

## ABSTRACT

Solar radiation is a promising source of renewable energy because it is abundant and the technologies to harvest it are quickly improving. An ongoing challenge is to find suitable and effective areas to implement solar energy technologies without causing ecological harm. In this regard, one type of land use that has been largely overlooked for siting solar technologies is closed or soon to be closed landfills. By utilizing Geographic Information System (GIS) based solar modeling, this study takes an inventory of solar generation potential for such sites in the State of California. The study takes account of various site characteristics in relation to the siting needs of photovoltaic (PV) geomembrane and dish-Stirling technologies (e.g., size, topography, closing date, solar insolation, presence of landfill gas recovery projects, and proximity to transmission grids and roads). This work reaches three principal conclusions. First, with an estimated annual solar electricity generation potential of 3.7 million megawatt hours (MWh), closed or soon to be closed landfill sites could provide an amount of power significantly larger than California's current solar electric generation. Secondly, the possibility of combining PV geomembrane, dish- Stirling, and landfill gas (LFG) to energy technologies at particular sites deserves further investigation. Lastly, there are many necessary assumptions, challenges, and limitations when conducting inventory studies of solar potential for specific sites, including the difficulty in finding accurate data regarding the location and attributes of potential landfills to be analyzed in the study. Furthermore, solar modeling necessarily simplifies a complex phenomenon, namely incoming solar radiation. Lastly, site visits, while necessary for validating details of the site, are largely impractical for a large scale study.