

EU Biomass/Bioenergy Policies: Regional-Global Linkages

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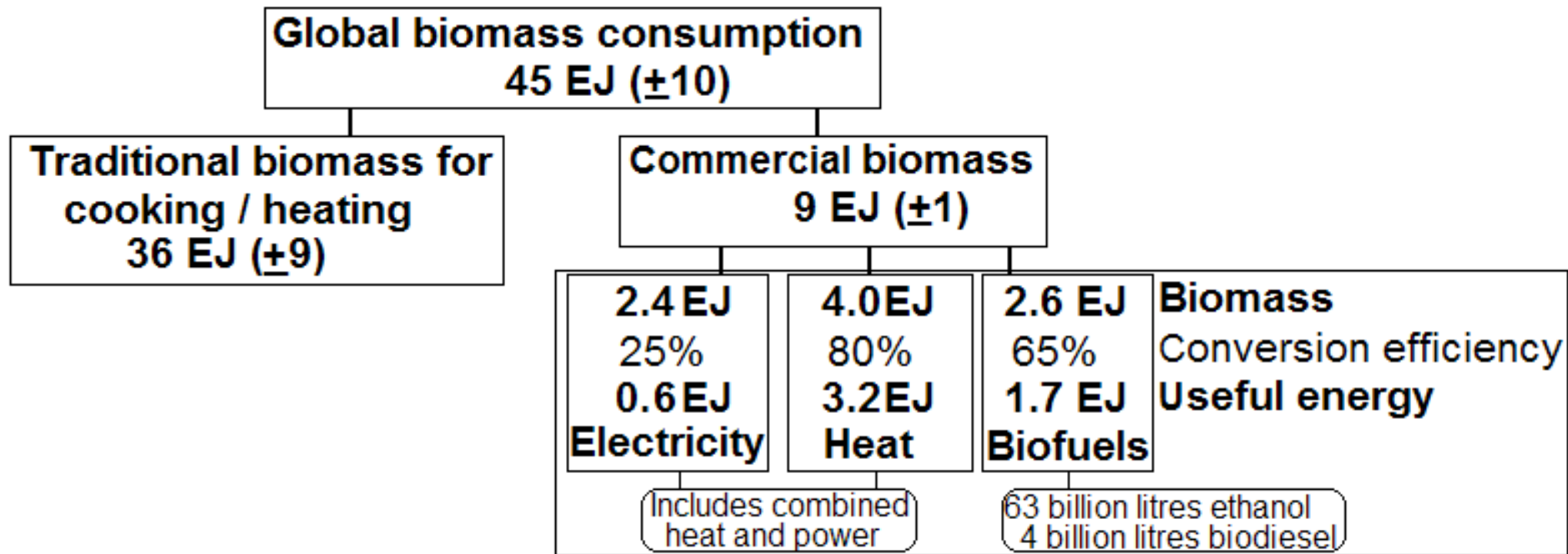


The Bioenergy Transition:

