

III.1 Introduction to Analysis Activities

Analysis activities are conducted at GCEP to support the construction and redistribution of its technical portfolio and monitor the impact of its research. This Chapter reports progress in technical analysis activities that are performed for the overall project. The first is a Systems Analysis project, led by A. J. Simon of the GCEP staff. This effort is intended to provide a capability for tracing of mass and energy flows for energy systems, so that quantitative comparisons of energy technologies can be made, and to make that capability available for general use via web-based tools. The second is a project entitled Integrated Assessment of Energy Technologies, led by Professors John Weyant and James Sweeney in the Management Science and Engineering Department. The Integrated Assessment project is aimed at developing a comprehensive analysis system that can be used to estimate probable significance of technologies, to explore options to speed up diffusion of technologies, and to determine the magnitude of potential reductions in greenhouse gas emissions.

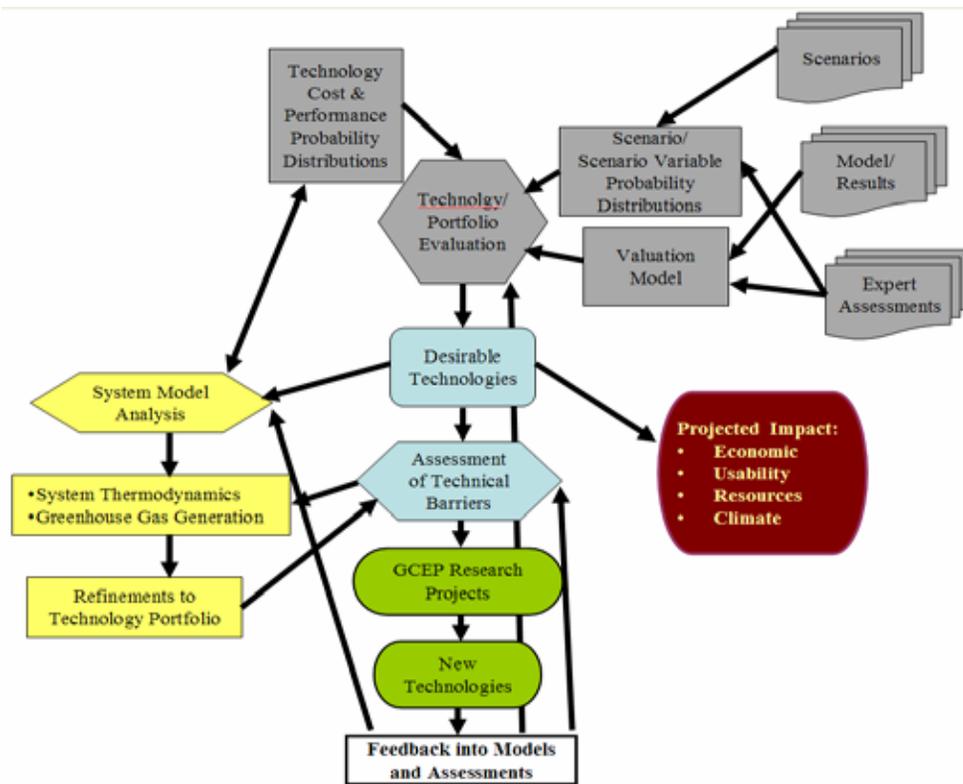


Figure 1: Analysis Activities

These analysis activities are related through the larger structure of GCEP as illustrated in Figure 1. The primary purpose of GCEP is, of course, to produce new energy technologies with positive economic and climatic impact. The GCEP technical projects, at the bottom center of the figure, represent this activity. The technology assessments, in the center of the figure, serve as the main vehicle through which GCEP makes its decisions to investigate specific technologies. The assessments are performed in concert with systems analysis and integrated assessment. Integrated assessment, in the upper right-hand corner, provides a measure of the potential impact of technology development in the context of infrastructure cost and with respect to the probabilities of success for other technologies. Systems analysis, on the left side of the figure, provides a theoretical bound on performance predictions for new technologies and a set of tools to analyze the performance of developed technologies. Furthermore, detailed systems analysis efforts can be used to advise the integrated assessment effort on the scale of equipment needed to accomplish a certain energy conversion task. The result of these interactions is a detailed technical understanding of a proposed project, a thorough survey of the state-of-the-art and a reasonable estimate of the potential impact. While each of those components could stand on its own merit, the integrated combination will provide GCEP with a high level of confidence in its technology portfolio.