

Emerging LCA Issues: A European Perspective

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LCA...in EU: briefly (1)

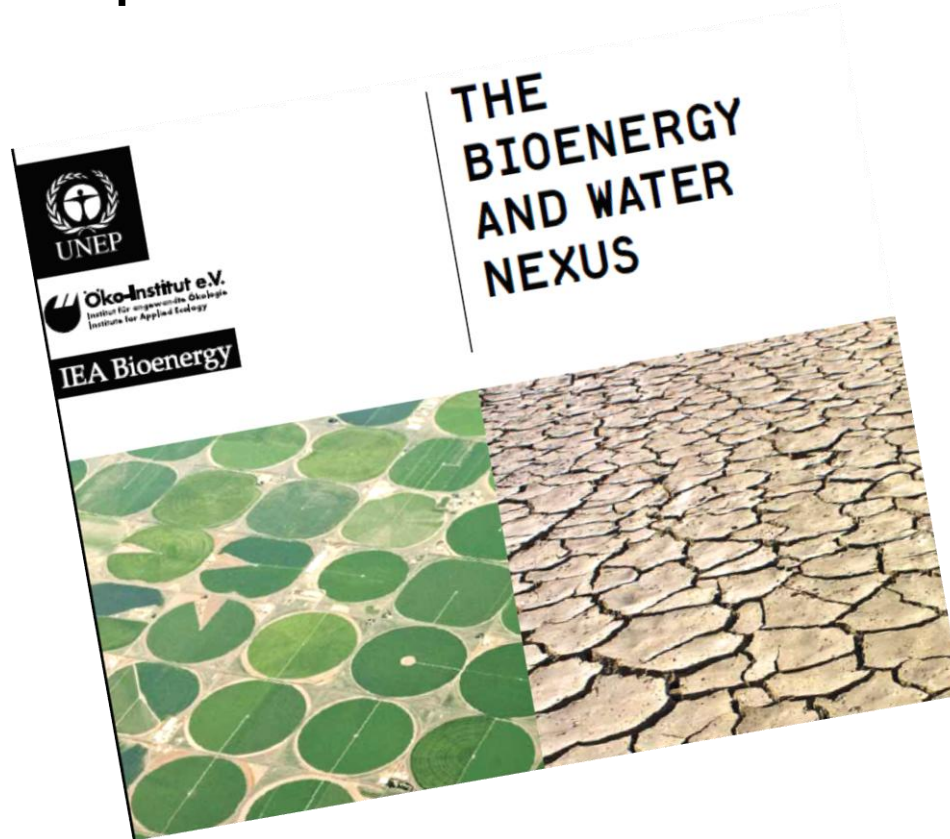
- EU has > 30 years of LCA research on energy – many Member States (e.g. AT, DK, ES, FI, FR, NL, SE, UK) + CH active
- biofuels work since early 1990s
- also other renewables and energy efficiency options (e.g. insulation, CFL/LED lighting)+ other products (ICT, food...).
- overall biomass-related issues such as ILUC
- **sustainability in EU: more than GHG**

LCA...in EU: briefly (2)

- **beyond** “attributional vs. consequential”: cross-sector scenarios to avoid allocation → MFA
- **metrics**: broadening view to biodiversity, land and water use, and social to **support sustainability assessments**; also on UN level (FAO, UNEP...)
- **data**: **imported** bioenergy and biofuel feedstocks; more spatially explicit processes with GIS/hybrid approaches

LCA: More than GHG...

