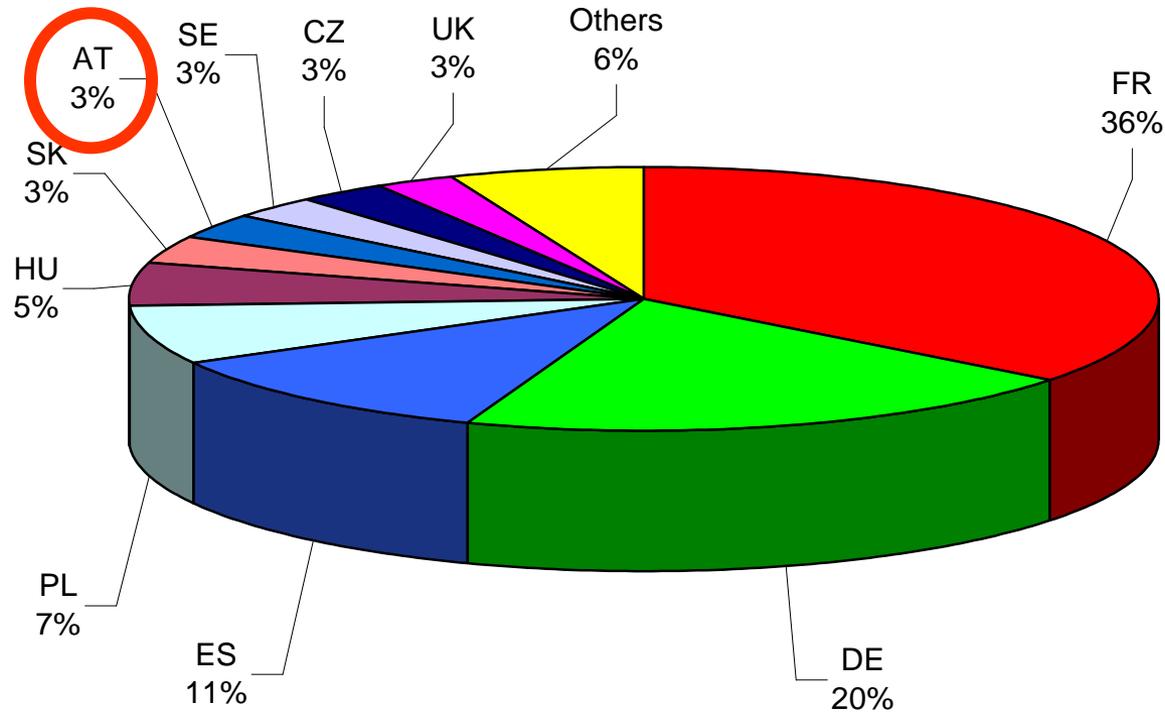


Recent trends in ethanol production (Data source: F.O.Licht, IEA, EBTP)



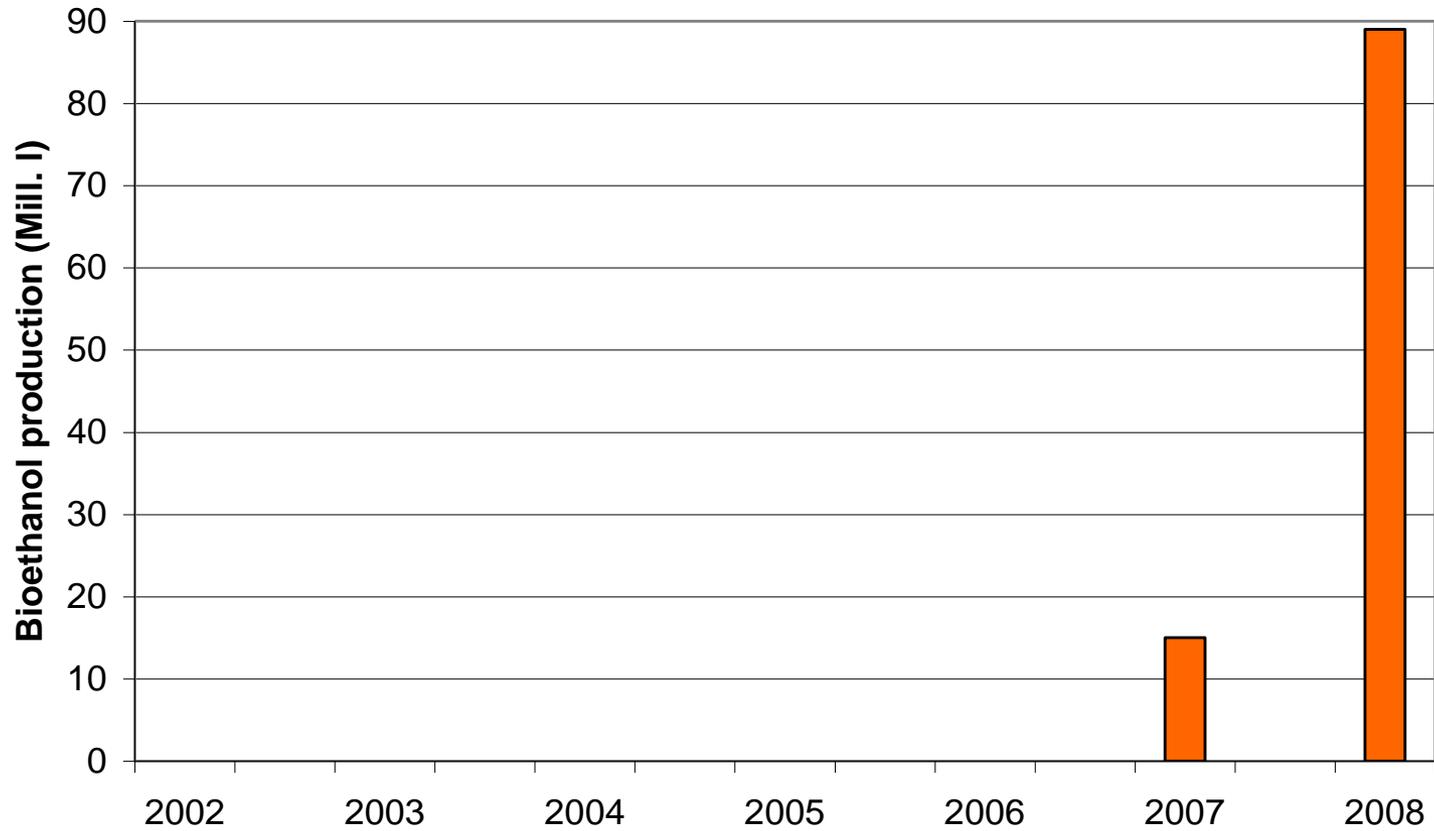
Recent trends in ethanol production in EU-27

