



Innovations in Sustainable Enterprise

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Inside this Edition...

Featured Faculty Research: "Systems Thinking for Sustainability: A Decision-Support Approach for Electrical Utility Executives Addressing Climate Change"	1
Upcoming CSE Events	2
Sustainable Enterprise at Kenan-Flagler: CSE Program News	3
Sustainability in NC: Events	3
Notes from the Field: UNC Faculty & Student Projects	4
CSE Opportunities	4
Sustainability News & Innovations around the World	5
Reading & Resources	5

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Kenan-Flagler Business School
University of North Carolina

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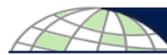
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Featured Faculty Research

"Systems Thinking for Sustainability: A Decision-Support Approach for Electrical Utility Executives Addressing Climate Change"

By Andrew Jones

Consider the challenge an electrical utility executive faces when designing a financially robust strategy that addresses global climate change. When will a federal or state carbon tax or limit be imposed? What, if anything, should she do before that time? Invest in renewables like wind or biomass, trusting that costs will continue to fall? Coal gasification, natural gas, or nuclear, with its other pollution concerns? Distributed generation? Can she actively close polluting plants and build new, cleaner ones? Can she spark her customers to increase electrical use efficiency and reduce demand? What are the interactions and synergies between such strategies? Then add in the secondary effects. How will gas and coal prices respond to a carbon tax? How might investments in wind accelerate the reduction in the cost of wind?

Put it all together, and you have a managerial challenge with high degrees of complexity and uncertainty.

In such domains, there is no single optimal strategy that a smart analyst with a spreadsheet can generate. Instead, what managers need is an approach and tool that can support management team conversations about how various strategies would play out over time, and whether they would meet financial and environmental goals.

In a project funded by the Concordia Foundation, a team of experts from the Sustainability Institute and the Rocky Mountain Institute are working to create just such a tool. The project will push our own thinking about effective utility strategies, while supporting innovative utility leaders who are struggling with the same questions.

To do this, we are using an approach called System Dynamics (SD) Modeling, which is the more technical wing of the broader field of Systems Thinking. SD Modeling grew out of MIT in the 1950s and has evolved in recent decades into a practical, flexible thinking tool that managers use to address a wide range of strategic questions.

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Andrew Jones works with Sustainability Institute out of Asheville, North Carolina and is reachable at ajones@sustainer.org. As an adjunct faculty member, he is teaching "Systems Thinking for Sustainable Enterprises" at UNC's Kenan-Flagler Business School this fall. He studied System Dynamics at MIT.

"Systems Thinking for Sustainability"
continued from page 1

SD modeling includes three core tools. The first tool supports diagramming the interrelationships and accumulations in systems. For example, diagramming tools might help a management team explore how future carbon regulations could affect prices of coal and natural gas, which would affect the "dispatching" or use of the different capacity types, which, in turn, would affect utility CO₂ emissions.

The second tool is the creation of formal mathematical models that bring numerical rigor to the diagrams and lead a modeling team to use data and expert opinion to quantify important relationships in the system. For example, what are the likely future costs of carbon offsets on the open market? How much do we expect wind farm prices to fall? How much global warming pollution can be abated through coal gasification with carbon sequestration?

The third tool is the creation of a user-friendly interface onto the model that turns it into a "management flight simulator." Using the analog from pilot training, such a simulator allows a utility executive to "fly" his company for the next 20 years, experimenting with a wide range of strategies given a wide range of regulatory and market scenarios. In such a setting, the rate of learning is accelerated; instead of waiting 10 years to see how a strategy actually works, one can see a (much-simplified) set of results in 10 seconds. For example, a leader could see how a 50/50 mix of wind and natural gas

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Upcoming CSE Events

Sept. 21

CSE Distinguished Speaker:
"Implementing Natural Capitalism"
Hunter Lovins
UNC, Chapel Hill, NC
[more info](#)

Oct. 28

Net Impact "Careers in Sustainable Enterprise" Forum
UNC, Chapel Hill, NC
[more info](#)