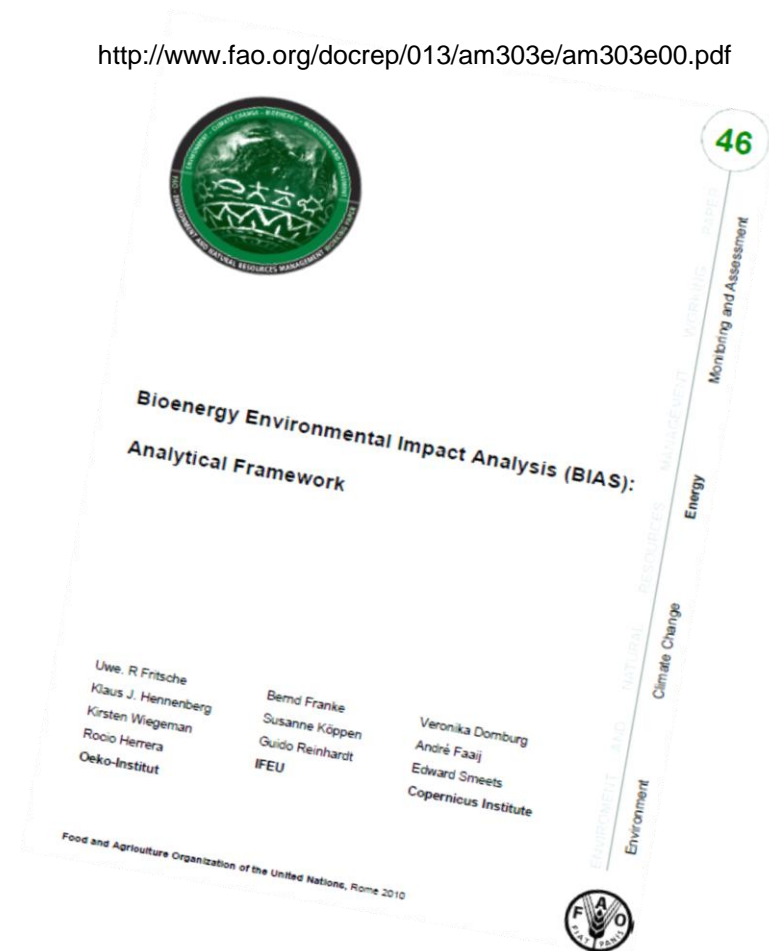
Examples of international/ UN research supported by EU/Member States:



http://www.unep.fr/energy/bioenergy/documents/pdf/waternexus_summary.pdf

[http://www.unep.fr/energy/bioenergy/documents/pdf/Assessing%20Bio
fuels-full%20report-Web.pdf](http://www.unep.fr/energy/bioenergy/documents/pdf/Assessing%20Bio%20fuels-full%20report-Web.pdf)

<http://www.fao.org/docrep/013/am303e/am303e00.pdf>



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LCA: towards sustainability?

Examples of international/UN research on supported by EU/Member States:



<http://www.estis.net/includes/file.asp?site=lcinit&file=DD37BF36-A625-48EA-BE92-9700F77D6844>


Co-ordination Action for innovation
in Life-Cycle Analysis for Sustainability

<http://www.calcasproject.net/>

http://www.unep.fr/shared/publications/pdf/D TIx1164xPA-guidelines_sLCA.pdf

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LCA: “new” fossil fuels

- **unconventional fossil** fuels receive more attention:
- HCICO: syncrudes from oil shales/tar sands; several studies on syncrude from CA; default value for EU FQD → LCA data **available**, issue of **marginality/scenario** assumed
- **frac gas**: relatively new in EU, studies in Germany and on EU level started. Currently, info based on US activities → German data in early 2012.

LCA: “new” bio processes

- **biomaterials, biorefineries, and cascading use** of biomass are researched
- EU sponsors 3 major biorefinery pilot projects, including LCA data



**BIOCORE, SUPRABIO
and EUROBIOREF**

- Member States have own activities (e.g. Dutch and Finnish studies; BioCouple project and roadmap process in Germany)