Bioethanol production

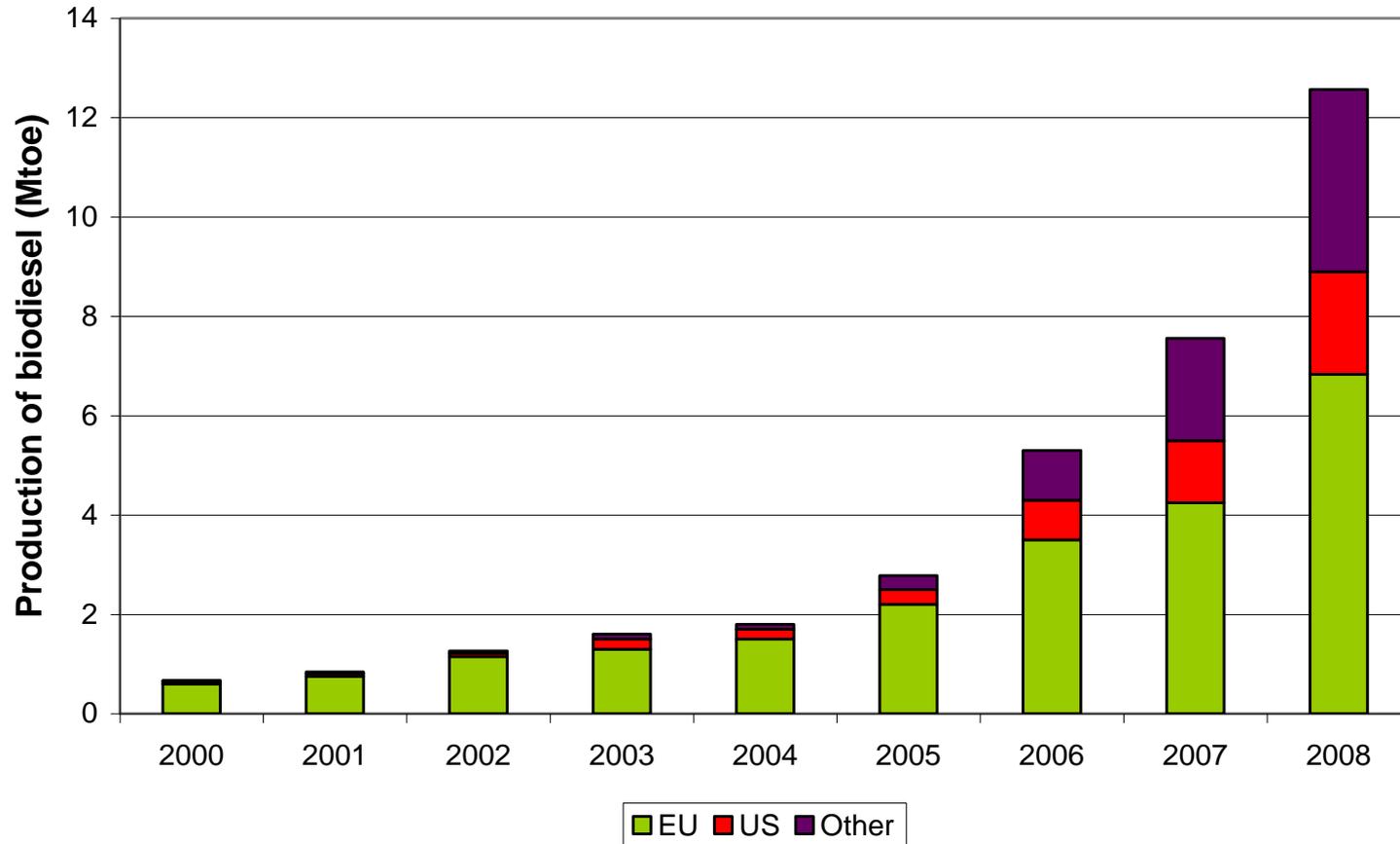


Bioethanol production in EU-27, 2008

Bioethanol production

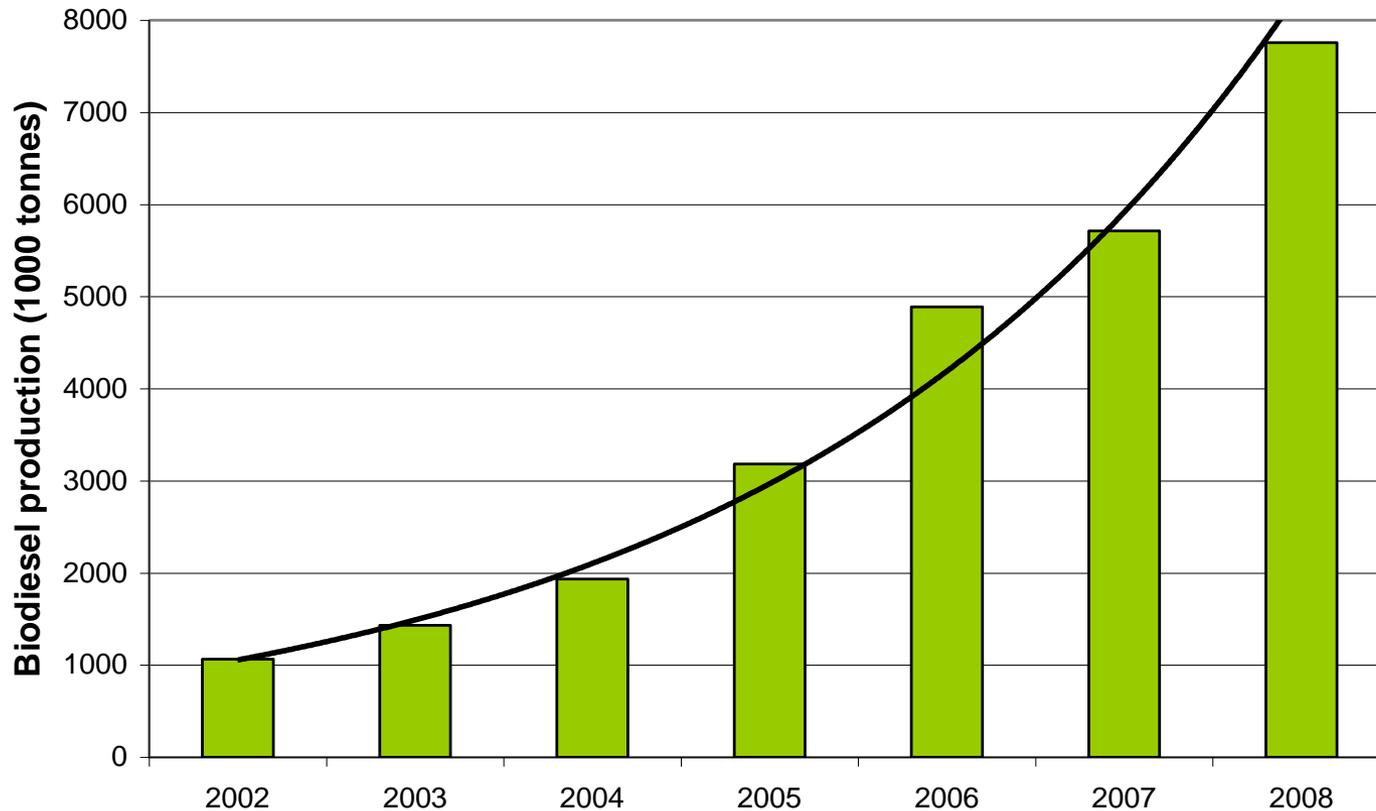


