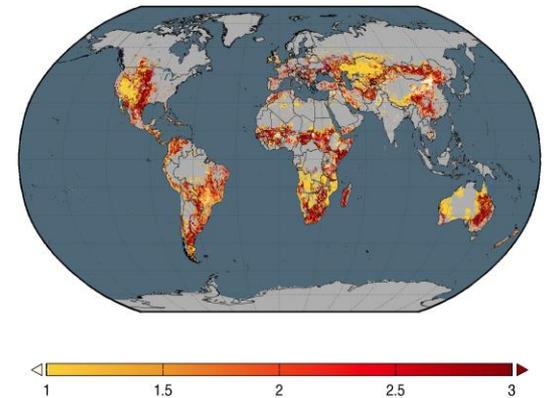
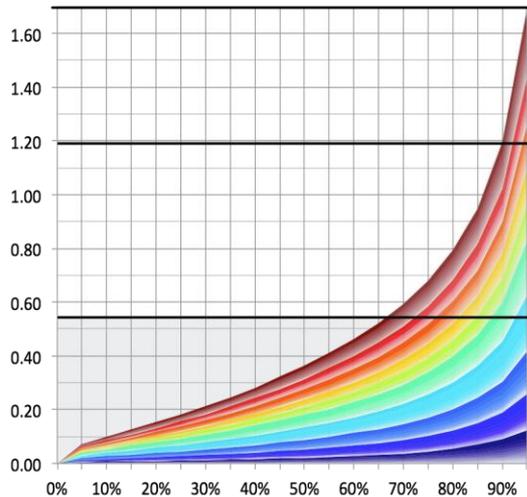


GSB Overview

Lee Lynd

Thayer School of Engineering, Dartmouth College
Global Sustainable Bioenergy Project
Mascoma Corporation
Bioenergy Science Center

**GSB Workshop
Oak Ridge National Lab
June 12 & 13, 2013**



Global Sustainable Bioenergy: Feasibility & Implementation Paths

“GSB Project” (<http://bioenfapesp.org/gsb/>)

Objective: Expand understanding of the possibility of beneficially producing bioenergy on a very large scale - e.g. 25% of primary energy supply in 2050, consistent with recent IEA low carbon scenarios.

Working hypotheses:

1. That it is physically possible to “make room” for bioenergy while honoring other land use priorities.
2. That a systemic approach to food and bioenergy production could positively and synergistically impact multiple urgent human needs.

Structure

Stage 1. Continental Conventions (completed)

- Gather input on framing stages 2 and 3
- Continental and common resolutions
- Recruit participants & funds

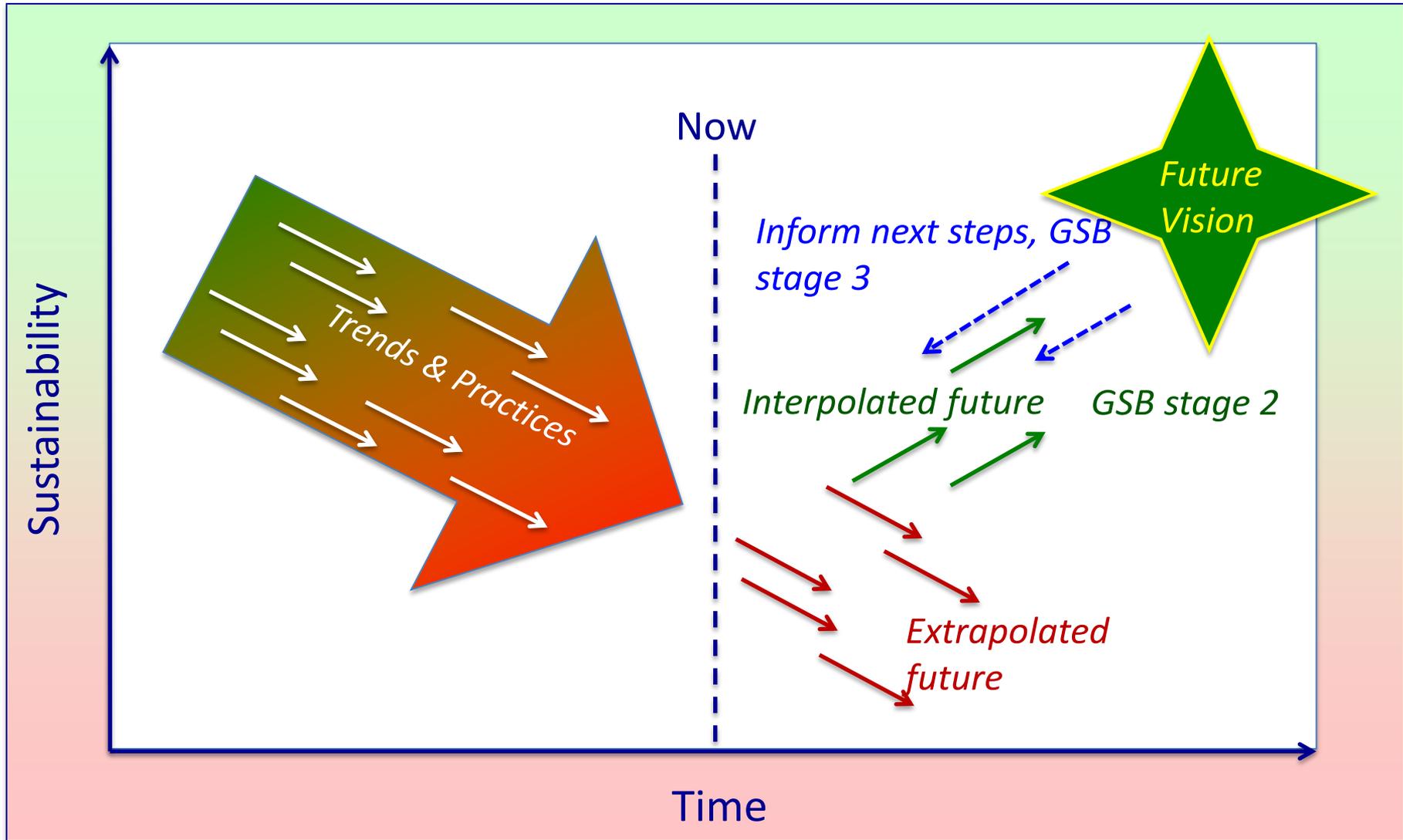
Stage 2. Address working hypothesis, unconstrained by current realities.