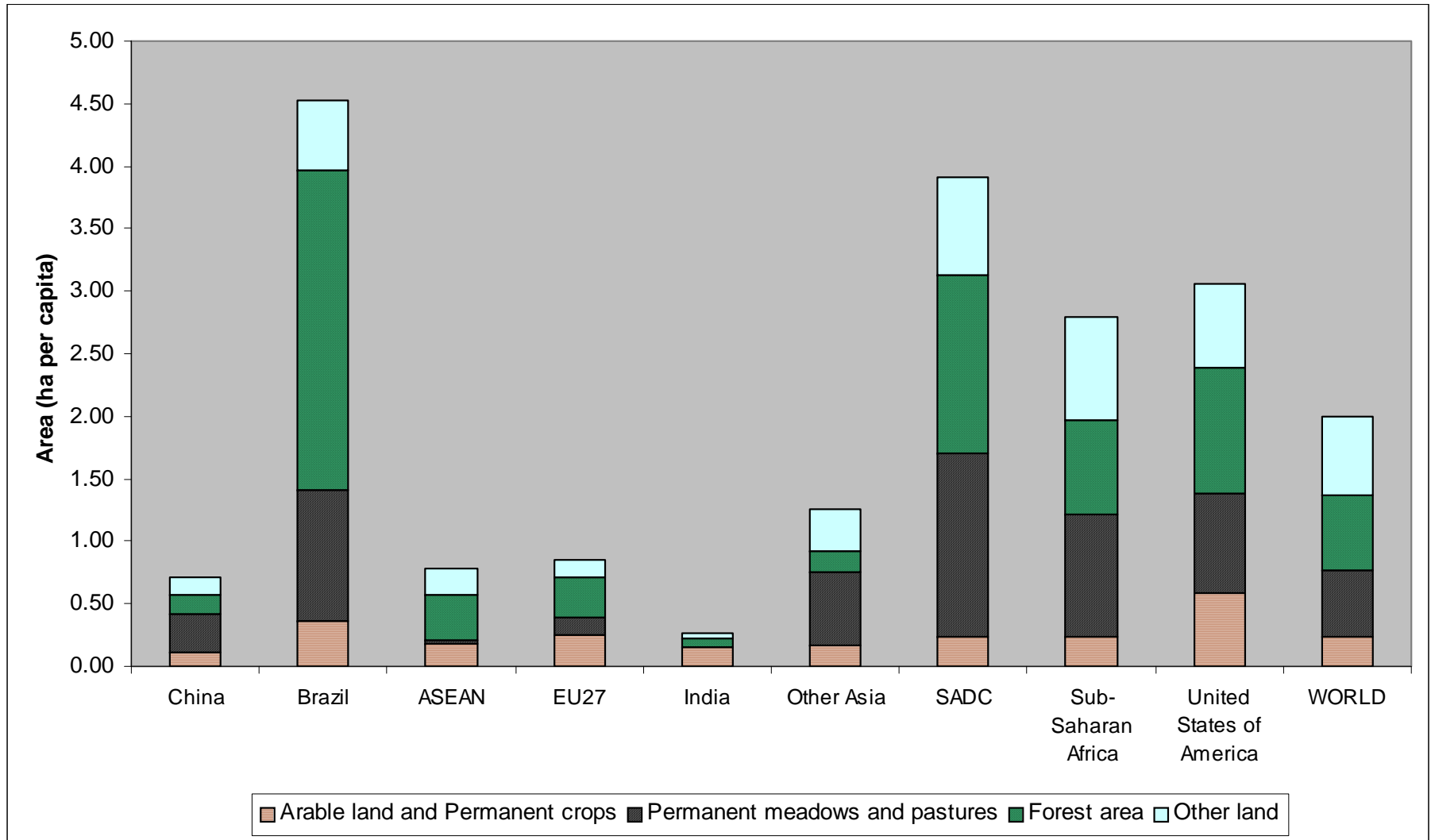
the transformation of biomass from a predominantly local resource into a strategic, multi-purpose, multi-product international commodity

1. Local use of forest and agricultural residues
2. Assuring proper waste treatment, processing of residues, and energy efficiency
3. Infrastructure development
4. National market development through supportive policies and incentives
5. Regional biomass markets, medium-to-large scale utilization, transport logistics
6. Increasing scale, followed by decreasing costs
7. Global commodity market