Bioethanol production in Austria



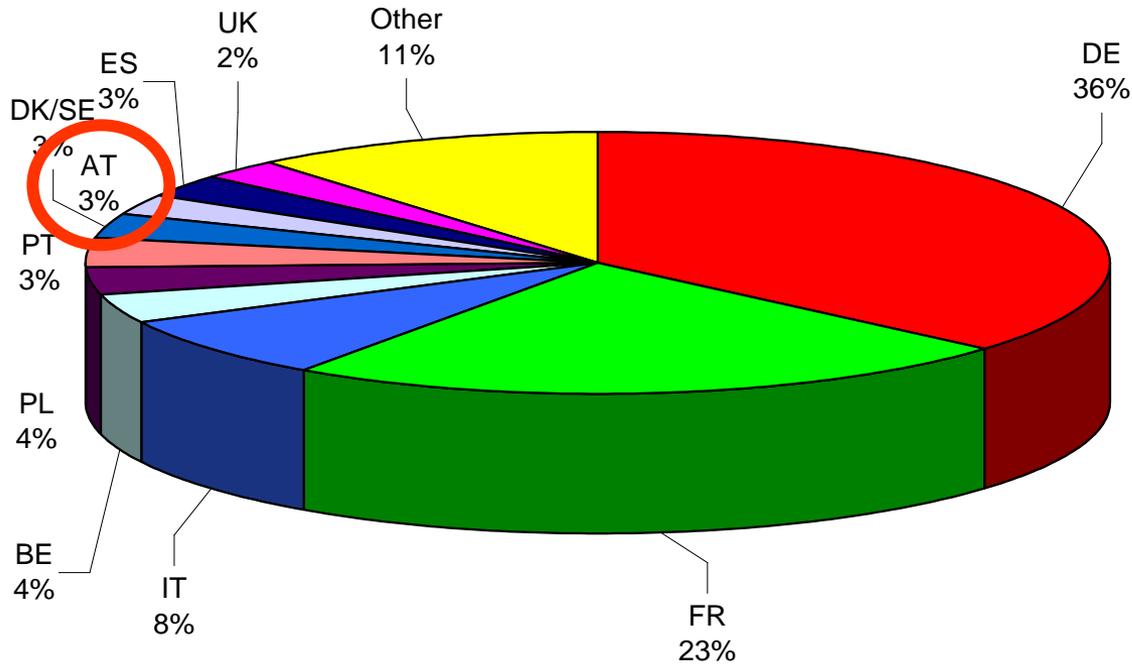
Recent trends in biodiesel production (Data source: F.O.Licht, IEA, EBTP)

