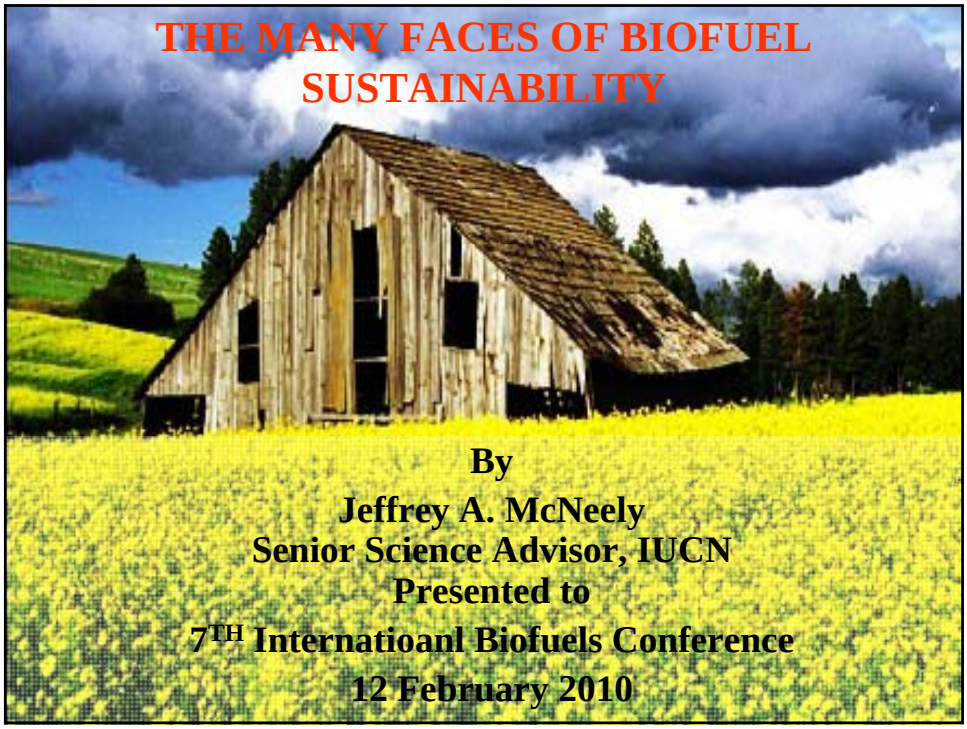
THE MANY FACES OF BIOFUEL SUSTAINABILITY