Feb. 17

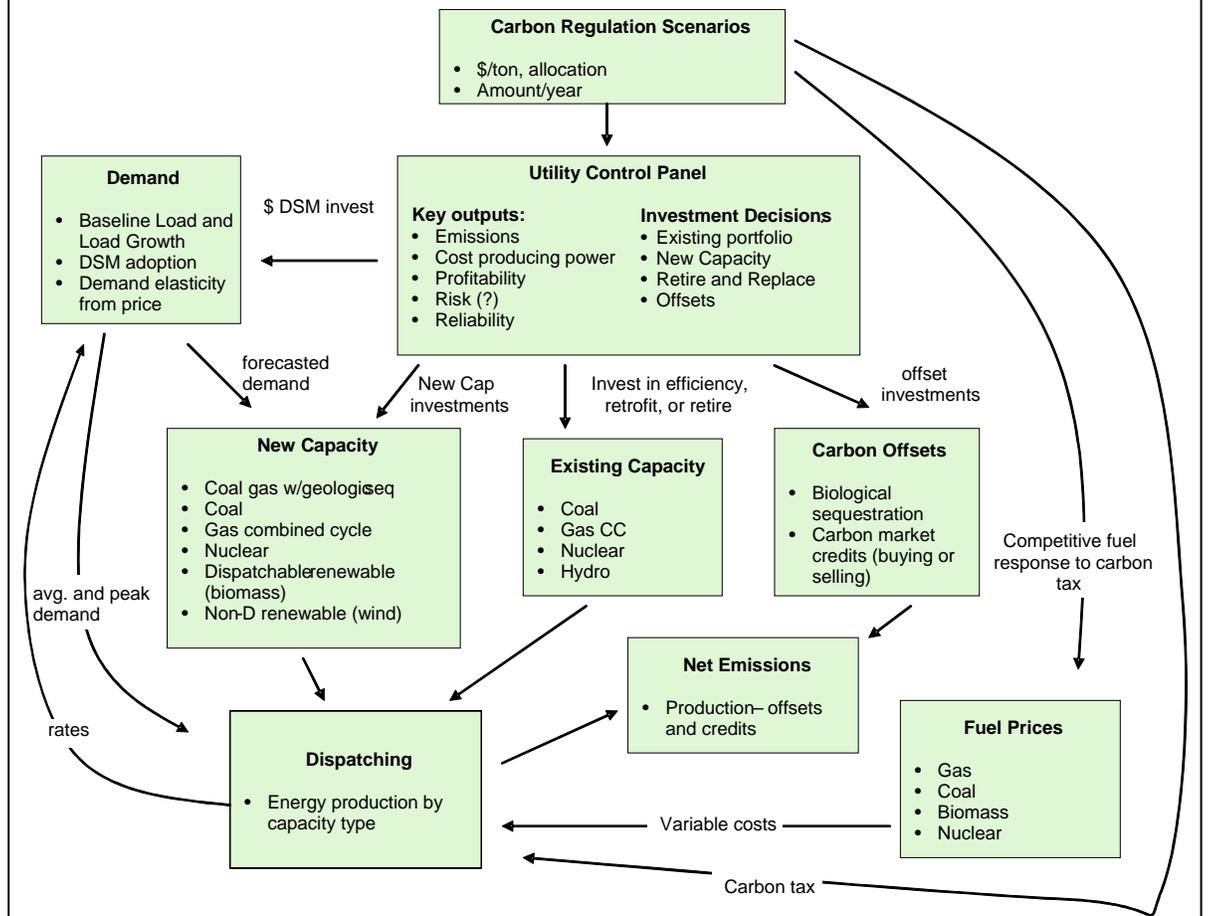
Sustainable Enterprise Career Fair
UNC, Chapel Hill, NC
[more info](#)

Mar. 30-31

CSE Annual Conference:
"Reinventing Today's Business for the Challenges of Tomorrow"
Hilton Hotel, RTP, NC

[CSE Events Calendar](#)

SD diagramming tools such as this can be used to help management teams understand the interrelationships between different components of complex systems.