Biodiesel production



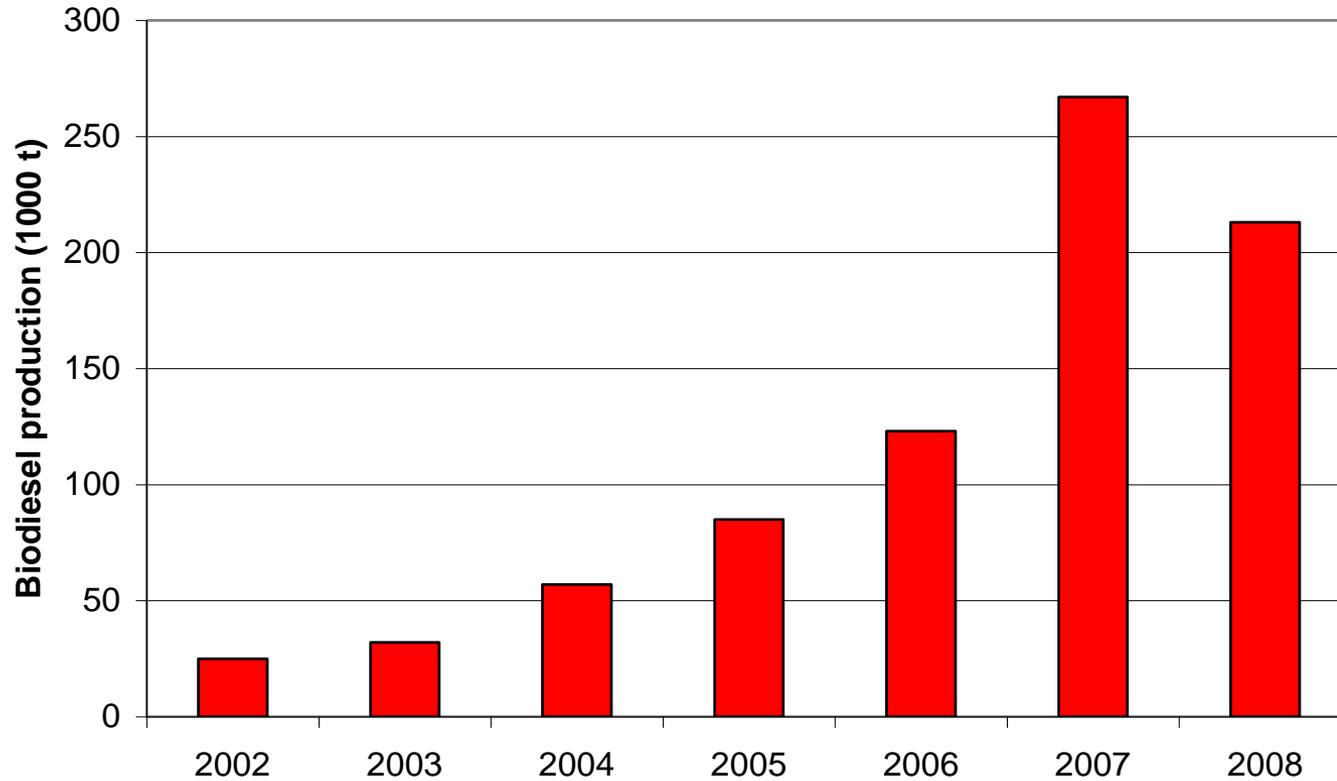
Recent trends in biodiesel production in EU

