BIOFUELS AND SYNTHETIC BIOLOGY

Problematizing

The Energy Crisis

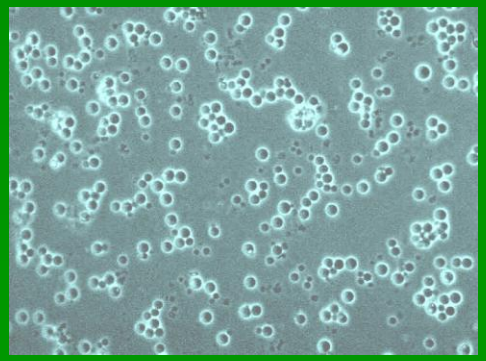
Introduction: The Basics

- What is the energy crisis?
- What is a biofuel?
- What is a renewable energy source?
- What is sustainability?
- What is the role of synthetic biology in biofuels?
- Where does human practices fit in?
- What is the role of industry?

AMYRIS
BIOTECHNOLOGIES

- technology: hydrocarbon biofuel
- framing of problem
- proof of concept
- affiliation with academia
- abstraction

yeast



JBEI
JOINT BIOENERGY INSTITUTE

DOE Bioenergy Research Centers

JBEI's office in Emeryville, CA

- DOE initiated and funds JBEI
- Association of 3 universities and 3 government research facilities.
- Goals include replacing transportation fuels with biofuels in a cost efficient, easily integrated manor

JBEI cont: Their Approach to Biofuels

- JBEI approach to Biofuels
- research split into 3 emphasis's
  - feedstock production
  - Deconstruction
  - fuel synthesis
- The science: where does synthetic biology come in?
- The role of industry

bio-reactor

JBEI cont: Discussion

- Abstraction
- The structural organization of the process of doing the research
- Modes
  - An attempt at mode three
- Problematization: how does JBEI construct the problem they wish to solve?

The EBI Proposal

- A “unique collaboration”
- Research and development
- Technically feasible & economically viable solutions
- New field of ENERGY BIOSCIENCE
- Biofuels

http://www.energybiosciencesinstitute.org/

Areas of Research

1. Feedstock development:
   Plants → Biofuels

2. Biomass depolymerization:
   Breaking down plant

3. Biofuels production:
   Improve concentration of fuel

4. Fossil fuel bioprocessing:
   Reaching oil and coal

5. ESE research:
   Understand the impact

- How much land globally is available?

- What might be the consequences of devoting land to produce biofuels?

- Will food production be affected?

- What impact would a dynamic biofuels market have on the environment?

The Energy Crisis

- What is the problem?
  - Global energy challenges—focus on global warming (fossil fuels)
  - The impact, on environment, of current energy sources
- What's the solution?
  - New and cleaner energy sources to use as fuel for road transport
  - Scientific research: probing the emerging secrets of bioscience for the answer

The EBI Structure

- Research Collaboration
  - Open component
  - Proprietary component
- Governance
  - The Governance Board
  - The Executive Committee
- The Public?

Public, Research, & Modes

- Public exclusion—the undemocratic process
- Control over research agenda—Who decides?
- Modes
  - Will the ESE research change anything?
  - “Good” science
  - Human Practices

The EBI—Problem Construction

- The global energy challenge is a technical problem
  - With a technical solution: Science will produce the answer (biofuels research)
- Other world problems are only remotely related to this crisis
  - Environmental, social, and economic concerns do not shape research
- The solution is technically feasible (science) and economically viable (industry)
  - Transition into the marketplace is necessary and is best facilitated by industry (potential and future in industry-academia relations)

Alternate Approaches: Two Big Ideologies

- Capitalist
  - Industry
  - Government
    - DOE
- Environmentalist
  - Tad Patzek and co.
- Supply and access
- Business as usual
- Where does synthetic biology fit in?

Foreign Oil

US Department of Energy

- National security
  - Supply and accessibility
  - Safety, security, preparedness
- Sustainability
- Fuel categories
- Fuel and technology, synthetic biology

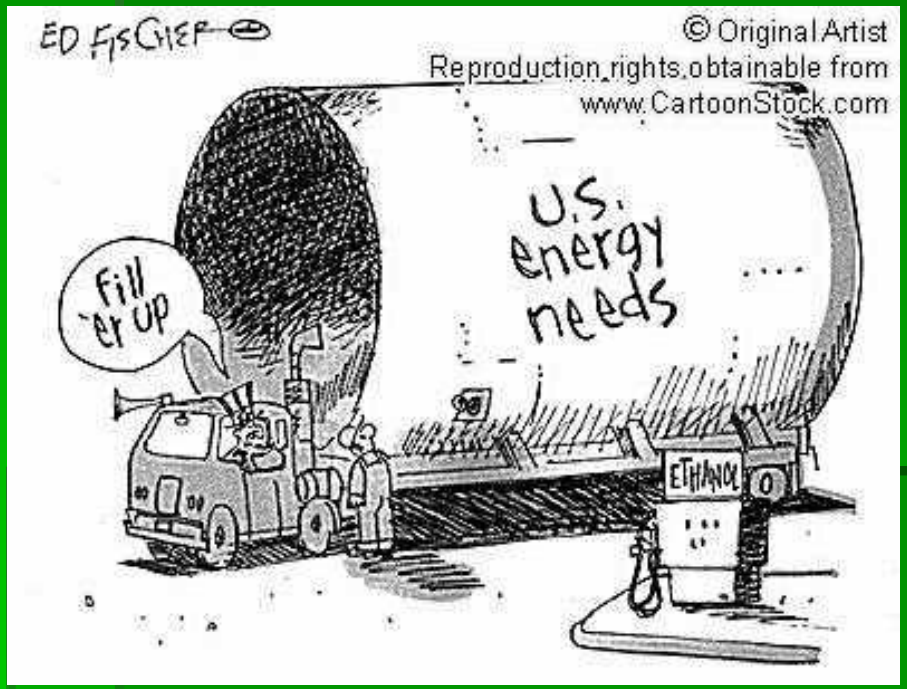
DOE cont.

- 20 in 10 program
  - What is it and what are its goals?
  - How will it do this?
- Biomass R&D Initiative
  - What is it and what does it do?
  - How does it do this?
- Modes

Tad Patzek

- Representative of larger group of environmentalists and scientists against biofuels
- The politics of access
- Environmental devastation
- The role of technology

Patzek cont.



- Business as usual
- Sustainability
- Role of the US and Europe
- What needs to change
- Catastrophe

Conclusion: What Does The Future Hold?

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