"Systems Thinking for Sustainability"
continued from page 2

investments along with a modest demand-side management program fares amidst regulation that brings a carbon tax by 2009. He doesn't like the result? He will try another approach in the next experiment.

The overall approach takes a unique angle on the use of technical models to support decision-making. It starts with the premise that all managerial decisions, about sustainable practices or other matters, are made with models. Usually these are our "mental models," the understandings we have in our heads about how the system works. The trouble is, in complex domains such as utility strategy for addressing climate change, such models are typically fraught with errors as we misunderstand time delays, feedback interactions, and other features of the system. Thus, SD modeling works to supplement our "mental" models with more formal ones that do not spew out answers as much as support effective conversations about strategy that are grounded in the real mechanics of the system.

The desired end result is that leaders who are struggling with the most challenging questions of our time—for example, how to address climate change in a way that makes business sense—have the technical and conversational support that matches the level of courage they bring to the challenge of creating a sustainable world. ❖



Sustainable Enterprise at Kenan-Flagler: CSE Program News

The CSE will host its first **annual conference** on March 30-31, 2006. The focus will be **"Reinventing Today's Business for the Challenges of Tomorrow"**, featuring the latest research on and application of sustainable business practices. More info will be available soon. Interested participants and sponsors may contact CSE executive director [Katie Kross](#).

Hunter Lovins and **Stephen Self** of **Natural Capitalism Inc.** will be on campus to discuss sustainable business practices with Kenan-Flagler students and faculty on Sept. 21. Ms. Lovins will give a public lecture on **"Implementing Natural Capitalism"** to a large audience in the evening.

Drew Jones, of the Sustainability Institute, joins UNC Kenan-Flagler as an Adjunct Professor for 2005-06. Drew will teach the MBA elective course "Systems Thinking for Sustainable Enterprise" this fall.

In its first year, **CSE Consulting** has surpassed expectations and achieved tremendous success in providing top-notch sustainability consulting to six different organizations over the summer. The CSE would like to thank our summer consultants for jobs well done! *Clockwise from top right: Grayson Jones, Bruce Herzer, Supitcha Phitthayanont, and Galya Vasylevska, all MBA Class of 2006*



A **new elective** is available to MBAs this semester: "Global Corporate Social Responsibility in the US and EU" will be taught by Susan Aaronson (Kenan Institute, Washington).



The CSE is pleased to announce the addition of an MBA Intern, **Ogemdi Ike** (MBA '06), to its staff to assist us as we develop and expand the CSE Knowledge Bank, an online resource of white papers, cases, and research resources.

Attended by more than 90 students, faculty and staff, the CSE's fall social was indicative of the **overwhelming interest in sustainable enterprise by the incoming MBA class**. The Net Impact Club is likewise experiencing record numbers of new members from the Class of 2007.

Sustainability in NC: Events

Sept. 20-22

Environmental Summit
Nicholas Institute for Environmental
Policy Solutions Inaugural Event
Duke Univ., Durham, NC
[more info](#)

Sept. 21

"Refueling America" Workshop
Keynote Speaker: Paul Roberts,
NC State, Raleigh, NC
[more info](#)

Sept. 21

Summit of Colleges for Energy
Sustainability
NC State, Raleigh, NC
[more info](#)

Sept. 22-23

"Cultivating a Community to
Address Importance of Environ. for
a Diverse Population"
NC State, Raleigh, NC
[more info](#)

Sept. 22

Sustainable Business
Networking Social
Triangle Net Impact, Raleigh, NC
[more info](#)

Sept. 23-24

"Sustaining Rural America: Defining
Our Common Future"
UNC Pembroke, Pembroke, NC
[more info](#)

Sept. 23-24

Sustainability Fair
Central Carolina Community
College, Pittsboro, NC
[more info](#)

Sept. 28

"States as the Driving Forces in
American Climate Change Policy"
Barry Rabe, PhD
UNC, Chapel Hill, NC
[more info](#)

