Searching for Sustainability: The Best as the Enemy of the Good

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Biobased product assessment methods are now part of the debate

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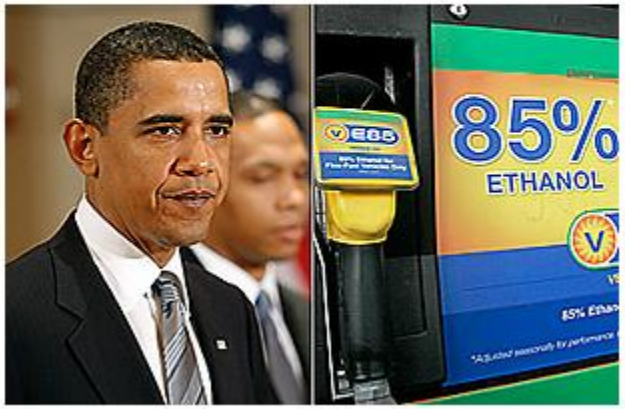
Stress-Testing Biofuels: How the Game Was Rigged

By MICHAEL GRUNWALD Tuesday, May. 12, 2009



(l. to r.): Kevin Lamarque / Reuters; Brennan Linsley / AP

“The draft conclusions announced by Environmental Protection Agency (EPA) administrator Lisa Jackson were that cellulosic ethanol and other next-generation renewables will dramatically reduce greenhouse-gas emissions over their entire life cycle, but ...”

Sustainability is an essentially contested concept

- There is widespread agreement on the abstract core *notion* itself, whilst there is endless argument about what might be the best *realization* of that notion.
- ***'Sustainability'*** assessments must be conducted with a clear purpose and clearly stated objectives.

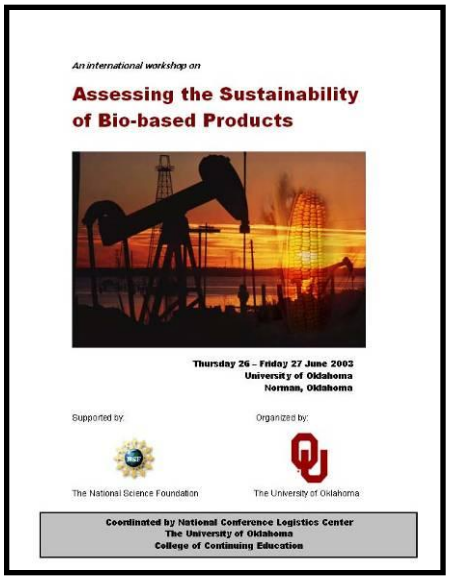
Truth is forward-looking, and a society can claim to have found it only when the society's practices and institutions sustain its people indefinitely on the land it inhabits.

---Bryan G. Norton, Sustainability, 2005

Biobased Product Sustainability Assessment Workshop 2003

The 'top 5' indicators of bio-based product sustainability identified were:

- Land Use / Soil Conservation
- Energy Flows (Density, intensity, quality)
- Social Issues / Vulnerability
- Economic Viability / System Profitability
- Climate Change / Greenhouse Gases
- Nutrient Cycles



Conference Reports

International Workshop on Assessing the Sustainability of Bio-based Products

June 26 and 27, 2003 in Norman, Oklahoma, USA

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This workshop held on June 26 and 27, 2003 in Norman, Oklahoma (USA) gathered 44 experts from academia (14), government (10), industry (10), NGOs (3) and some from Europe (4) and Canada (2). It aimed to provide a forum to begin building a consensus about appropriate methods for assessing the impacts and sustainability of products, such as fuels and chemicals, made from biomass.

mentation process development at Metabolix Inc. He was the first but not the last to mention that biological processes and bio-based products do not automatically mean less use of non-renewable resources. He nicely illustrated this fact with a life cycle study of a biopolymer (polyhydroxylalkanoate or PHA) produced in genetically engineered corn that has been developed by Monsanto. He identified renewable energy as the key

A Rationalist Approach to Environmental Sustainability Policy

- Aggregated economic and environmental performance indicators are calculated by mathematical models to inform policy makers and all stakeholders of all feasible alternatives.
- The non-dominated set of alternatives is generated.
- All trade-offs among the indicators are displayed.

Many Indicators - Many Problems

Impact	*Normalization Value*
Global Warming	25 582 640.09 g CO_2 equivalents/year/capita
Acidification	7 800 200 000.00 millimoles H+ equivalents/year/capita
Eutrophication	19 214.20 g N equivalents/year/capita
Fossil Fuel Depletion	35 309.00 MJ surplus energy/year/capita
Indoor Air Quality	35 108.09 g TVOCs/year/capita
Habitat Alteration	0.00335 T&E count/acre/capita[a]
Water Intake	529 957.75 liters of water/year/capita
Criteria Air Pollutants	19 200.00 microDALYs/year/capita
Smog	151 500.03 g NO_X equivalents/year/capita
Ecological Toxicity	81 646.72 g 2,4-D equivalents/year/capita
Ozone Depletion	340.19 g CFC-11 equivalents/year/capita
Human Health	274 557 555.37 g C_7H_8 equivalents/year/capita

[a] One acre is equivalent to 0.40 hectares.

Source: BESS 4.0

Harsh Reality

- Cognitive and analytical resources are limited.
- Public decision making is characterized by conflicting objectives representing the values of different participants with no ‘optimal’ solution.
- At best will achieve a *satisficing solution*, which is a solution path acceptable (not optimal) for the majority of parties concerned.
- Comprehensive planning is impossible.
- We MUST “muddle through” with successive limited comparisons based on a few important evaluation criteria.

*Lindblom, C. E. 1959. The science of muddling through.

Looking for the “more preferred” rather than the best

- Purpose and objectives must be clear and sufficiently narrow.
- A degree of comprehensiveness is possible and necessary.
- Tinbergen Rule* states that for each and every policy target there needs to be at least one policy tool.
- Selection of alternative futures
  - *Consequential* vs. *Attributional* analysis

*Tinbergen, J. (1952). *On the theory of economic policy*.

Improvement Analysis

With apologies to Robert F. Kennedy:

There are those who look at things the way they are, and ask how good they are…
why not dream of things that never were and ask how good they can be?

Reimagining Agriculture: What could be …

Triticale

Corn

Sorghum

Sunn Hemp

From “counting beans” to designing for resilience & self-renewal

- All social and biophysical systems are constantly changing.
- Design systems for resilience and self-renewal through built-in redundancy and diversity.
- Resilience has real cost.

"We have assumed that we could manage individual components of an ecological system independently, find an optimal balance between supply and demand for each component, and that other attributes of the system would stay largely constant through time.“

- Resilience Alliance

Summary

- Many sustainability indicators are not practical for use in formulating public policy
- Biobased product policy should be pursued to achieve limited, clearly defined objectives
- One set of indicators will not be appropriate for all products or assessments

Summary (cont.)

- Multi-criteria analysis (MCA) can be helpful if question is well defined and salient to decision-makers
- Sustainability cannot be achieved by managing individual components of our ecosystems or our consumption
- We should seek highly desirable alternate futures characterized by resilient systems

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