Stage 3. Analyze implementation paths, recommend policies

GSB Stage 1 Conventions

Continent	Location	Dates (2010)	Host Institution	Chairs	Sponsors	Number of Attendees
Europe	Delft, The Netherlands	February 26-26	Kluyver Centre for Industrial Fermentations	Patricia Osseweijer, Andre Faaij	Kluyver Centre for Genomics of Industrial Fermentation, Netherlands Organisation for Scientific Research; Delft University of Technology	70
Africa	Stellenbosch, South Africa	March 17-19	University of Stellenbosch, South Africa	Emile van Zyl	SANERI Chair of Biofuels; Stellenbosch University; National Research Foundation	40
Latin America	Sao Paulo, Brazil	March 23-25	The São Paulo Research Foundation (FAPESP)	Brito Cruz, Jose Goldemberg	FAPESP Bioenergy Research Program (BIOEN), Brazilian Academy of Sciences (ABC)	200
Asia, Oceania	Kuala Lumpur, Malaysia	June 14-16	Universiti Teknologi Malaysia	Ramlan Aziz	Ministry of Energy, Green Tech & Water	86
North America	Minneapolis St. Paul, USA	September 14-16	University of Minnesota	John Sheehan, Jon Foley	Institute for Renewable Energy and the Environment	64

Future Vision Point of Reference: Extrapolated and Interpolated Resource Futures



GSB Project: Approach and Differentiation



	Most Bioenergy Projects & Analyses	GSB Project
Focus	Most probable	Most desirable
Expert opinion	Reflected, often sharply divided	Informed, seek new understanding & consensus
Point of reference	Current reality	Future vision
Value	✓	✓

LACAf-I Project

Led by Professor Luis Cortez, the LACAf project was conceived as Brazil's contribution to the GSB project.

2 year project funded in February, 2013

Goal: *Create a robust and updated perspective for sugarcane bioenergy development in the targeted countries, aiming to build a base for consistent decision making and offering a possible model for similar contexts.*

Targeted countries: Columbia, Guatemala, Mozambique, South Africa

Tasks

Diagnosis Energy and Food Situation and Integrated Analysis. Horta Nogueira

Determining Land Use and Physical Near-Term Potential. Edgar Beauclair

Production Models and Innovation. Regis Leal

GSB Structure

	Geospatial Analysis			Social		Environmental				Integrated Analyses & Scenarios	
	Livestock Production	Energy Crop	Database Development	Food security	Social Welfare & Economic Development	Soil Fertility	Water	Climate	Biodiversity	Making Room for Bioenergy	Multiple benefits
Global											
Local, "LACAF"* Countries											

*Latin America, Caribbean, and Africa

Status

Geospatial: LACAf-I (sugar cane modeling). FAPESP proposal under development. Submission by the end of June targeted, 7 papers outlined. Published papers on crop models (Shujiang, Stan W.). Papers under development on livestock intensification (John), empirical crop models (Shujiang). Led by Jansle, with John, Beauclair, Keith, Shujiang.

Integrated analysis. LACAf-I work (diagnosis, production models & innovation). NEPAD/FAPESP collaboration & related paper. Soon to be submitted papers: Diet & land availability, Need for biofuels in a low-carbon economy. Lee & Horta leaders.

Social: Proposal under development. Led by Andre Furtado with Marcia Azanha, Jeremy.

Environmental: Preliminary discussions with potential Luiz Martinelli (potential leader), Suani Coelho, Oswaldo Lucon, and Gideon Wolfaardt (water), Heitor Cantarella (soil)

BIOEN/FAPESP Scholar Exchange Program

- Brazilian scholars studying abroad
- International scholars studying in Brazil
- Several days to a year
- Yet to have a proposal turned down

Table 2. Persons supported by the BIOEN/FAPESP Scholar Exchange Program.

Visitor	Dates	Host Institution
Lee Lynd, Professor of Engineering and Adjunct Professor of Biology, Dartmouth College, USA	September to December, 2012	University of Campinas
Jeremy Woods, Lecturer, Imperial College, UK	October, 2012	University of Campinas
Keith Woods, Senior Staff Scientist, Oak Ridge National Lab, USA	October, 2012	University of Campinas
John Sheehan, Scientific Program Coordinator for Biofuels, Institute on the Environment, University of Minnesota, USA	November to December, 2012	University of Campinas
Brazilian attendees at a 2-day workshop on geospatial analysis: Edgar Beauclair, Heitor Cantarella, André Santanchè, Luiz Horta Nogueira, Jansle Rocha	June, 2013	Oak Ridge National Laboratory

Project Support

In hand

FAPESP

LACAf-I Project. \$1.5 million

BIOEN/FAPESP Scholar Exchange Program

ORNL

Support for participation of ORNL personnel (Keith, Shujiang, Maggie, others who worked on crop models)

New Partnership for African Development (NEPAD). 2 African Post Docs to support collaboration with FAPESP.

Prospective

Multiple proposals to FAPESP expected and encouraged.

Many other prospects – Prominent papers indicative of thought leadership likely impetus