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## **Techno-Economic Feasibility of Rooftop Photovoltaic Systems over Gas Stations in New York State**

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**Abstract:** This paper aims to study the techno-economic feasibility of rooftop photovoltaic (PV) solar energy systems over gas stations in New York State (NYS). This study provides an estimation of the potential total electricity generation from solar systems. Real data of four case studies in four different geographical regions (Manhattan, Hamilton, Syracuse, and Niagara) in NYS are collected. The feasibility study of grid-tied systems is conducted. The National Renewable Energy Laboratory's (NREL) System Advisor Model (SAM) software is used to compute annual energy production for each PV system. The results show that all four gas stations are economically feasible, which is a positive indicator of adopting solar energy in the four regions. The four selective gas stations can produce 135,207 kWh, 144,183 kWh, 109,660 kWh, 157,321 kWh, respectively per year. The average energy production of the four stations (11,383 kWh) is higher than the average demand (8,149 kWh) per month. It is found that the four gas stations can provide fully self-power for eight months (from March to September) and more than 60% for other months. The payback period ranges between 6.1 and 7.2 years without incentives. The results show that solar systems can save \$24,048, \$25,101, \$20,748, and \$26,645 per year, respectively, for these four cases. The studied systems are feasible and will yield tangible financial benefits.

*Keywords:* Feasibility Study, Photovoltaic (PV), Solar Energy, Gasoline Stations, New York State