

CCSF Topical Lunch Summary
Systems Approach to Sustainable Energy
October 28, 2009

Introduction

- Systems approach includes 5 components: management, context, identification of problem, finding solution, and implementation of solution.
- Energy considerations: sources, distribution, and conservation;
- Maximum energy potential, feasibility, economic viability and societal acceptance have to be considered for each of these.
- Interactions with other complex systems such as food, water must be considered.

Al George

- Energy is a topic of tradeoffs. Quantification of economic and environmental impacts is essential.
- Challenge is to accomplish this and find funding for such projects.
- Systems area faculty hires needed.

Jeff Tester

Attendees expressed their interest in systems, sustainability and energy, mentioned related research areas and colleagues who should be contacted. Cornell's breadth of research and interest in sustainable systems in Engineering, AAP, AEM, and Agriculture was evident as was some cross-colleges collaboration underway, including with Human Ecology.

Common themes raised by attendees describing their areas of interest include: fusion, electric power systems, wind energy, solar, carbon sequestration biofuels, systems, mathematical and computational approaches to complex systems. Two evident areas of cooperation were sustainable transportation and the Smartgrid.

Attendees mentioned other colleagues who share these interests: Mason Peck, Steve Pope, Hsiao-Dong Chiang, Larry Walker, Lars Angenent, Beth Ahner, Bob Thomas, Lindsay Anderson, Don Greenberg, Linda Nozick, Oliver Gao and Mark Turnquist

The Way Forward: a follow-up meeting leading to collaboration for (a) systems view of large problems (b) adding systems aspects into existing projects.

Attendees:

Lance Collins

Interest in potentially hiring more faculty; MAE has a number of faculty with research interest in systems area: space systems, rotating machinery, combustion, wind energy, electric vehicle, etc.

Lang Tong

Expertise in communication networks/IT; interested in Smartgrid and energy distributions; optimization; large scale estimation learning problems

Dave Hammer

Fusion energy expertise; how to bring more systems perspectives into the problem

Norm Scott

Sustainable communities;

Ray Zimmerman

Tools for simulating electric power systems, integration of wind and storage, impact of environmental problems

Brandon Hensey

Integration/coordination/control problems, modeling, predicting behavior; integration smart/micro grids and wind energy

Kevin Pratt

Systems approach to sustainable design; develop a very fast architectural systems design including social aspect of architecture as well as pure aesthetics; attention to cultural aspects

Mike Hoffman

Biomass from various sources; capturing all aspects in the systems approach

Dave Dieterich

Background in chemistry and material sciences
Interest and experience with bringing products to market

Michael Moore (University of Calgary)

Experience in regulatory world; research on carbon controls and markets, how to set price on elementary carbon vs. transformed carbon

Antonio Bento

Economics aspect; large computable equilibrium models, behavior across agents in a system; cost and environmental impact of biofuel mandates; optimal use of feedstock and unintended effects of policies

Carla Gomes

Interest in interdisciplinary groups and collaboration; experience in computation sustainability; optimization systems, machine learning, inference and Smartgrid

Tim Mount

Power systems, deregulation and market effects; Smart grid integration & economics

Pierre-Alexander Gourdain

Fusion and transition to practical power plants; trying to get people to put together a college-wide introductory engineering class for freshmen

Paulette Clancy

Represents a solar energy group that is based across 2 colleges; looking at solar from the molecular level; all the way to a system that is tangible; link between sustainable business and solar work; Cornell could do more to break barriers across colleges

Brian Chabot

Interest in larger systems and the social dimension

Frank DiSalvo

Director of CCSF which has worked with over 180 faculty, sustainability is the mother of all issues; interest in materials and batteries

Hector Tito Abruna

Director of Energy frontier research center; goal to identify high performing materials and how to apply material development to fuel cells, batteries, etc.

John Guckenheimer

interdisciplinary research, mathematics, nonlinear phenomenones; computational tools

Helene Schember

Experience in management of technical programs;

Francis Vanek

Sustainable energy for transportation and energy efficiency; developing “sustainable transportation for mega regions”

Terry Jordan

Representing geology and atmospheric sciences; geological sequestration of CO₂ and unconventional hydrocarbons

Al George (co-host)

Systems; vehicles; energy; Systems Engineering Program; have about 7 faculty members interested in systems and working with others.

Jeff Tester (co-host)

Overall energy and energy systems; geothermal.