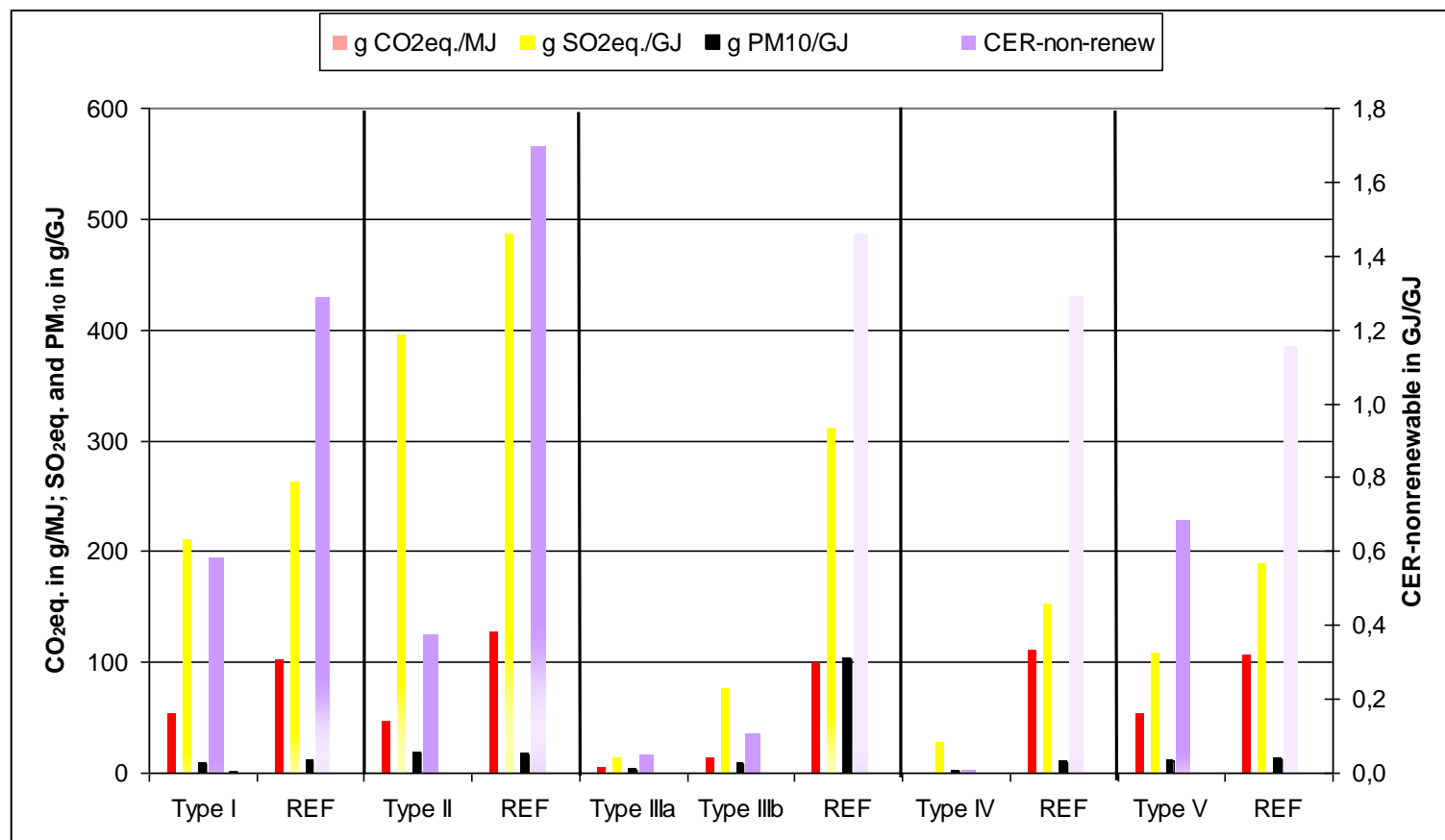
LCA: “new” bio-processes

- German analysis of generic future biorefineries, 2020-2030

item	unit	Type I	Type II	Type IIIa	Type IIIb	Type IV	Type V
GHG	g CO ₂ eq./MJ	52,3	45,2	3,8	12,1	0,1	53,0
	g CO ₂ /MJ	34,8	21,5	3,6	7,4	0,2	50,2
air emissions	g SO ₂ eq./MJ	0,21	0,40	0,01	0,07	0,03	0,11
	g SO ₂ /MJ	0,02	0,03	0,00	0,01	0,02	0,03
	g NO _x /MJ	0,08	0,10	0,01	0,04	0,01	0,10
	g PM ₁₀ /MJ	0,01	0,02	0,00	0,01	0,00	0,01
CER _{non-renewable}	MJ _{primary} /MJ	0,58	0,37	0,04	0,10	0,01	0,68
supply costs	€cent ₂₀₁₀ /MJ	2,4	3,6	2,4	4,2	2,6	6,8
Outputs:		EtOH	RME	BtL	BtL	EtOH	el.
couple products	unit	Type I	Type II	Type IIIa	Type IIIb	Type IV	Type V
electricity	MJ/MJ			0,075	0,075		
naphta	MJ/MJ			0,081	0,081		
DDGS	MJ/MJ	0,82					
rapeseed cake	g/MJ		39,6				
fertilizer	g/MJ						0,27
insulation material	g/MJ						0,03
glycerine	g/MJ		2,9				
bio-PE	g/MJ						0,06
lignin	g/MJ					0,01	

