

PRIORITIZING IMPROVEMENT OPTIONS FOR BUILT ENVIRONMENT SUSTAINABILITY:

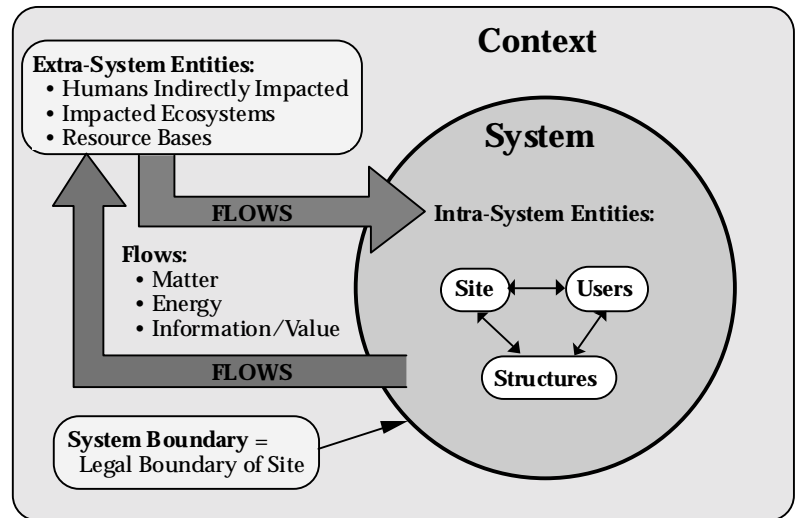
THE SUSTAINABLE FACILITIES & INFRASTRUCTURE PROGRAM

Annie R. Pearce, Ph.D., Director

Sustainable Facilities & Infrastructure Program, Georgia Tech Research Institute

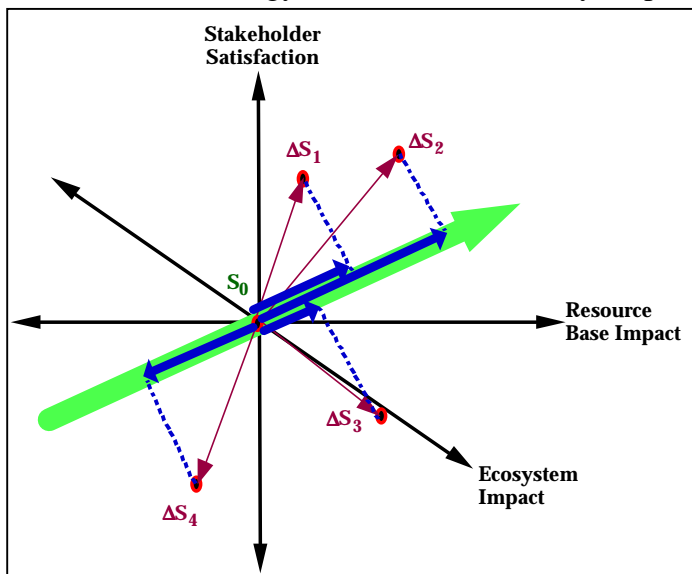
Throughout recorded history, humans have constructed built facilities to shelter themselves and their possessions and to meet a variety of needs critical to human survival and prosperity. While the impacts of built facilities on the environment have not always been immediately evident, their cumulative effects on the planet over time have become more apparent. In response to these impacts, sustainability has emerged as guiding paradigm to create a new kind of built environment: one that meets the needs of humans in the present without compromising the ability of future generations to meet their own needs.

Within this paradigm, researchers and practitioners have begun to identify a variety of ways for facility stakeholders to improve the sustainability of their built facilities. These improvement options span the entire scope of facility scales, types, and life cycle phases, ranging from purchasing energy efficient appliances, to installing water-saving fixtures, to using finish materials that improve indoor air quality. Faced with more improvement options than available resources to implement them, decision-makers are forced to prioritize and select the most suitable opportunities to increase sustainability within their resource and contextual constraints. However, due to the apparent incommensurability of variables affected by these diverse opportunities, comparatively evaluating them in terms of sustainability is difficult. A limited number of tools and techniques exist today to compare the environmental, energy, and economic life cycle performance of individual materials, components, or systems within a facility.



However, systematic mechanisms to evaluate the sustainability of a facility from an integral perspective, particularly in terms of selecting improvement options, currently do not exist.

This research addresses this void by taking a first step toward the development of a metric and an accompanying process for evaluating the relative sustainability of improvement options on a facility scale as a whole. Using the improvement of residential facilities in the operation and maintenance phase of their life cycle as the primary research focus, this investigation has developed (a) a theoretical representation of sustainability for built facilities; (b) a metric for benchmarking the current level of sustainability of a built facility; and (c) a process for applying the metric to prioritize facility improvement options from a sustainability perspective. These three elements come together as a systematic mechanism that at an individual facility level will enable decision-makers to evaluate improvement options in terms of their relative contribution to the sustainability of a facility. More importantly, the research contribution has



the potential to increase global sustainability by providing a framework for understanding the concept in terms of the built environment.