Biodiesel production



Biodiesel production in EU-27, 2008

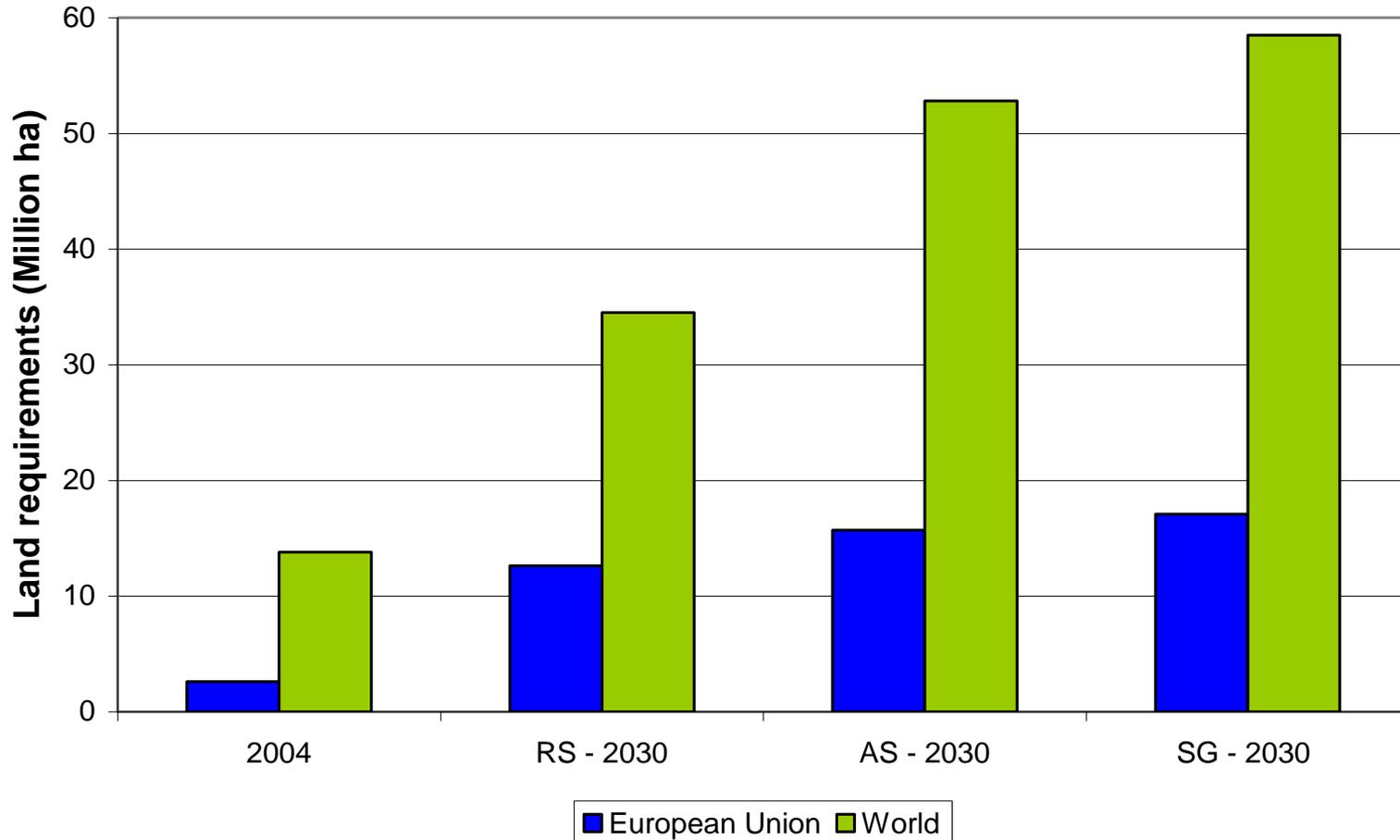
Biodiesel production



Biodiesel production in Austria

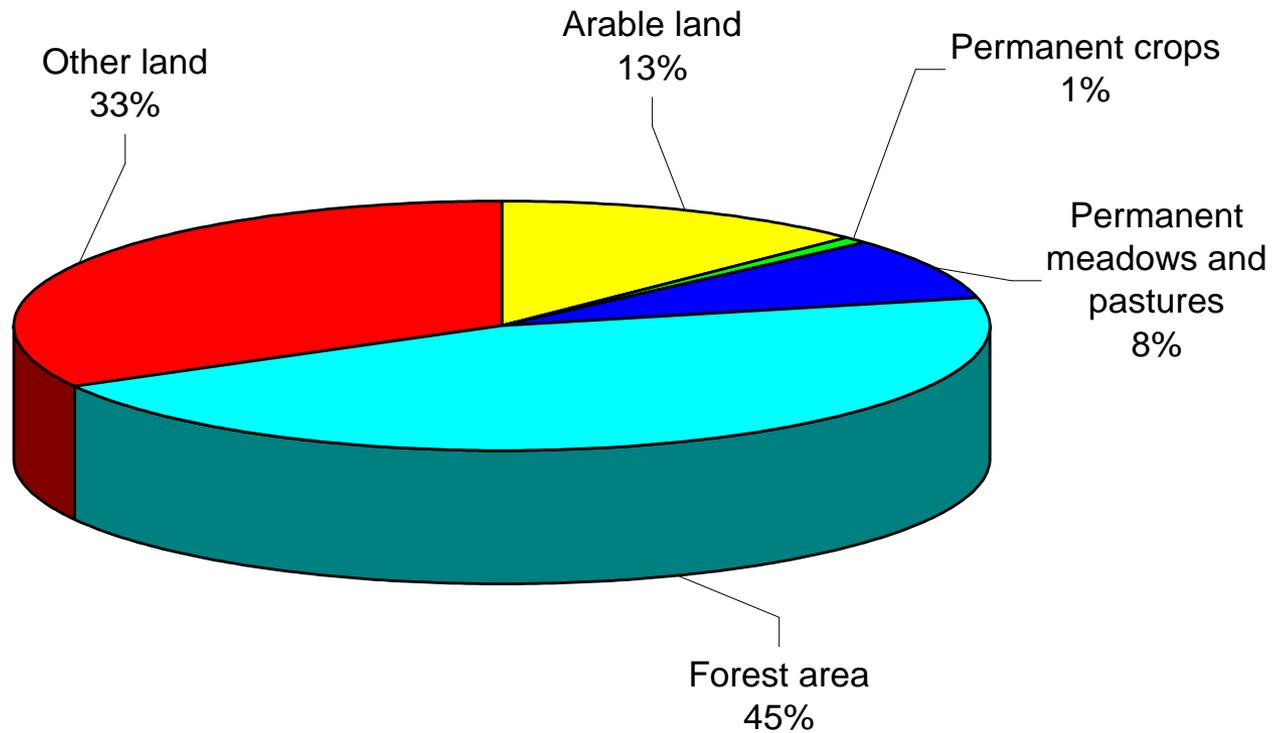
LAND RESOURCES AND LAND USE

Land requirements for biofuels production

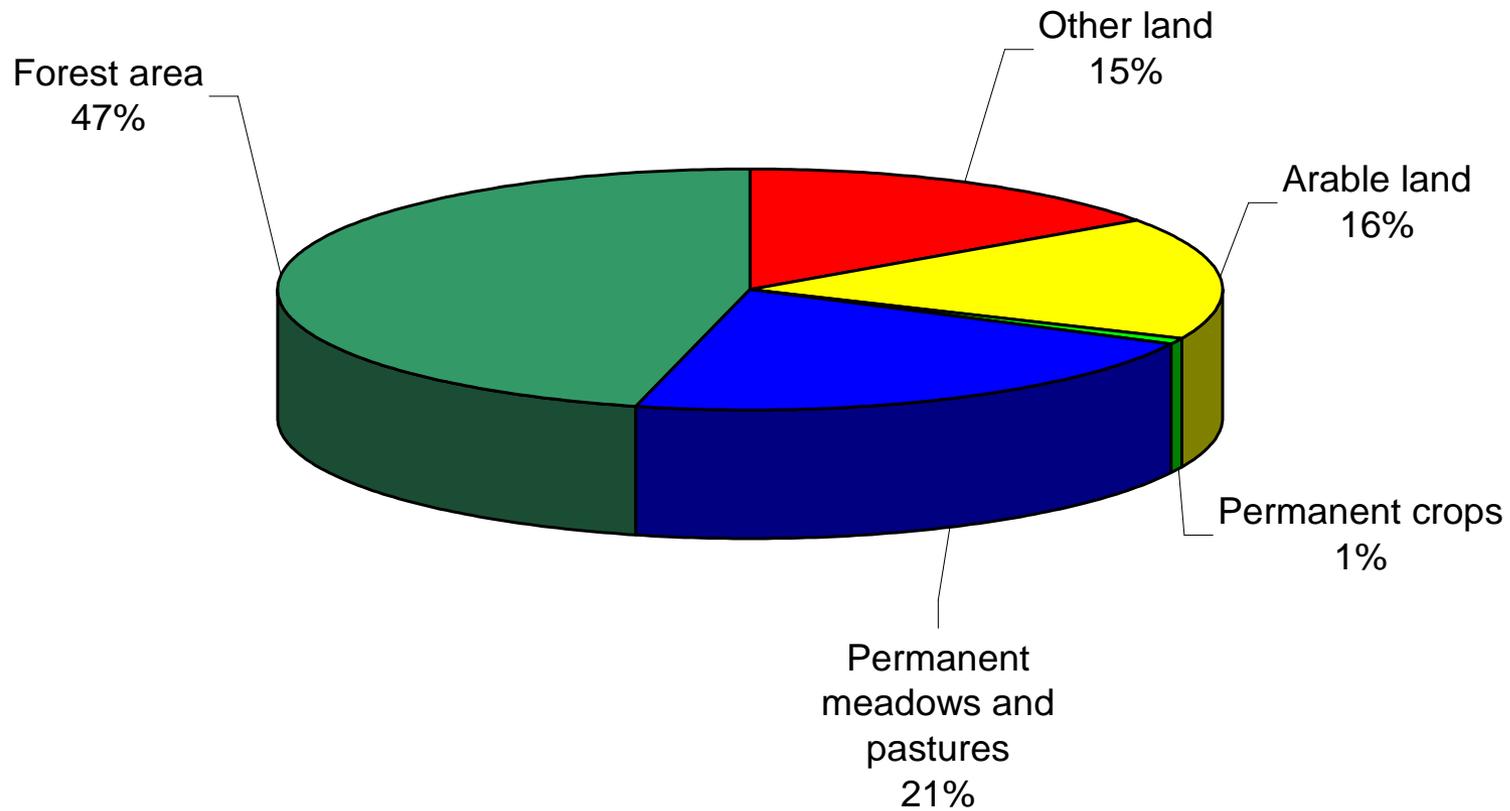


