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MODELING MEGA-PROJECTS: A SPACE SOLAR POWER CASE STUDY

Abstract

Evaluating options for various "mega-projects" is exceptionally difficult early in the definition of the prospective projective project – particularly when the project involves new technologies and new systems-level infrastructure, such as in the case of many space missions and markets. Modeling must be physics-based and involve both physicality (e.g., sizes and numbers of systems, etc.), cost estimation (for services and systems), and markets or missions (e.g., prospective revenue and economics) – but must also be parametric, allowing variations in key independent variables to determine the consequences for dependent variables. Masses must be clearly associated with costs, costs with prices, and so on.

This paper will review various mega-projects and the challenges of modeling these prospective future developments. It will examine in some a specific mega-project: 'space solar power', which is considered as a potential Carbon net-zero source of energy for terrestrial markets. The paper will conclude with a set of prospective ground-rules for future modeling and systems analysis of space mega-projects.