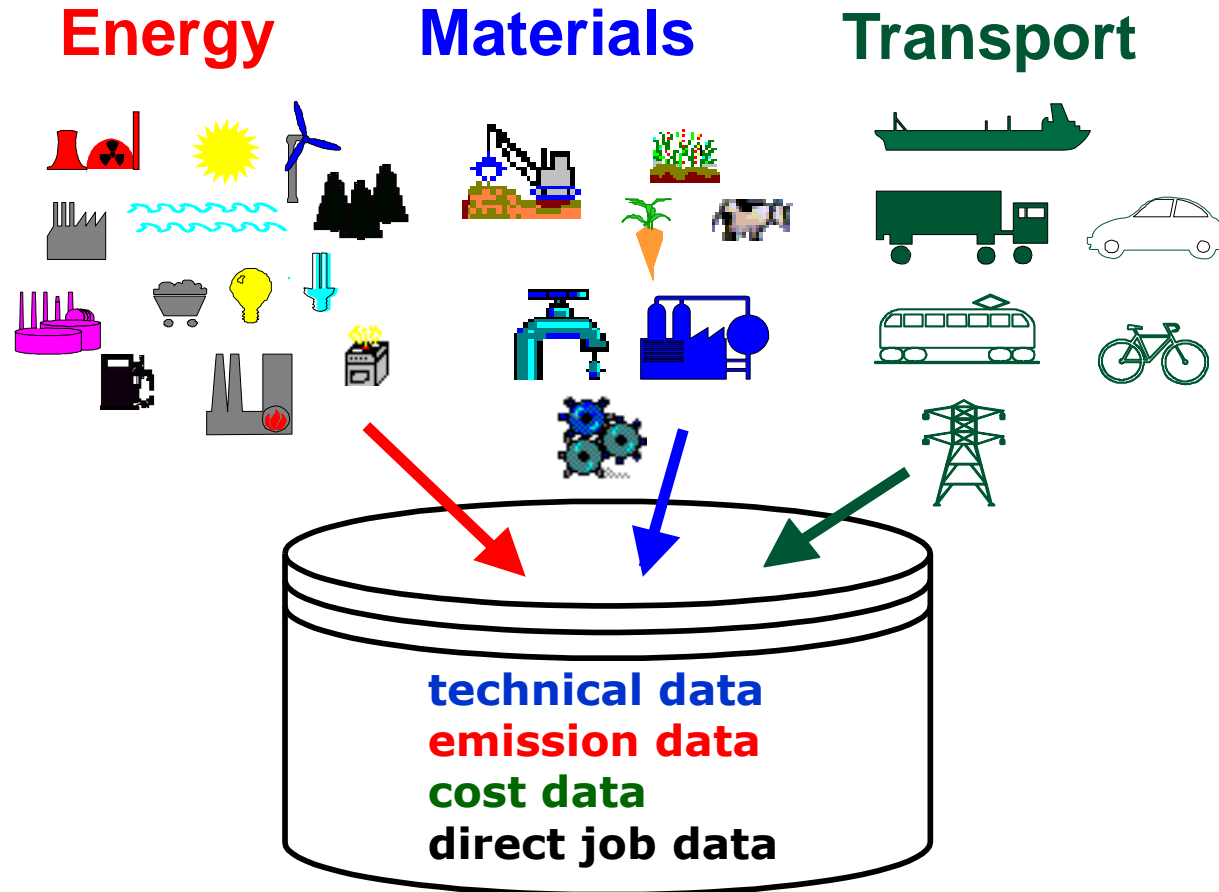
LCA: “new” bio-processes

- Results from German analysis of comparing generic future biorefineries with non-coupled reference systems: 2030



- reference systems show **temporal** dynamics (moving target)
- **future** electricity, transport, fertilizer, plastics, steel etc.
- full multi-sector integrated energy and material flows + transports needed
- due to global trade, imports (energy, materials) and global logistics are relevant
- only little “dynamic” LCA data available

Access to LCA Data



GEMIS: processes for life-cycles and material flows

Access to LCA Data

Using and distributing GEMIS is free

Software & database available from website:

<http://www.gemis.de>

Bioenergy & biofuel data:

<http://www.oeko.de/service/bio>

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