Distribution of biomass used for energy by type and end-use

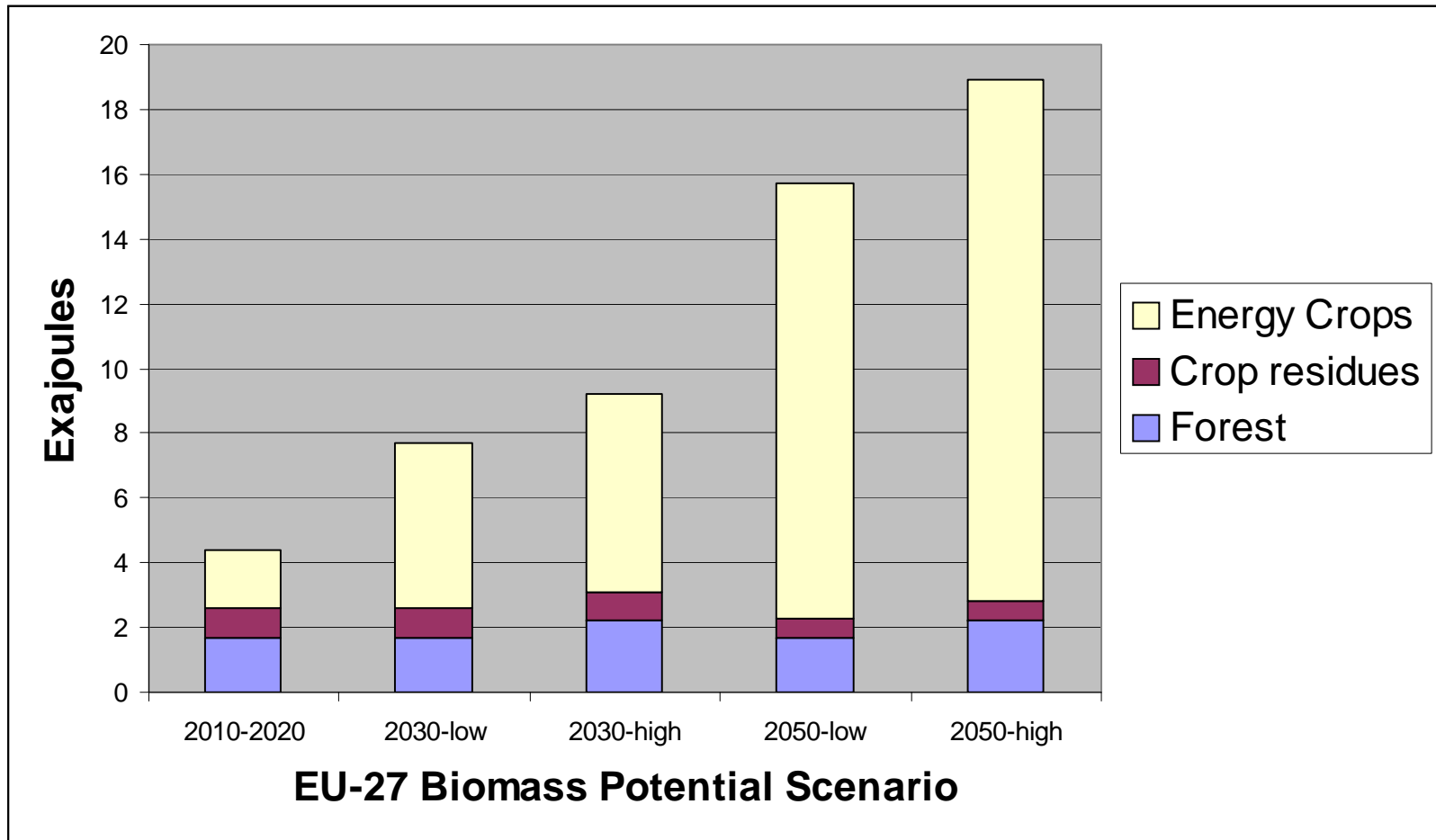


Land area per capita by type and region



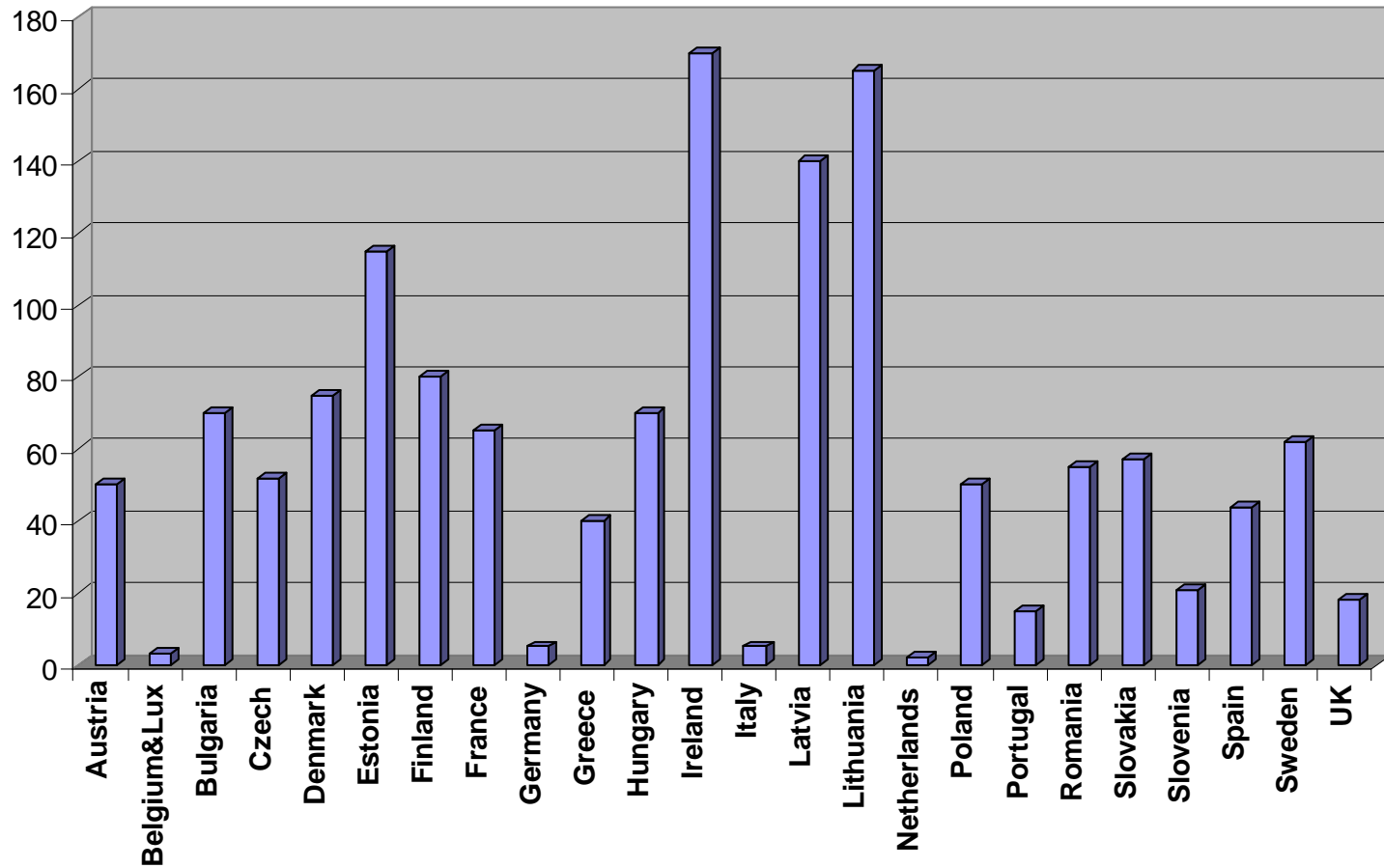
Source: FAOSTAT, 2008

Estimate of EU-27 biomass potential for different timeframes and yields



Source: Ericsson and Nilsson, 2007

Estimate of biomass long-term (2050) potential by Member State (GJ/capita)