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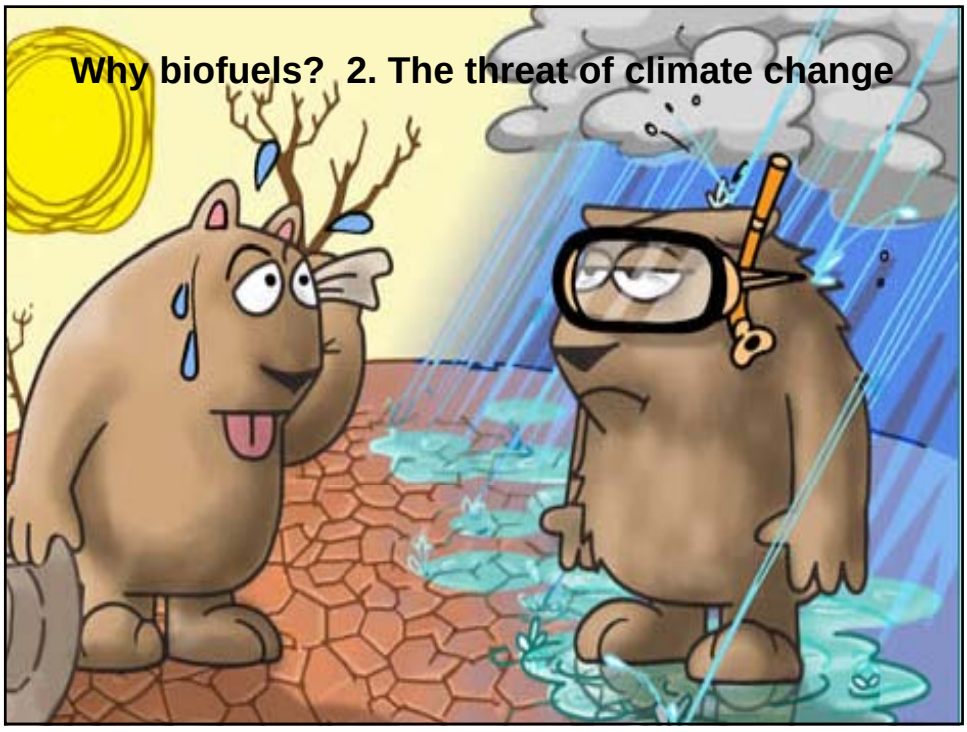
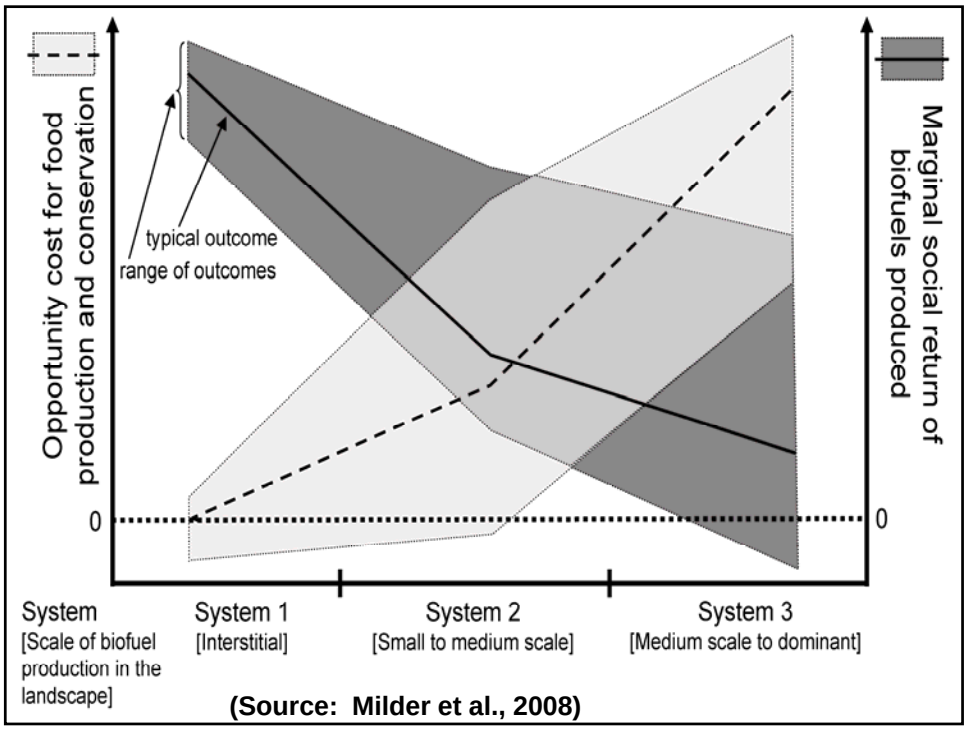
Presented to
7TH Internatioanl Biofuels Conference
12 February 2010


A post-petroleum future?


Why biofuels? 2. The threat of climate change



(Source: Milder et al., 2008)

But some key complexities of bioenergy remain

- Diverse components: Feedstock supply, conversion technology, and energy use
- Diverse economic, social, and environmental factors
- Diverse scales, from local to international
- Diverse objectives, from energy autonomy at the local level to serving international markets

Sustainability will often involve trade-offs. What should be the basis for the trade-offs?

