

Life Cycle Assessment tools/methodologies for GHG calculations in the RSB working group

1. Methodology and Results
of LCA-Study
2. Roundtable on
Sustainable Biofuels RSB

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TSL Technology and Society Lab @ EMPA

IEA Bioenergy; Dubrovnik, 25. October 2007

RSB Roundtable on Sustainable Biofuels



Materials Science & Technology

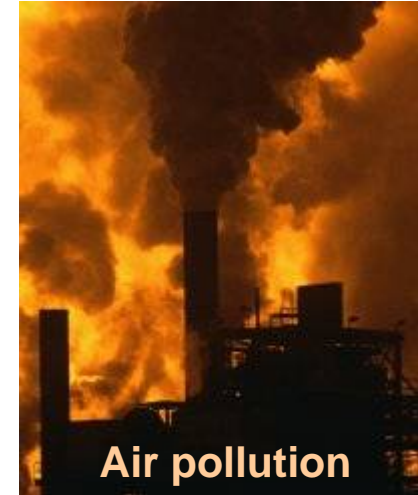


Environmental impacts of fuel production?

For fossil fuels



... and for biofuels



Why Life Cycle Assessment?

Example: Fossil Energy Demand of Biofuels

Fossil fuel → **Biofuel**



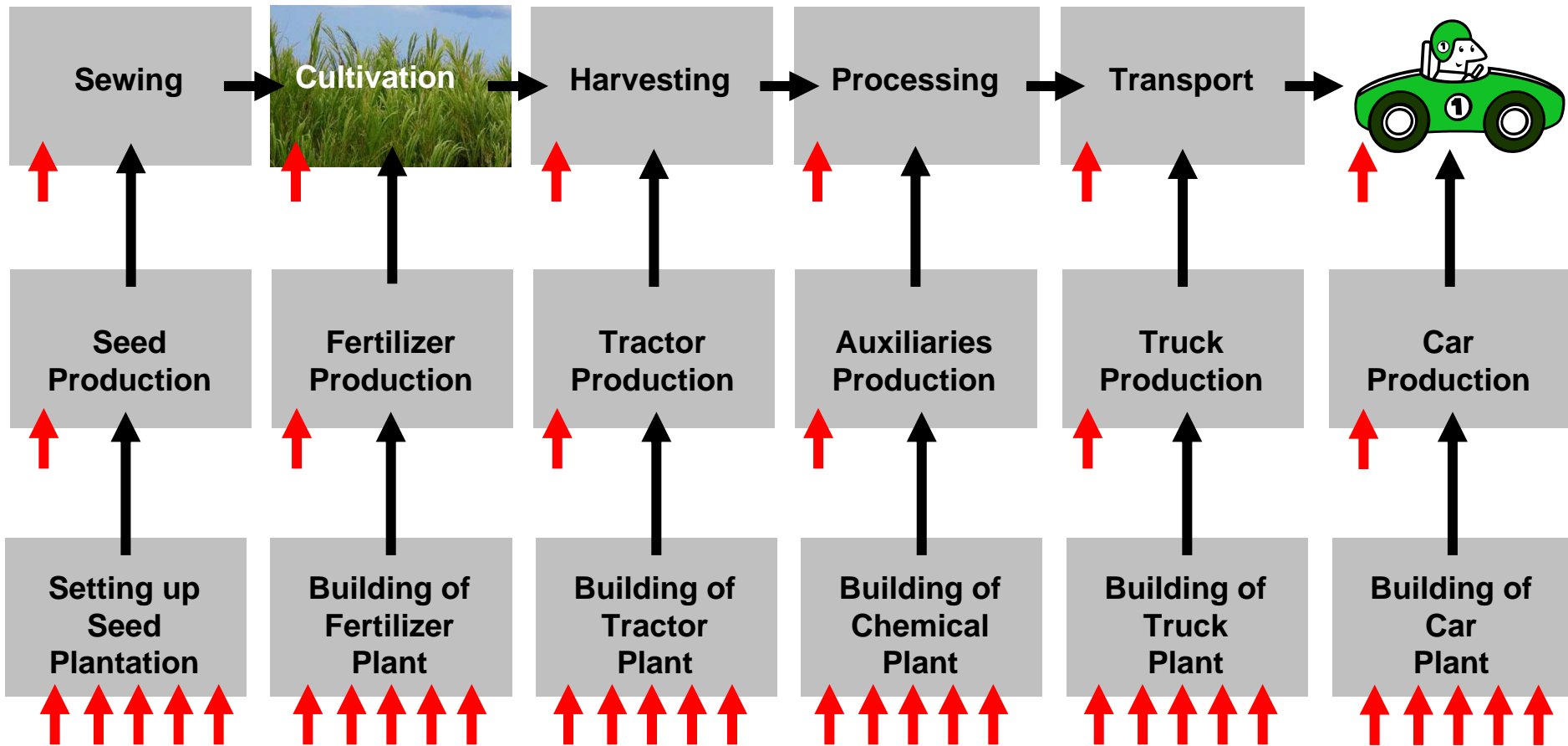
On a first approach

→ 100% savings of fossil energy sources

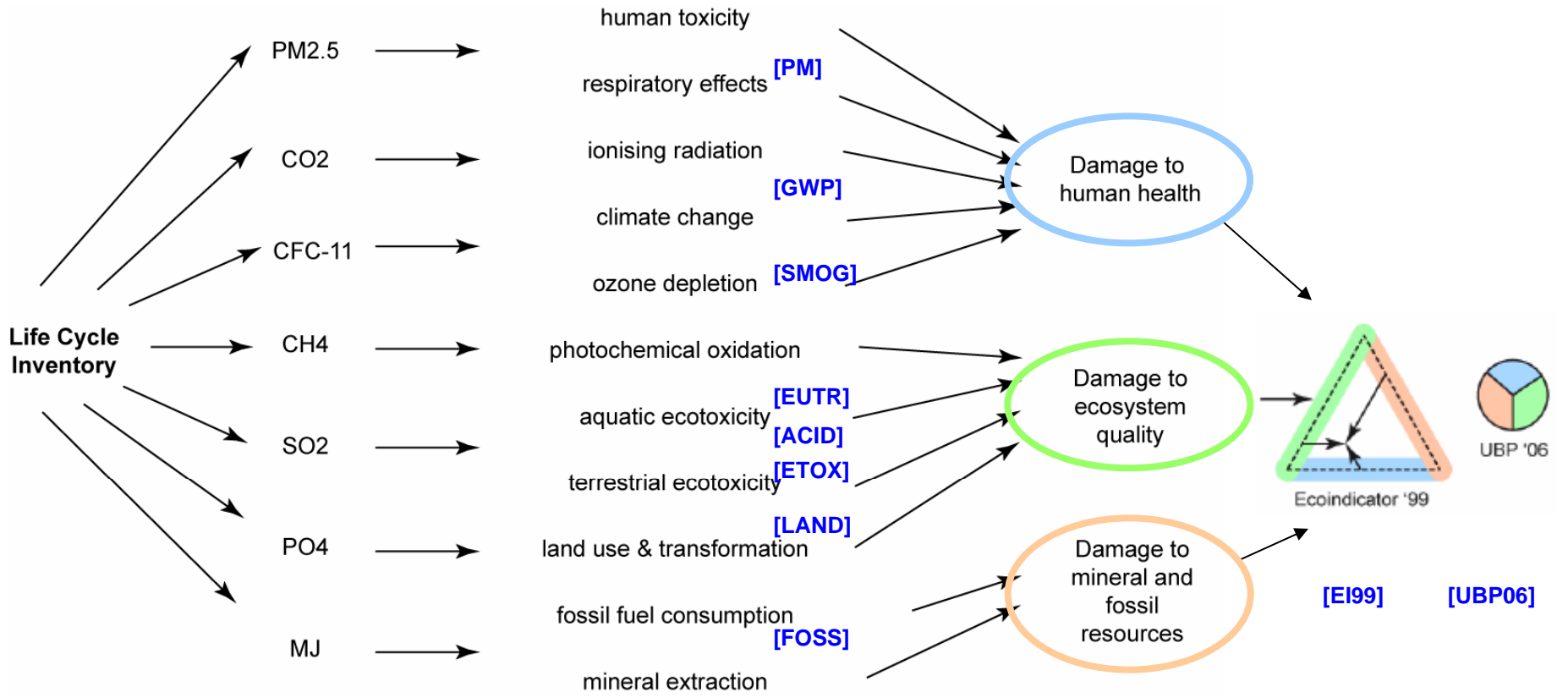
Example: Fossil Energy Demand of Biofuels