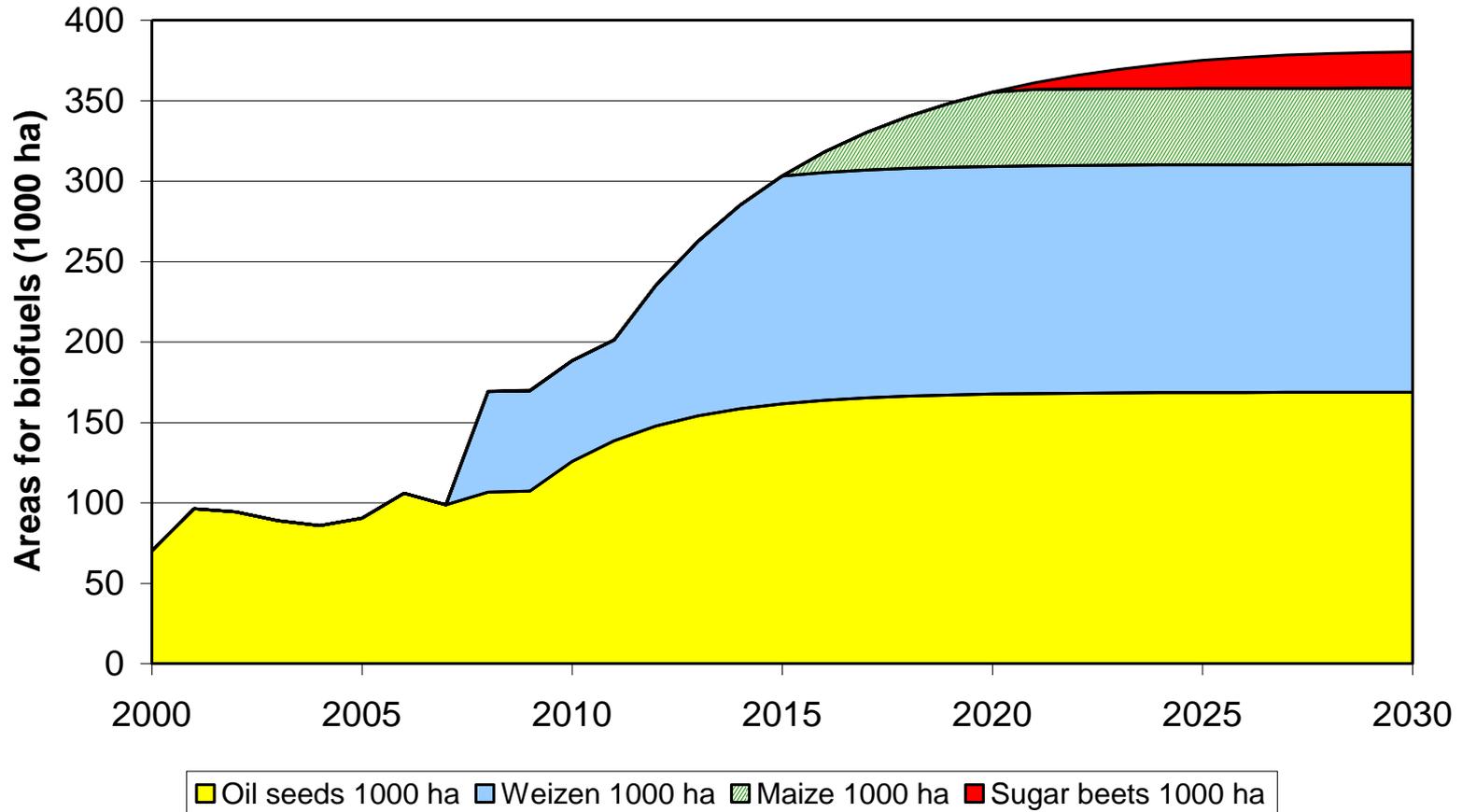
Land requirements for biofuels production

Land area in Europe



Land area in Austria





Areas for biofuels in Austria (“Maximum”)

COST OF BIOFUELS

Biofuels costs (BFC)

$$BFC = FC + ACC - Sub$$

- Net feedstock costs (FC)
- Average gross conversion costs (ACC)
- Subsidy for biofuels (Sub)