Options for more sustainable use of biomass

1. Increasing yields and optimizing agricultural production

Options for more sustainable use of biomass

2. Restoring formerly degraded land

Options for more sustainable use of biomass

3. Stationary use of bioenergy

Options for more sustainable use of biomass

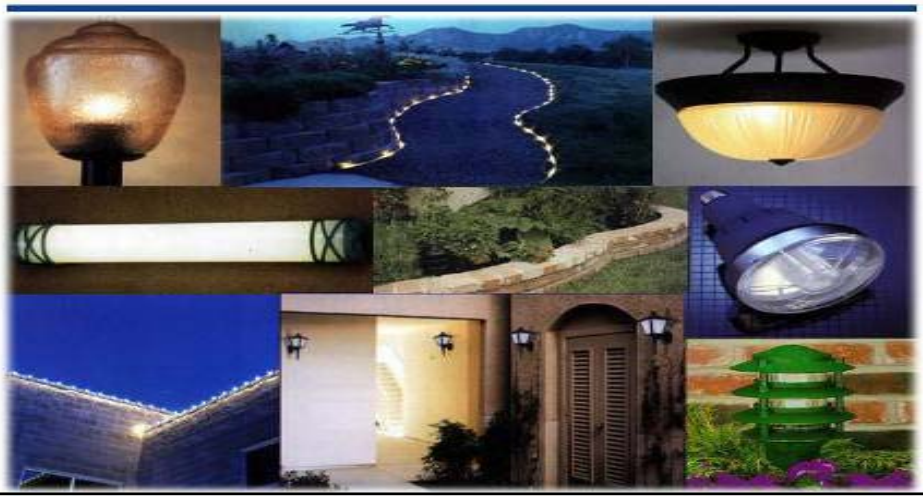
4. Use of waste and production residues

Options for more sustainable use of biomass

5. Cascading use of biomass

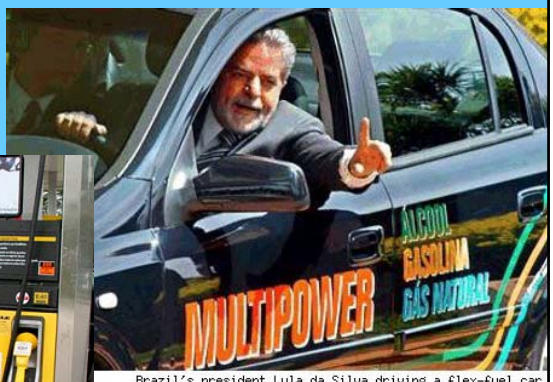
Options for more sustainable use of biomass

6. Replacing biomass with other energy options



Options for more sustainable use of biomass

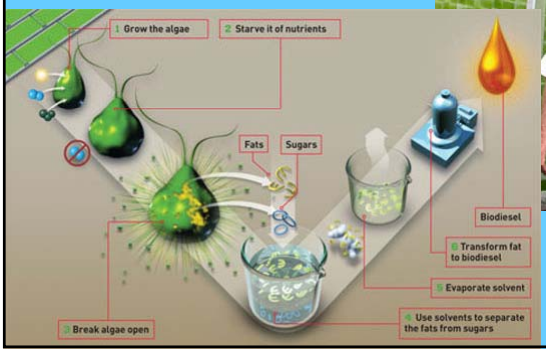
7. Production standards and production certification



Brazil's president Lula da Silva driving a flex-fuel car

Options for more sustainable use of biomass

8. Continuing research to develop advanced technologies



The Roundtable on Sustainable Biofuels

The RSB is an international multi-stakeholder initiative developing a sustainability certification program for biofuels production. The RSB standard is …

- **generic** to all crops,
- **adaptable** to new information,
- **multi-stakeholder** driven;

… and includes …

- **environmental criteria**
- **social criteria**
- **LCA-based GHG accounting**

Version 1.0 - RSB Standard

- Principle 1: **Legality**
- Principle 2: **Planning, Monitoring and Continuous Improvement**
- Principle 3: **Greenhouse Gas Emissions**
- Principle 4: **Human and Labour Rights**
- Principle 5: **Rural and Social Development**
- Principle 6: **Local Food Security**

More RSB Principles

- **Principle 7: Soil**
- **Principle 8: Conservation**
- **Principle 9: Water**
- **Principle 10: Air**
- **Principle 11: Use of Technology, Inputs, and Management of Waste**
- **Principle 12: Land Rights**

Possible Indirect Impacts

Expansion of the biofuel sector could have at least the following indirect effects:

1. **Impact on commodity prices:** can lead to impacts on principle 6 on food security if grain/oil price increases due to biofuels make it more difficult for vulnerable populations to afford food.
2. **Displacement of former production, possibly to other regions of the world (indirect Land Use Change):** Can lead to impacts on principle 3 on Greenhouse Gas emissions if iLUC occurs on land with high carbon stocks, and principle 8 on Conservation if iLUC occurs on land with High Conservation Values

Bottom line: Sustainability of bioenergy will depend on multiple issues, of scale, form of feedstock, and objectives for the end users