Sept. 28

"Where Will the Natural Gas Come
From?"
Andrew Weissman
UNC/Duke Robertson Seminar
Duke Univ., Durham, NC
[more info](#)

Oct. 1

NC Annual Green Building Tours
Statewide, NC
[more info](#)

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Notes from the Field: UNC Faculty & Student Projects

National Public Radio's **Marketplace Morning Report** interviewed **David Kirkpatrick** (EMBA '91), founder and managing director of SJF Ventures; intern **Deborah Parsons** (MBA '06); and Kenan-Flagler ethics professor **Bob Adler** in "Community Venture Investing" on Aug. 15. [Listen](#)

The International Society of Logistics Engineers (SOLE) presented CSE director **Al Segars** with their **Best Paper Award** for, "Building Smart Supply Chains for Agility: the Logistics Matrix," which looks at logistics from both a forward and reverse perspective—a method being used by the Navy and Army Material Command as well as Dell and Apple Computer.

An innovative new UNC program supports **social entrepreneurship** on campus; undergraduate students can apply for admittance in the [Social Justice Entrepreneurship Incubator](#), which provides financial, academic, and networking support to the student projects.

Jim Johnson's Center for Urban Investment Strategies held its second **Entrepreneurship Boot Camp** in July, bringing together 40 entrepreneurs, faculty scholars, and guests from across the nation to discuss leading research in entrepreneurship in an effort to promote minority and women's entrepreneurship.



CSE director **Al Segars** will speak about "Strategic Change through Technology and Business Innovation" at the upcoming [Society of Human Resource Management conference](#) in New York City (Oct. 26-28).

John Edwards, director of the UNC School of Law's Center on Poverty, Work and Opportunity was the first speaker in a new lecture series sponsored by the center that will feature faculty and national public policy experts to examine how to move more Americans out of poverty... [more](#)

Chancellor James Moeser announced plans for a proposed **UNC-Chapel Hill nutrition research center** that will be part of the newly announced North Carolina Research Campus in Kannapolis, NC, part of the Kannapolis community revitalization efforts... [more](#)



CSE Opportunities

The CSE, in partnership with UNC's CIBER is offering **\$5,000 Faculty Grants** to support leading-edge academic research in the topics of sustainable business practice. Grants are open to faculty at any university. Applications now being accepted... [details and application](#)

This Fall, UNC Kenan-Flagler Business School will be seeking an adjunct faculty member to teach on topics of sustainability and finance. Stay tuned to [our website](#) for details later this month.



Kenan-Flagler students, faculty, and staff gathered at the CSE Fall Social on Aug. 31

Sustainability in NC: Events

(continued)

Oct. 4

"Energy & Env. Aspects of Biofuels"
David Pimentel, PhD
UNC/Duke Robertson Seminar
Duke Univ., Durham, NC
[more info](#)

Oct. 5-7

2005 Statewide Conference for
NC's Nonprofit Sector
Westin Hotel, Charlotte, NC
[more info](#)

Oct. 11-12

NC Economic Developers Assn.
2005 Fall Conference
Greensboro, NC
[more info](#)

Oct. 13

"GreenNC Tradeshow: Building for
a Sustainable Future"
Raleigh, NC
[more info](#)

Oct. 21-22

NC Environmental Justice Summit
Whitackers, NC
[more info](#)

Oct. 24

Joel Swisher, PhD
UNC/Duke Robertson Seminar
Duke Univ., Durham, NC
[more info](#)

Oct. 25

"Transitioning to Safe, Economical
Electricity," with Amory Lovins &
William Schlesinger
Chapel Hill, NC
[more info](#)

Oct. 26

National Campus
Sustainability Day

Nov. 3

Conference: "The Shifting
Landscape of Poverty"
UNC, Chapel Hill, NC
[more info](#)

Nov. 4-6

20th Annual Sustainable
Agriculture Conference
Durham, NC
[more info](#)

Nov. 9

Annual NC Sustainability Awards
Raleigh, NC
[more info](#)