→ Material flows
→ Fossil Energy flows



Assessment of Environmental Impacts



Midpoint-Indicators

Overall-Indicator:

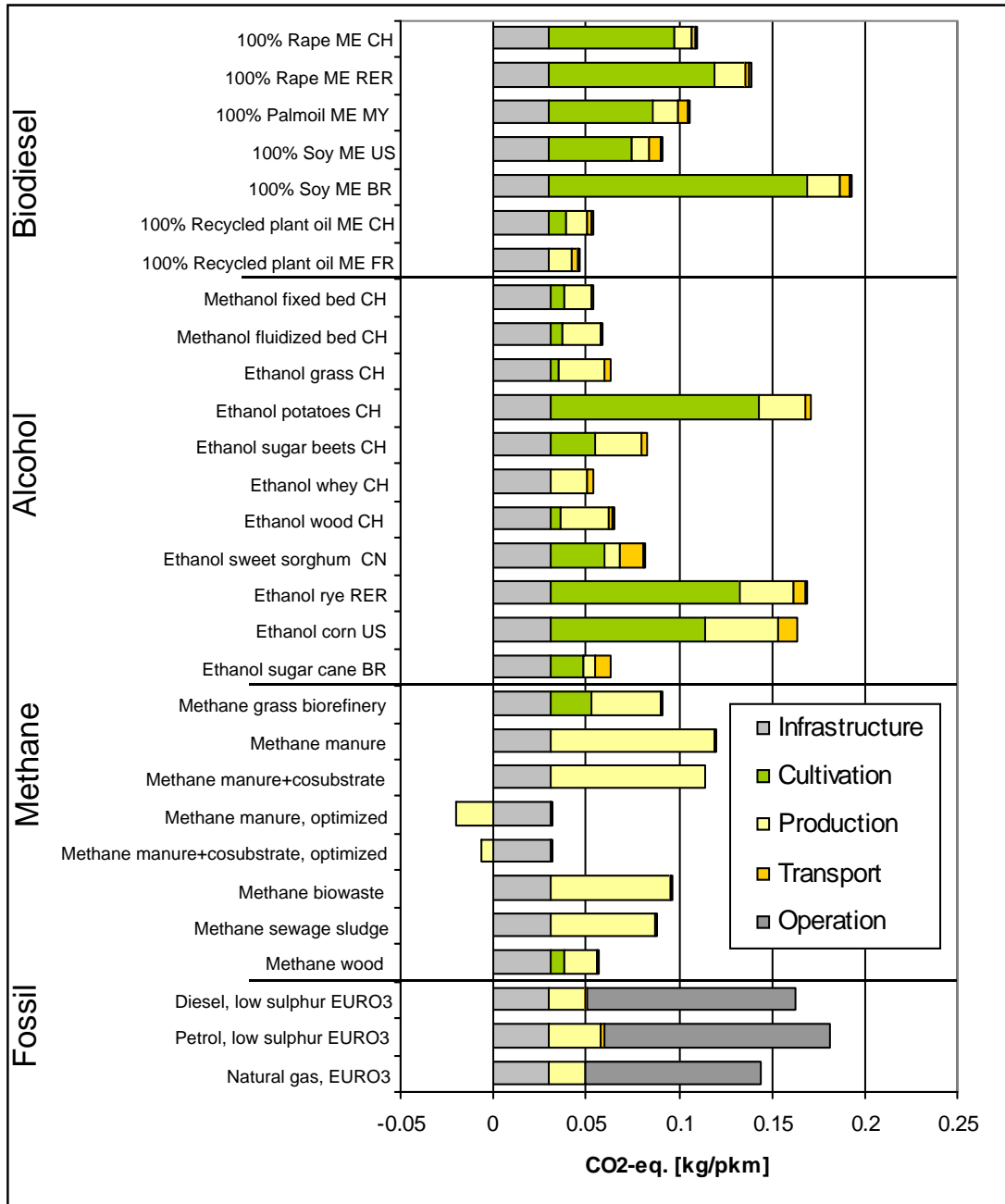
Emissions/Consumption → Environmental Fate & Exposure → Effect → Damage

Environmental burden as one only number -> 'Ecobalance'

Scientific accuracy Relevance for the society



Global Warming Potential CO2-eq.