Source: Ericsson and Nilsson, 2007

Available land (Mha) biofuels potential (EJ) in Europe

	SCENARIO	EU-15+ ²	EU-12 ³	Ukraine	Total
ARABLE ¹ land	Baseline (trend)	19.3	23.4	22.4	65.1
	Low (more organic cultivation)	16.9	23.4	22.4	62.7
	High (higher yields)	23.4	28.3	25.4	77.1
PASTURE	Baseline	4.8	0.3	0.7	5.8
	High (as in baseline + partial use of grassland not required for feed)	10.1	8.4	5.5	24
TOTALS	Baseline	24.1	23.7	23.1	70.9
	High	33.5	36.7	30.9	101.1

		<i>1st generation only</i>				<i>2nd generation</i>			
		EU15+	EU12	Ukraine	Total	EU15+	EU12	Ukraine	Total
ARABLE land	Baseline	1.5	2.1	2.3	5.9	2.3	3.2	3.4	8.9
	Low	1.3	2.1	2.3	5.7	2.0	3.2	3.4	8.6
	High	1.8	2.5	2.6	6.9	2.8	3.8	3.8	10.4
PASTURE	Baseline	Not used				Not used			
	High	Not used				1.3	1.0	0.8	3.1
TOTAL	High	1.8	2.5	2.6	6.9	4.1	4.8	4.6	13.5

Source: Fischer et al, 2007

¹ Arable land includes set-aside lands and other agricultural areas not required for food production

² EU-15+ includes Norway and Switzerland.

³ EU-12 includes those countries that joined after 2004.

RE/Biomass Policy Instruments in EU-MS as of 2008

	Feed-in tariff	Renewable Portfolio and/or fuels standard	Capital subsidies, grants, rebates	Investment & other tax credits	Energy or sales tax, VAT reduction	Tradable RE Certificates	Energy Production payments, tax credits	Public Investment, loans, financing	Biofuel Blending Mandates	Biofuels tax exemptions	
Austria	1		1	1		1					
Belgium		1	1		1	1				1	
Bulgaria											
Cyprus	1		1								
Czech	1		1	1	1	1					
Denmark	1				1	1		1	1		
Estonia	1				1						
Finland			1		1	1	1				
France	1		1	1	1	1		1	1	1	
Germany	1		1	1	1				1	***	
Greece	1		1	1				1		1	
Hungary	1				1	1		1			
Ireland	1		1	1		1		1	1	1	
Italy	1	1	1	1		1				1	
Latvia	1							1	1		
Lithuania	1		1	1				1		1	
Luxembourg	1		1	1							
Malta	1				1						
Netherlands	1		1	1		1	1				
Poland		1	1		1			1	1		
Portugal	1		1	1	1						
Romania					1						
Slovakia	1			1				1			
Slovenia	1							1		1	
Spain	1		1	1				1		1	
Sweden		1	1	1	1	1	1		1	1	
UK		1	1		1	1			1	1	
Total	20	5	18	14	14	12	3	12	6	3	10

Food, Feed or Fuel?

Soybean equivalent exports to EU (2006-2007)

Country of origin	Soybean equivalent of EU-27 imports 1,000 tonnes	Total soybean harvest in 2006/2007 1,000 tonnes	Exports to EU-27 as % of total harvest %
United States	3,508	86,770	4%
Canada	785	3,466	23%
Argentina	12,365	48,700	25%
Brazil *	18,524	58,726	32%
Paraguay	995	5,856	17%
Uruguay	89	820	11%
Other countries	363	33,099	1%
Total	36,628	237,437	15%

Soybean hectares/exports to EU by use (2006-2007)

Country of origin	Biodiesel	Livestock products	Soy oil used in other products	Total acreage	
	hectares	hectares	hectares	hectares	%
United States	753,891	781,256	327,205	1,862,353	13%
Canada	30,260	182,290	79,374	291,924	2%
Argentina	50,459	4,240,559	132,358	4,423,376	31%
Brazil	520,954	4,995,608	1,366,495	6,883,057	49%
Paraguay	44,121	263,553	115,731	423,405	3%
Uruguay	4,286	26,319	11,244	41,849	0%
Other countries	18,863	76,791	49,478	145,132	1%
Total soybean acreage	1,422,834	10,566,377	2,081,885	14,071,096	
Acreage per capita (m ² /person)	29	213	42	284	

