**Facilities Description**

**E3 Systems Analysis group**

Dr. Carbajales-Dale heads the Energy-Environmental-Economic (E3) Systems Analysis Group, which sits within the Department of Environmental Engineering & Earth Sciences (EEES) at Clemson. The group’s research focuses on building tools to reduce the environmental impacts of energy systems. The current group focus is on understanding energy and material requirements for renewable energy systems.  Our approach includes building engineering-based bottom-up life cycle assessment (LCA) models to generate rigorous estimates of environmental impacts from energy extraction and conversion technologies.  Also, develop techno-economic modeling tools to improve the energetic, environmental and economic performance of energy systems.

Our methods are applied primarily to electricity generation, in an effort to understand and reduce the environmental impacts of conventional thermoelectric and substitutes for conventional technologies (e.g., wind, photovoltaics).  We are also currently developing optimization capabilities for combinations of electricity generation and storage technologies.  A third area of interest is in the mathematical modeling of material and energy flows and accumulations at the economic sector level using input-output techniques.