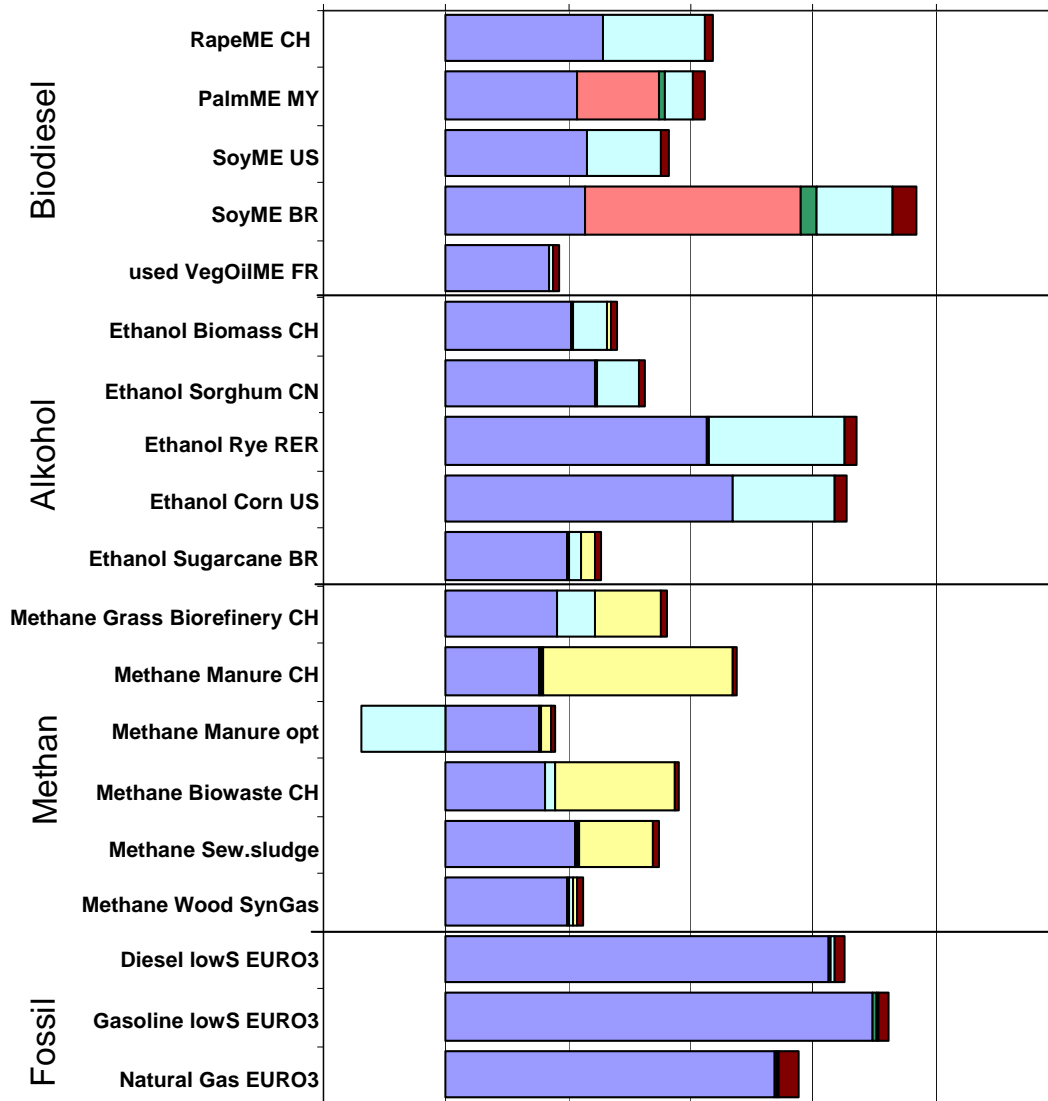


Total chain from cultivation to use

- Largest impact from agriculture -> land use
- Differences are great within fuel classes
- In every fuel class there are good and bad pathways

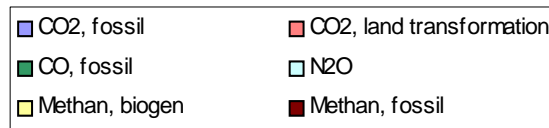
Global Warming Potential kg CO₂-eq. per MJ of fuels energy

-0.05 0 0.05 0.1 0.15 0.2 0.25



Contribution distinction

- GHG-Emissions are dominated by fossil CO₂
- Clear cutting forests up to 50%
- N₂O emissions from soils: up to 40%
- Production of biogas is dominated by Methane emissions



Not only Greenhousegas matters

GHG

selected midpoint indicators

Greenhousegas CO₂-eq.