Key biofuel provisions, EU Renewables Directive

- Binding 10% share of **renewable fuels** for transport
- Biofuels must meet **sustainability criteria** to qualify under the 10% share
- Minimum GHG reduction – 35%, increasing to 50% in 2017
- Establishes “no-go” areas: undisturbed forests, nature reserves, bio-diverse grasslands, wetlands
- Requirements at filling stations – availability, labelling
- Methodology Equation + Default values for GHG emissions
- Provisions/incentives for biofuels from degraded lands
- Reporting/update requirements for Member States, COM
- Indirect land use change (ILUC) NOT included, COM to issue report on methodologies for ILUC in 2010

EU Dir. biofuels sustainability criteria

(1) Irrespective of whether the raw materials were cultivated inside or outside the territory of the Community, energy from biofuels and other bioliquids shall be taken into account for the purposes listed under points (a), (b) and (c) only if they fulfil the sustainability criteria set out in paragraphs 2 to 5:

- (a) measuring compliance with the requirements of this Directive concerning national targets;***
- (b) measuring compliance with renewable energy obligations;***
- (c) eligibility for financial support for the consumption of biofuels and other bioliquids.***

EU Dir. biofuels sustainability criteria

- ***However, biofuels and bioliquids produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues, need only fulfil the sustainability criterion set out in paragraph 2 in order to be taken into account for the purposes listed under points (a), (b) and (c).***

EU Dir. biofuels sustainability criteria

(2) The greenhouse gas emission saving from the use of biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 ***of this Article*** shall be 35%.

With effect from 2017, the greenhouse gas emission saving from the use of biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 of this Article shall be 50%. After 2017 it shall be 60 % for biofuels and bioliquids produced in installations whose production has started from 2017 onwards.

EU Dir. biofuels sustainability criteria

(3) Biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 of this Article shall not be made from raw material obtained from land with high biodiversity value, that is to say land that had one of the following statuses in or after January 2008, whether or not the land still has this status:

- ***(a) primary forest and other wooded land, that is to say forest and other wooded land of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed;***

EU Dir. biofuels sustainability criteria

(b)

(i) areas designated by law or by the relevant competent authority for nature protection purposes; or

(ii) (ii) areas for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the second subparagraph of Article 18(4);

EU Dir. biofuels sustainability criteria

(c)

- (i) *highly biodiverse natural grassland, that is to say grassland that would remain grassland in the absence of human intervention and which maintains the natural species composition and ecological characteristics and processes; or***
- (ii) *highly biodiverse non-natural grassland, i.e. say grassland that would cease to be grassland in absence of human intervention and which is species-rich and not degraded, unless evidence is provided that harvesting of raw material is necessary to preserve its grassland status.***

EU Dir. biofuels sustainability criteria

- (4) Biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 shall not be made from raw material obtained from land with high carbon stock, that is to say land that had one of the following statuses in January 2008 and no longer has this status:***
- (a) wetlands, that is to say land that is covered with or saturated by water permanently or for a significant part of the year;***
 - (b) continuously forested areas, that is to say land spanning more than 1 hectare with trees higher than 5 metres and a canopy cover of more than 30%, or trees able to reach these thresholds in situ;***

EU Dir. biofuels sustainability criteria

(c) land spanning more than 1 hectare with trees higher than 5 metres and a canopy cover of between 10% and 30%, or trees able to reach these thresholds in situ, unless reliable evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in Part C of Annex V is applied, the conditions laid down in paragraph 2 would be fulfilled.

The provisions in this paragraph shall not apply if at the time the raw material was obtained, the land had the same status as it had in January 2008.

EU Dir. biofuels sustainability criteria

(5) Biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 shall not be made from raw material obtained from land that was peatland in January 2008, unless it is proven that the cultivation and harvesting of this raw material does not involve drainage of previously undrained soil.

