Introduction

As the use and demand for the energy continue to grow quickly, fossil and nuclear fuel are becoming increasingly limited. Needs for development of alternative energy has been emerging and the study on the potential of solar power system has been very promising. The demand for the use of solar energy will constantly increase since the solar energy can be operated for an indefinite period of time without wearing out unlike other natural resources such as petroleum, coal, and natural gas. Therefore, the sun is the most dependable source of energy for future, and the solar energy can reduce carbon footprint and electricity bill significantly.

Feasibility Study

• Location Feasibility
  - 4.25 kWh/m²/day of solar radiation
• Celenzano Hall PV System Cost Analysis
  - 1,200 ~ 2,500 kWh electricity generation capacity
• Technical Factors
  - Usable roof area
• Economic Factors (Incentives) - $27 Million fund supported by government
  - ZREC
  - MACRS
  - Tax Exemption

This study focused on the economic feasibility of installing photovoltaic systems in the University of New Haven campus. The result of this study will be used to analyze and further develop the feasibility study of PV systems for other universities in New England (NE), which share similar characteristics of climate and economic factors. The electricity price in Connecticut is currently 4.25 kWh/m²/day of solar radiation, which is one of the highest in the nation, and electricity demand in NE region has been continuously increasing. This suggests that the prosperity of PV systems in the region and development of precise models for economic analysis are urgent.

Economic Feasibility Study of Photovoltaic System in UNH Campus

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PV System Output Estimation

Solar Energy Generation (1)

E = A * r * H * PR

= Energy (KWh)

A = Total Solar Panel Area (m²)

r = Solar Panel Yield (%)

H = Annual Average Solar Radiation on Tilted Panels

PR = Performance Ratio, Coefficient for Losses (Default = 0.75)

Conclusions

• 25 out of 30 UNH Buildings are feasible for PV System
• Most of buildings qualifying for ZREC and other incentives
• Most of buildings with qualifying ZREC incentives will start generating positive cash flow within 11 years
• Average annual electricity saving from Campus wide PV System: $ 210 K

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References