

**High energy efficiency building systems for sustainable communities -- design, analysis and simulation of alternative energy options including geothermal, solar, wind and biomass**

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Population and economic growth will lead to increasingly negative global environmental impacts, unless patterns of production and consumption can be changed. Impact reduction strategies may include the shift to clean and efficient technologies (production perspective), shifts to less material-based, more sustainable life styles as well as the use of low impact products (consumption perspective) and the use of low impact materials (materials perspective). Recently an initiative was launched at Cornell to engage students across disciplines to design “sustainable communities” in New York State. The approach involves adoption of sustainable practices that can be demonstrated and quantified. The main goal is to develop a systems design tool to explore options which incorporates multiple characteristics for a sustainable community to meet a broad set of performance, environmental, economic and social responsibility objectives. A key part includes refining and deploying a systems model that includes having a sustainable energy supply, energy distribution and end use systems for all built structures. Students interested in developing MEng projects in this area should take CHEME 6660 Analysis of Sustainable Energy Systems in the fall term.