Whirlpool Corp., Colgate-Palmolive, DaimlerChrysler and Goldman Sachs are among the new additions to the **Dow Jones Sustainability Index** (DJSI World); results of the 2005 DJSI Review were announced on Sept. 7... [more](#)

This month, the DJSI also launches two new indexes: **DJSI United States** and **DJSI North America**... [more](#)

Wal-Mart opened its first "green" store in July—a 206,000-square-foot building including features such as a 120-foot tall wind turbine and a rainwater harvesting pond for irrigation... [more](#)

The **5th International SAM/SPG Sustainability Leadership Awards** were presented on Sept. 8 to Lars Rebien Sørensen, CEO of **Novo Nordisk** (Denmark) and Bob Welsh, CEO of **VicSuper** (Australia)... [more](#)

Ashoka announced a new competition to recognize global "Market-Based Strategies that Benefit Low-Income Communities"... [more](#)

Toyota, Matsushita Electric, and Hitachi were among the winners of the **Global 100 Eco-Tech awards** presented at the **2005 World Expo** in Aichi, Japan... [more winners](#) ... The expo, which showcases advanced technologies for transportation, communications, buildings and more around the theme of "Nature's Wisdom" will conclude on Sept. 25... [more](#)

Related: The next **World Expo** is planned for Zaragoza, Spain in 2008 around the theme of "water and sustainable development"... [more](#)

The Ethical Corporation conference, "**The New Role for Business in Developing Countries**," will be held in London on Oct. 18-19... [more](#)

John Deere & Co. announced plans to invest up to \$60 million in wind energy projects in the U.S. by the end of 2005... [more](#)

The **American Stock Exchange** has begun publishing the Palisades Water Index, a new index of publicly traded companies that stand to benefit from the burgeoning global demand for safe drinking water... [more](#)

Companies can now apply for "**Cradle to Cradle Product Certification**" as a means to differentiate products based on their environmental/human health implications... [more](#)

Bank of the West announced that it would boost its community support to offer \$75 billion in loans, investments, contributions and services to help improve the economic health of the communities it serves... [more](#)

Shell has set up a new fund to pay U.K. small businesses up to £40,000 for innovative, commercially viable projects to reduce greenhouse gas emissions... [more](#)

Brooklyn Bridge is now accepting nominees for the **2005 TBLI (Triple Bottom Line Investing) Award**, to be given to an organization whose efforts further the cause of sustainable investment... [more](#)

On Sept. 15, **Brazil** announced the launch of the region's **first carbon credit market** in cooperation with the Brazilian Stock Exchange... [more](#)

The **Business for Social Responsibility (BSR) Annual Conference** will happen Nov. 1-4 in Washington, DC... [more](#)

Reading & Resources

[Availability & Affordability of Insurance Under Climate Change: A Growing Challenge for the U.S.](#)

New CERES report that examines the risks to U.S. insurers, government and consumers from climate change (*Sept. 2005*)

["The Myth of CSR"](#)

Stanford Social Innovation Review article that examines the failures of ethics and corporate responsibility theories (*Fall 2005*)

[Toward a Climate-Friendly Built Environment](#)

Pew Center report discussing green building markets, technologies, strategies, and policy options (*June 2005*)

[Aid Industry Reform and the Role of Enterprise](#)

Shell Foundation director Kurt Hoffmann makes the case for reforming the aid industry by empowering poor country entrepreneurs (*Sept. 2005*)

[Business & International Devt: Opportunities, Responsibilities & Expectations](#)

Survey of business, civil society, & media opinion leaders on the goals, challenges, and best practices of corporate engagement in international devt. (*Sept. 2005*)

[Sustainable Hotel Siting, Design & Construction](#)

Guiding principles for sustainable hotel development published by the International Business Leaders Forum (IBLF) and Conservation International (*Sept. 2005*)

[Bridgestar Guide to the Nonprofit Sector](#)

Collection of information resources for executives who to serve on nonprofit boards or in nonprofit management roles