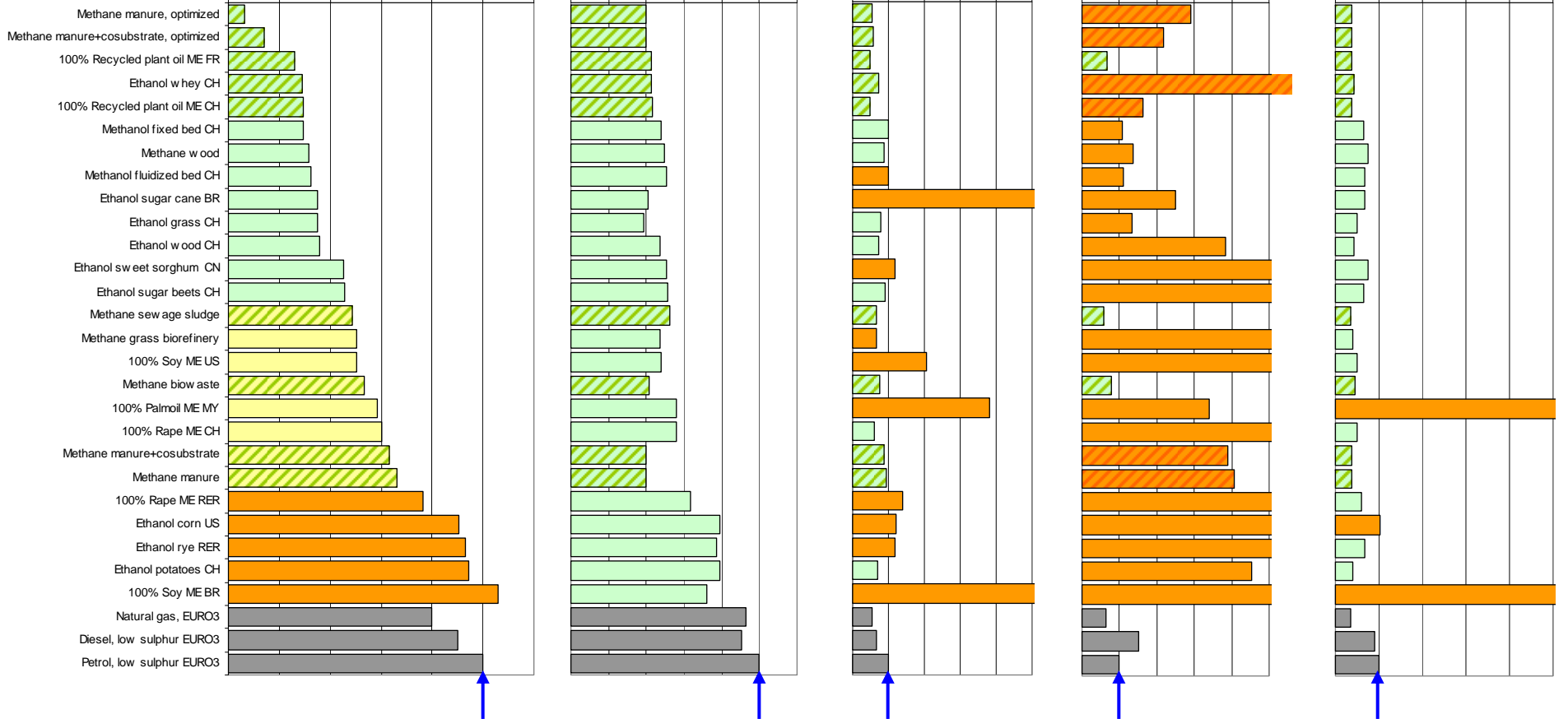
Non-renewable Energy

Smog

Eutrophication

Ecotoxicity

0% 20% 40% 60% 80% 100% 120% 0% 20% 40% 60% 80% 100% 120% 0% 100% 200% 300% 400% 500% 0% 100% 200% 300% 400% 500% 0% 100% 200% 300% 400% 500%