Current Methodology Equation for calculating GHG emissions for biofuels

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr} - e_{ee},$$

e_{ec} = emissions from the extraction or cultivation of raw materials;

e_l = annualised emissions from carbon stock changes caused by land use change;

e_p = emissions from processing;

e_{td} = emissions from transport and distribution;

e_u = emissions from the fuel in use;

e_{sca} = *emission savings from soil carbon accumulation via improved agricultural management*;

e_{ccs} = emission savings from carbon capture and *geological storage*;

e_{ccr} = emission savings from carbon capture and replacement; and

e_{ee} = emission savings from excess electricity from cogeneration.

Typical and default values for biofuels if produced with no net carbon emissions from land use change

Biofuel production pathway	typical GHG saving	default GHG saving
sugar beet ethanol	61%	52%
wheat ethanol (process fuel not specified)	32%	16%
wheat ethanol (lignite as process fuel in CHP plant)	32%	16%
wheat ethanol (natural gas as process fuel in conventional boiler)	45%	34%
wheat ethanol (natural gas as process fuel in CHP plant)	53%	47%
wheat ethanol (straw as process fuel in CHP plant)	69%	69%
corn (maize) ethanol, Community produced (natural gas as process fuel in CHP plant)	56%	49%
sugar cane ethanol	71%	71%
the part from renewable sources of ETBE (ethyl-tertio-butyl-ether)	Equal to that of ethanol production pathway	
the part from renewable sources of TAEE (tertiary-amyl-ethyl-ether)	Equal to that of the ethanol production pathway	
rape seed biodiesel	45%	38%
sunflower biodiesel	58%	51%
<i>soybean biodiesel</i>	40%	31%
palm oil biodiesel (process not specified)	36%	19%
palm oil biodiesel (process with ? methane <i>capture</i> at oil mill)	62%	56%
waste vegetable or animal* oil biodiesel	88%	83%
Hydrotreated vegetable oil from rape seed	51%	47%
Hydrotreated vegetable oil from sunflower	65%	62%
Hydrotreated vegetable oil from palm oil (process not specified)	40%	26%

Estimated typical and default values for future biofuels that are not or in negligible quantities on the market in January 2008, if produced with no net carbon emissions from land use change

Biofuel production pathway	typical greenhouse gas emission saving	default greenhouse gas emission saving
wheat straw ethanol	87%	85%
waste wood ethanol	80%	74%
farmed wood ethanol	76%	70%
waste wood Fischer-Tropsch diesel	95%	95%
farmed wood Fischer-Tropsch diesel	93%	93%
waste wood DME (dimethylether)	95%	95%
farmed wood DME (dimethylether)	92%	92%
waste wood methanol	94%	94%
farmed wood methanol	91%	91%
the part from renewable sources of MTBE (methyl-tertio-butyl-ether)	Equal to that of the methanol production pathway used	

Implications of EU Sustainability Criteria for Least Developed Countries

- Large potential market provides a major opportunity
- Meeting GHG criteria will generally not be a problem, but tracking, data collection, analysis will be
- Land availability vs. land tenure vs. changing land values
- Definition of “highly biodiverse grasslands”
- Degraded lands - given low cost of land in general for foreign investors, few incentives to use it
- Co-product markets opportunity, but accounting is difficult
- lower energy intensity of agriculture should be an advantage
- Measurement, monitoring, compliance are key issues for LDC producers – not specified in Directive

Overview of involvement of stakeholders in process of biomass certification: National Governments