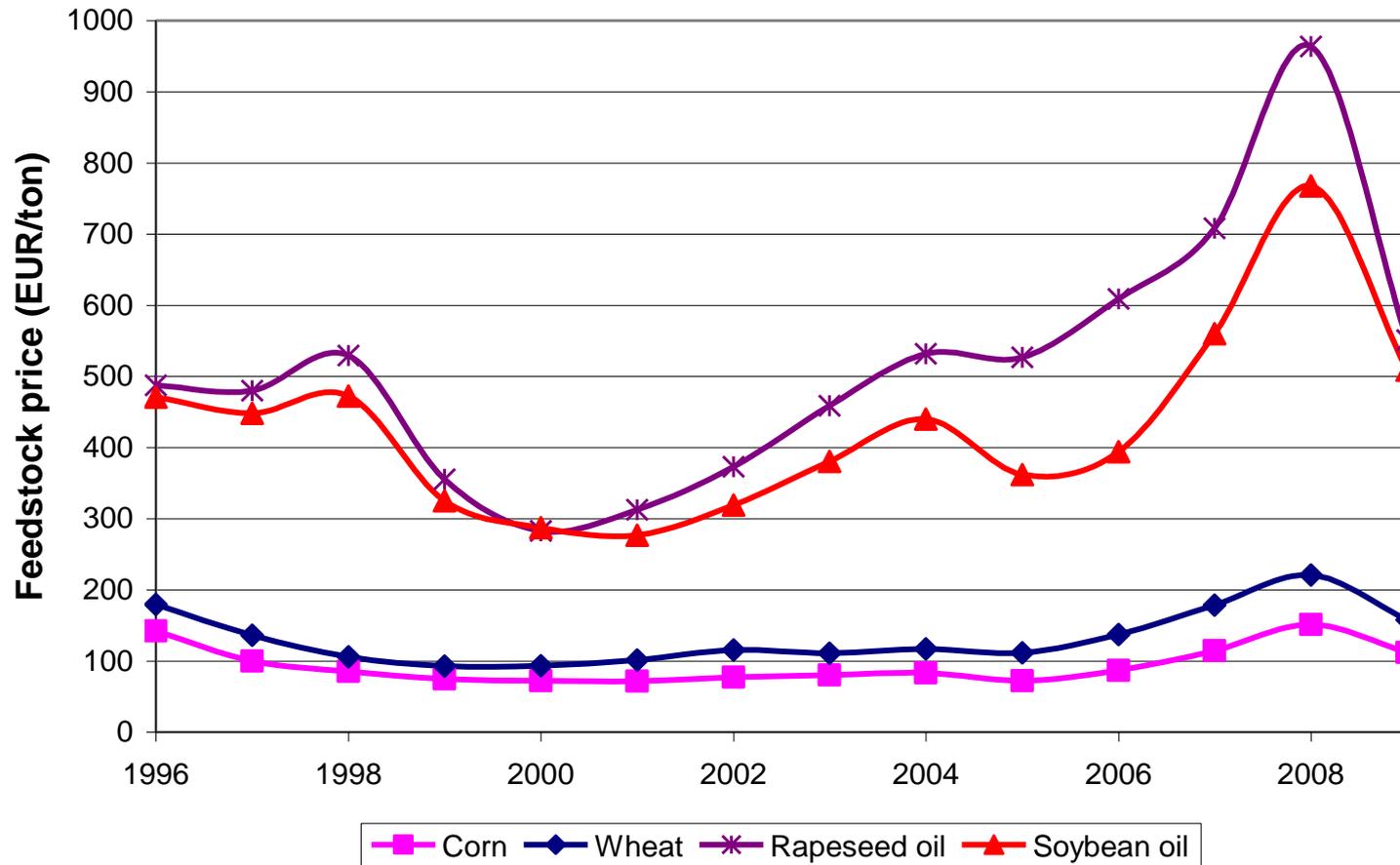
Net feedstock costs are calculated as:

$$FC = FP - ASub - C_{by-product}$$

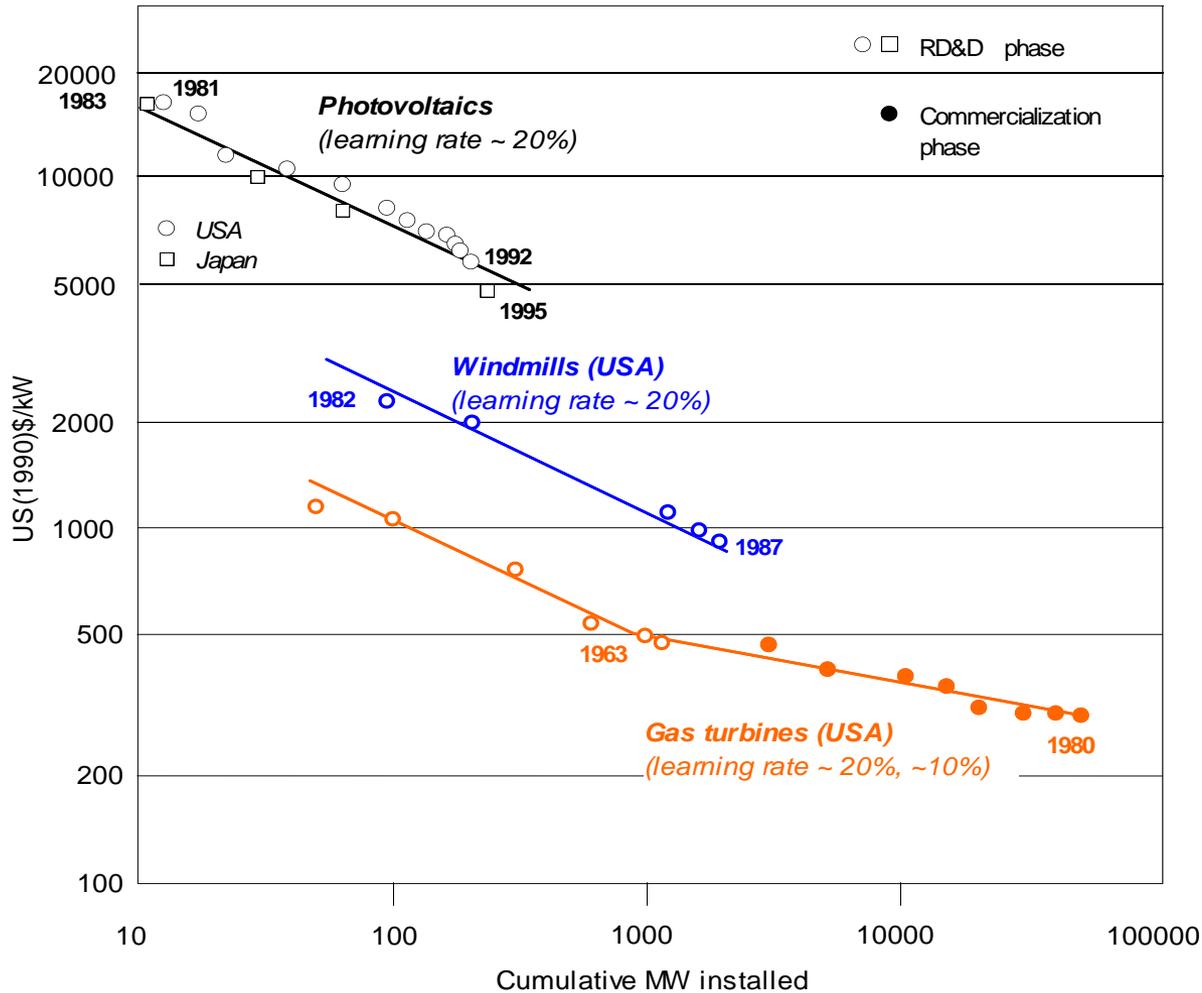
Where:

- FP.....Feedstock price
 - ASub.....Agricultural subsidy
 - Cby-product..... Credits for by-product
- Average gross conversion costs are calculated as:

$$ACC = CC + LC + EC + MC$$



Feedstock prices for period 1996-2009 (Data source: Index Mundi , FAPRI)



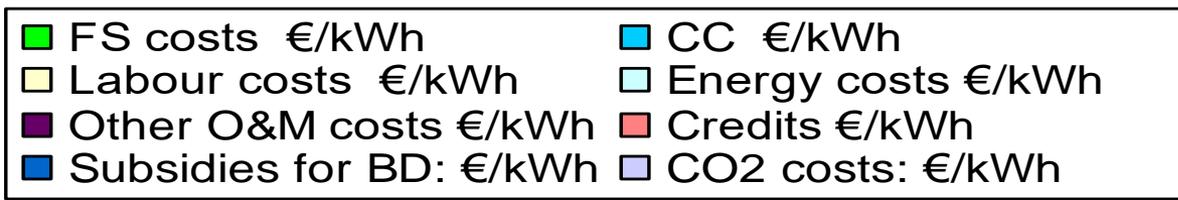
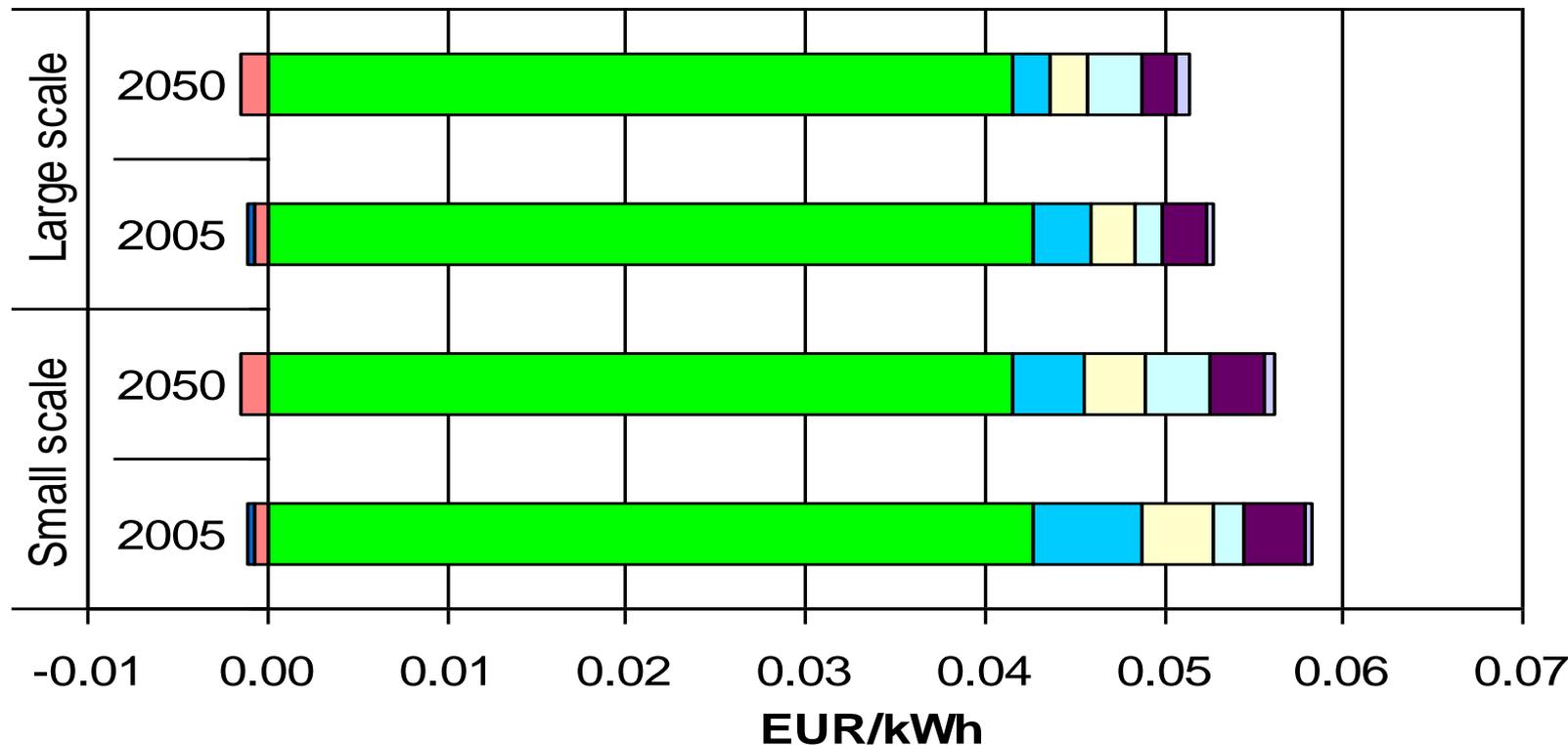
$$C(x) = a \cdot x^{-b}$$

C(x): Specific cost
x: Cumulative capacity
b: Learning index
a: Specific cost of the first unit

$$p = 2^{-b}$$

P: progress ratio

COSTS OF BIODIESEL



Conclusions

- Conventional production technologies for biofuels are relatively mature, but all current conversion technologies need to be optimised. Further incremental cost reductions can be expected, particularly through large-scale processing plants.
- Future biofuels costs depend on land availability for biofuels crops production, agricultural productivity and conversion efficiency over time, but also on the political will to support biofuels for transport until they are able to be competitive with conventional fuels.
- Biofuels production is very land intensive. In EU as well as in all regions with high population density biofuels production capacity is very limited.
- Biofuels can provide a significant contribution especially when accompanied by comprehensive efficiency improvements and continuous development towards 2nd generation biofuels, but biofuels will not be the one and only solution for GHG reduction in the transport sector.

Thank you for attention!