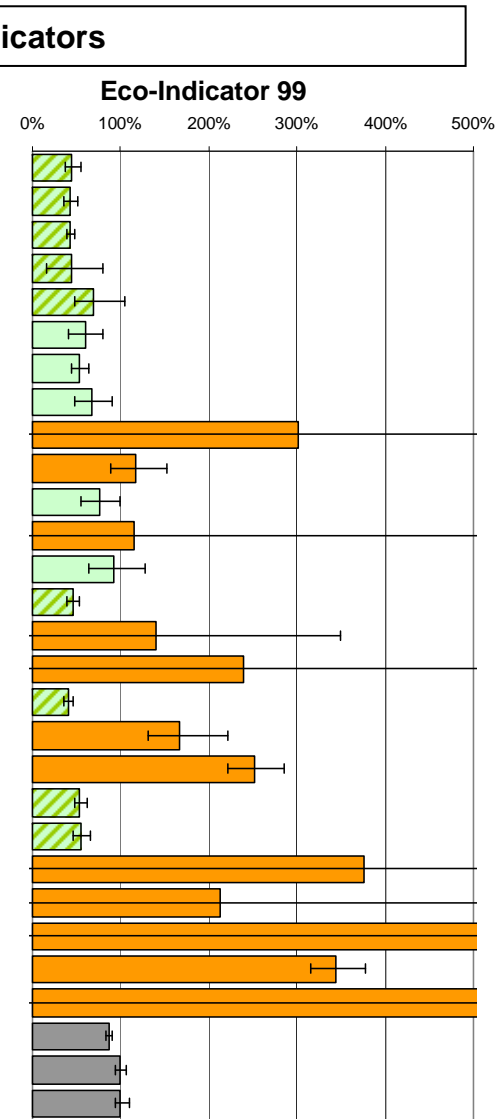
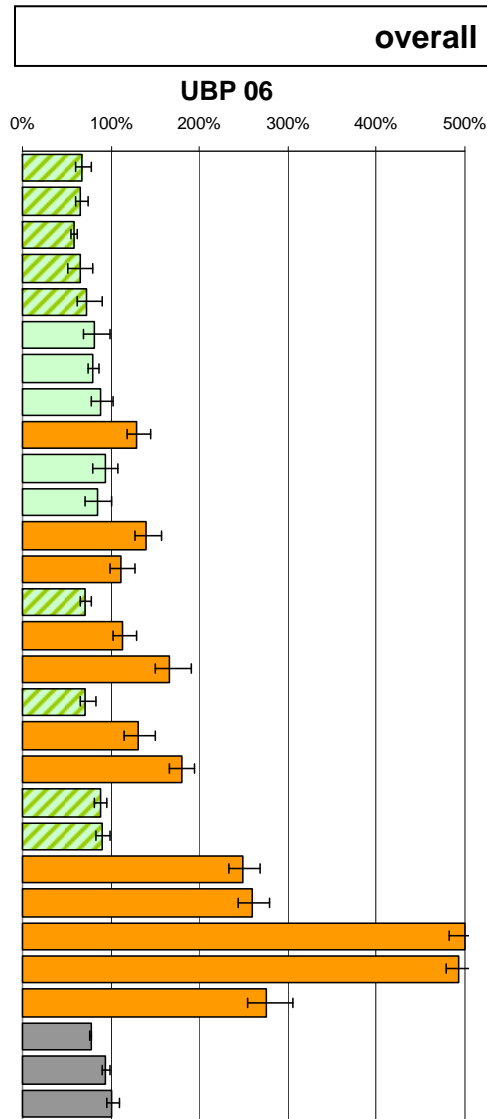
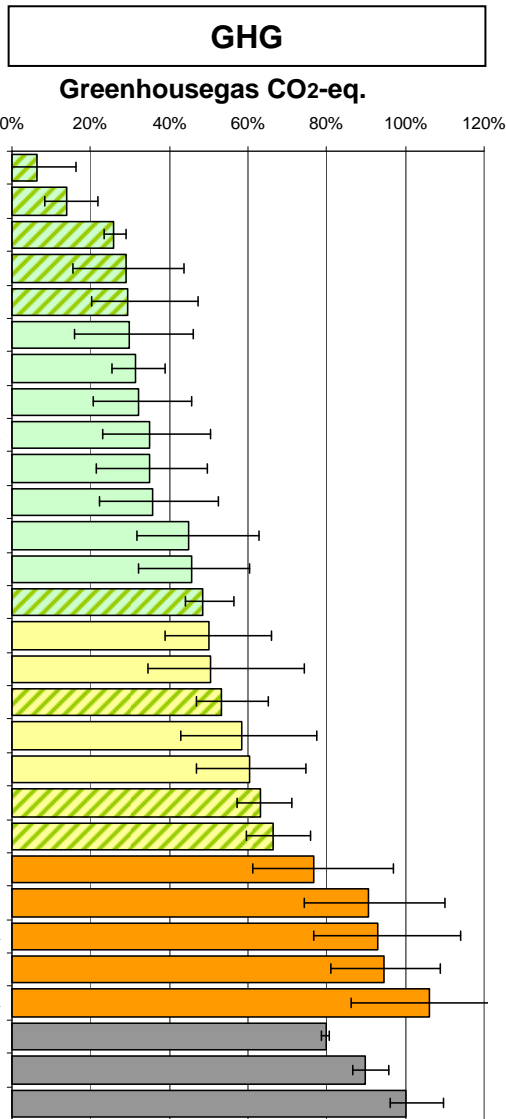
Petrol = reference 100%

