**Characterization of Event-based Supply and Demand in an Urban Market**
Christopher DiMaggio, PE, The Pennsylvania State University, Camarillo, CA

**Abstract text:** Urban construction activity has increasingly focused on infill sites where development tends to liberate a large amount of recycled aggregate. Benefits resulting from integration of recycled and virgin aggregate include improved utilization of logistics resources, reduced life-cycle greenhouse gas emissions, landfill diversion, and reduced peak-hour traffic and traffic-related impacts upon urban communities. Appropriate site selection is critical to realizing these benefits.

Identifying potential sites for a new aggregate recycling and distribution operation in an urban area presents an analytical challenge because prevailing spatial business intelligence models are equipped to characterize sites in the context of markets that are geographically dispersed and relatively persistent (e.g., traditional retail). In contrast, construction activity is a discrete entity, or a spatio-temporal event.

This study outlines the development and application of a hybrid spatial interaction model for the evaluation of a business initiative in which demand for goods and services is based more on events than on regional demographics. Free and open-source software (FOSS) and commercial software solutions are compared and contrasted, and a workflow for optimizing site selection to maximize revenue and market share is proposed. The model is illustrated with an application to a hypothetical extension of a multi-segment construction materials business in metropolitan Los Angeles, California. This study will provide business managers with a characterization of supply and demand in an urban setting, so that they can better plan and coordinate future recycling, landfill and aggregate operations.

Kirby Calvert, PhD, Penn State University, University Park, PA

**Abstract text:** The increasingly wide-spread adoption of solar energy conversion technologies brings unfamiliar opportunities and challenges to a range of stakeholder groups, including policymakers, planners, electricity system operators, property owners, and urban citizens more generally. There is a need among these stakeholder groups to evaluate the value of solar across space and time-horizons in common areas of interest and, perhaps more importantly, to understand inter-dependencies in their decisions. Exemplary questions include: What is the total solar energy production potential at my property or in my city? What combination of policy and economic conditions will unlock this potential? Where should I expect photovoltaic systems to be located within my electricity system service area, and what impact might this have on existing power flows? This presentation assesses the extent to which existing spatial decision support tools are able to meet these needs. After a brief review of academic research, we present results from a workflow analysis of existing online solar energy mapping tools available to practitioners. We then turn to our own open-source tool, called SolarPVAnalyst2.0, which tightly couples outputs from the System Advisor Model (SAM) developed by the National Renewable Energy Laboratory to the ArcGIS environment. Here, outputs from SAM such as the available irradiance, potential system output and financial indicators can be visualized and analyzed in spatial context. The analytical capacity of this tool is demonstrated through a case-study analysis of Philadelphia, PA; a large urban area that has not mapped its solar resource.