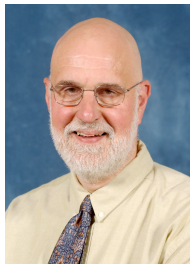
What Do the Physical Sciences and Social Systems Tell Us About Sustainability?

Carl Simon



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The Student Sustainability Initiative
The Graham Environmental Sustainability Institute
The Center for Research on Learning and Teaching

Teaching Strategy

Carl Simon and Irv Salmeen team teach a course that focuses on sustainable energy systems. The course is taken by students interested in the natural and physical science as well as engineering, architecture, business, and political science.

Their strategy is to compare and synthesize fundamental principles from chemistry, physics, geology, and biology to gain a deeper understanding of the factors influencing energy problems, such as our society's dependence on fossil fuels.

The course also explores human behaviors and the choices we make that exacerbate energy challenges. Discussions examine how individuals, groups, and governments function in engineered, social, and natural systems. Consequently, the course integrates public policy and economics along with the natural and physical sciences into the study of energy systems.

Assignments include quantitative problem sets that apply the principles of physics and math to sustainability issues, in addition to more interpretive questions that require clear and logical thinking from multiple disciplinary perspectives. These story problems and open-ended questions challenge students to think in new ways.

Faculty Perspectives

"The Strategy of this course was to take a look at the physical sciences, chemistry, physics, biology, and geology. They say certain things about what is there, what we have to work with, and why we are stuck with fossil fuels."

"We tried to create assignments that were science-based assignments, but we also tried to ask questions that were more interpretive, recognizing that there were students who saw themselves as physical science students, there were engineers, and there were students who were interested in the subject but weren't comfortable with the hard sciences."

"There is no problem in the world that can be solved by a single discipline."

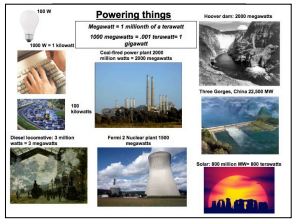
Student Perspectives

"A lot of my personal opinions on issues have been shifted. Taking this class allowed me to learn about viable alternatives to fossil fuels."

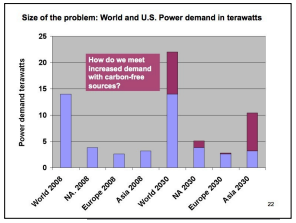
"I had never been a huge fan of math, and I probably would have never found myself doing research on geology or chemistry issues. But once I took this class, I was amazed at how interesting these topics were."

"A unique aspect of this course was how many different topics it touched on. This is the only class I've taken that was this interdisciplinary."

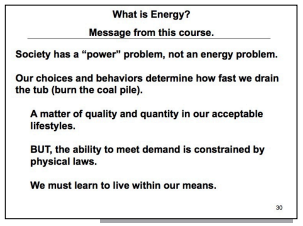
Examples of Teaching and/or Student Artifacts



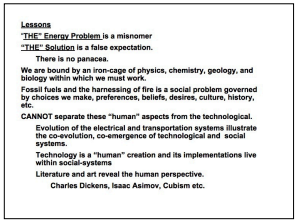
Human Energy Sources



US and World Energy Demands



What is Energy?



Lessons on the Energy Problem and Solution