green = better than petrol

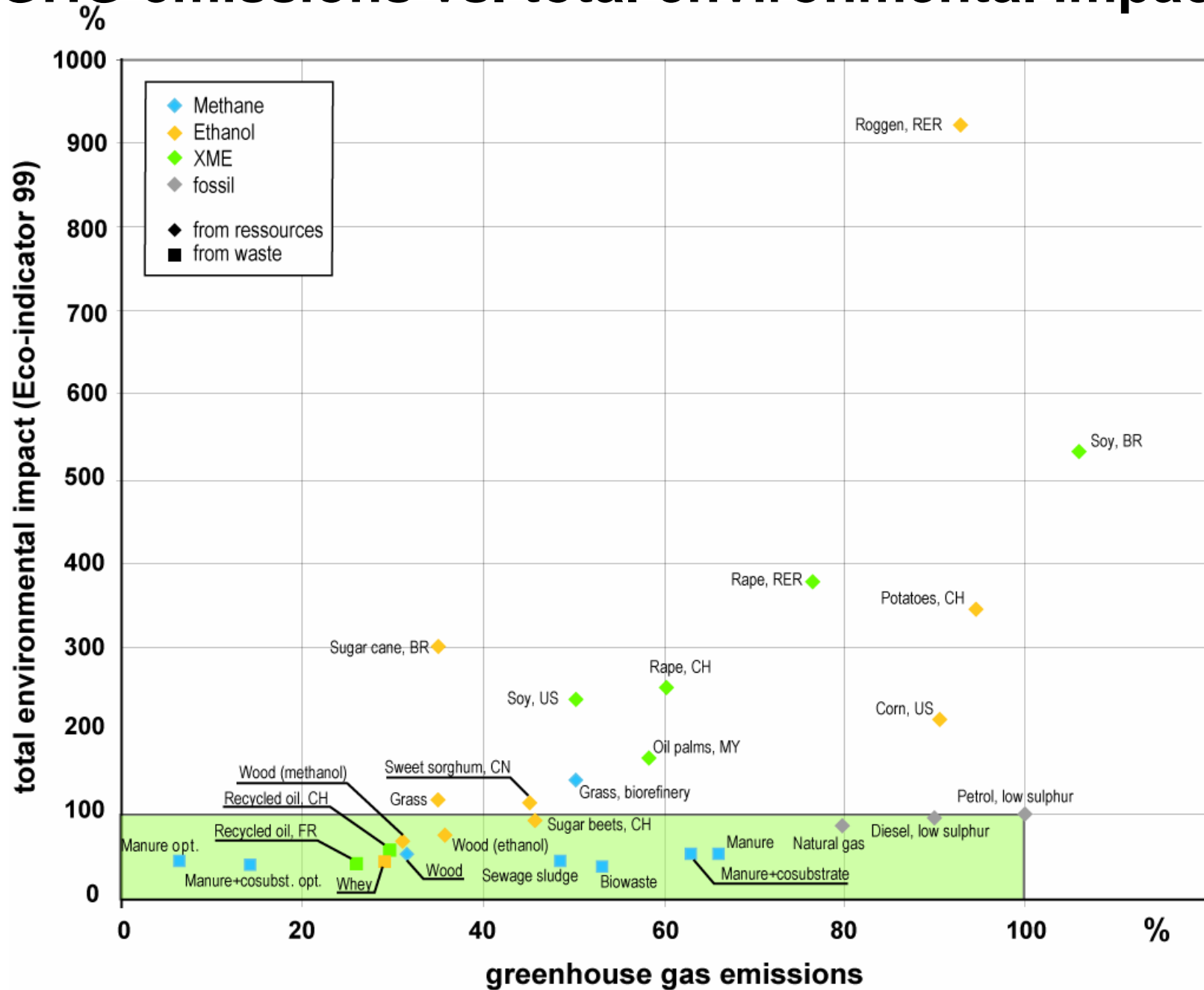
red = worse than petrol



Not only Greenhousegas matters



GHG emissions vs. total environmental impact





Roundtable on Sustainable Biofuels RSB

Ensuring that biofuels deliver on their promise of sustainability

Secretariat:

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<http://EnergyCenter.epfl.ch/Biofuels>

www.bioenergywiki.net





Concept

A multi-stakeholder initiative to coordinate and develop principles and criteria for sustainable biofuels production that are:

- Simple, accessible and implemented worldwide
- Generic to all crops
- Adaptable to new information
- Efficient and cheap to measure
- In line with WTO rules





Governance

- One **Steering Board** composed of international stakeholders
- One **secretariat** based at EPFL. Coordination of the RSB.
- Four **Working Groups** + expert panels to make recommendations to the Steering Board. 142 participants from international organisations, NGOs, private sector and academic institutions.
- **Global stakeholder** feedback at every step (blogs, meetings, wiki technology, pilot projects, regional outreaches)



The Steering Board

- **Steering Board members:**

include WWF, BP, Shell, National Wildlife Fed, FSC, Petrobras, Mali Folkecenter, Univ. Cal Berkeley, TERI India, Toyota, UNCTAD

- **Chair:** Mr Claude Martin
(former CEO of WWF)

- **Mission:**

Through a thorough consultation of the working groups, final validation of principles, criteria and implementation plan.

The 4 Working Groups

- **Greenhouse gases efficiency**: Validation of a reliable method to measure GHG balance on a Life Cycle perspective. About 80 members + 1 Expert Advisory Group