Initiatives	Principles	I&C ^a	Status	Organization	Platform function
<i>National governments</i>					
Netherlands	Yes (environment, socio-economic)	Yes	Pilot studies	Working group set up by government	Stakeholder consultation
Belgium	Yes (GHG, sourcing)	Yes	Criteria coupled to green certificate	Independent body in coop. with authorities	
UK	Yes (environment, socio-economic)	Yes	Certification expected in 2008	Legislation development (RTFO)	Stakeholder consultation
Canada	ECOLOGO (general), also for biomass	Yes	Since 2005	Government owned label	
Brazil	Social Seal for biodiesel	Yes	In implementation	Government regulation	
Germany	Yes (GHG and others)	No	In development	National regulation	
Others ^b	No	No	Not applicable	Not applicable	Partner in debate
E.C.	Yes, in development	No	Draft proposals	Policy development within EU	Partner in debate

Overview of involvement of stakeholders in process of biomass certification: Companies

Initiatives	Principles	I&C*	Status	Organization	Platform function
Companies					
Essent	Yes (Environmental criteria, social criteria in development)	Yes	Green Gold Label	Independent body: Control Union	IEA Task 40 member
Electrabel	Yes (Sourcing, energy/GHG balance)	Yes	Electrabel label	Independent body: SGS	Member IEA Task 40
BioX	Based on RSPO criteria	n.a.	Auditing palm oil locations	In cooperation with Control Union	RSPO member
Daimler-Chrysler	Background studies	No	Studies, discussion, forum	Initiative in coop. with UNEP	Forum for environment
Volkswagen	Tax model incl. criteria	Yes	Model development		Partner in debate
Shell	Studies on sustainability biomass	No	Studies, small projects	Under framework of BUS initiative	BUS Forum of experts
Rabobank				Financing partner	Partner in debate
Others ^c	No	No	Position papers	Not applicable	Partner in debate

Overview of involvement of stakeholders in process of biomass certification: NGOs

Initiatives	Principles	I&C ^a	Status	Organization	Platform function
NGOs WWF	Yes	Yes	Road map	Approaches, see study WWF Germany	RSPO member
Solidaridad	Yes (Utz Certified label)	Yes	Project with case studies	Project in coop. with GGL (Essent)	Involvement stakeholders
NGOs Netherlands	Yes	Yes	Proposals for policy tools, pilot studies	Study assigned by Dutch NGOs	Participation in debate (RSPO)
NGOs South Africa	Standpoints on concerns biofuel production	No	Position paper	Working group representing NGOs	
NGOs Germany	Yes	No	Policy Paper	Study through stakeholder process	
NGOs Brazil	Sustainability criteria	Yes	Report	Developed by various NGOs	
LATP	Sustainability criteria	No	Criteria combined with good practice	Through stakeholder process	
Others	Limited	No	Position papers ^d	Not applicable	Partner in debate

Overview of involvement of stakeholders in process of biomass certification: International Organisations

Initiatives	Principles	I&C*	Status	Organization	Platform function
UN-Energy	No	No	Not applicable	Platform (non-) UN organizations	Coordination, exchange info
UNBI	Background studies in trade and potential	No	In planning	UNCTAD chairs initiative	Coordination, support
FAO	Yes, for forest biomass	Yes	Pilot studies	Partner is IEA Task 31	Partner in debate
UNEP	In development	No	Preparatory studies	In coop. with others (e.g. G8 GBEP, DaimlerChrysler)	Partner in debate
IBEP	Background studies	No		FAO chairs initiative	Knowledge exchange
G8 GBEP	White Paper; mandated UNEP to develop I&C	(Yes)	In planning	Initiative within G8 countries+UNEP	Coordination
EUGENE	Yes (sourcing), additional P in process	Plan	Existing label, additional I&C	Network for green labels	Networking function
RSPO	Yes, for palm oil production	Yes	Pilot studies and working group	Roundtable on voluntary basis	Stakeholder process, platform
RTRS	Yes, for responsible soy production	Planned	Working group and consultation	Roundtable on voluntary basis	Stakeholder process, platform
RSB	Yes, for sustainable biofuels production	Planned	Working group and consultation		
BSI	Planned for sugarcane production	Planned	No	Roundtable on voluntary basis	Stakeholder process, platform



**Thank you
for your
attention!**