- **Environment**: Definition of principles and criteria that ensure biofuels to be a clean alternative (conservation, maintenance of soil, water and air sustainability, ensuring best practices in the use of technologies). More than 120 members + Expert panels on each topics to be covered
- **Social**: Definition of principles and criteria ensuring that biofuel channels are in accordance with WTO rules and prove beneficial for local livelihood and national economies. 75 members + Expert panels
- **Implementation**: Validation/adjustment of the principles and criteria against field reality and through pilot projects. 75 members + field partnerships

Timeline



- Two rounds of comments on principles
- Working Groups recommend text for criteria to meet these principles (in progress)
- By end 2007, consensus on principles
- By May/June 2008, good draft of criteria, next steps defined (Pilot projects)



First Round: Draft Principles

- **National Law** –
especially respective to land ownership, labor, water rights
- **GHG** –
positive balance over lifecycle, including direct & indirect effects
- **Environmental** –
conserve and protect high conservation values, soil, water, air; responsible use of biotechnologies
- **Social** –
biofuels should benefit to rural communities and workers; should not contribute to food insecurity

Thanks for your attention !



source: unknown

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Technology and Society Lab @ EMPA Switzerland



<http://EnergyCenter.epfl.ch/Biofuels>

Charlotte Opal / Sebastien Hays

www.bioenergywiki.net/index.php/Roundtable_on_Sustainable_Biofuels

