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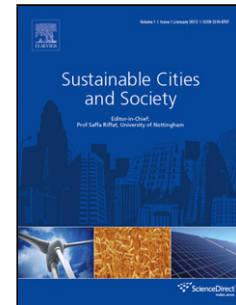
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Techno-economic assessment of a grid connected photovoltaic system for the University of Jordan

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I. HIGHLIGHTS

- A long list of Jordanian universities agrees to electrify using solar PV.
- Both, Build Operate Transfer (BOT) model and the Engineering Procurement Construction (EPC) model are used to erect PV projects.
- Fixed, single axis and two axes PV systems have different techno-economic aspects that need to be considered.
- The most attractive choice was the EPC model using the fixed PV system fixed tracking method for installation with 32% internal rate of return (IRR) and 3 years payback period.

Abstract

The high electricity consumption and cost at the University of Jordan has motivated the university to adopt a renewable energy and energy efficiency as one of its strategic objectives for the coming decade. The university has set forth an ambitious goal to achieve 100% electrical energy independence, relying mainly on renewable solar energy using photovoltaic (PV) panels.

This study investigates different technical solutions of the grid connected solar PV system; fixed, single-axis and double-axis tracking PV modules. Moreover, two engineering models for the construction of such a project have been investigated; the Build Operate Transfer (BOT) model and the Engineering Procurement Construction (EPC) engineering model.

The performance analysis was conducted in terms of final yield, land use and conversion efficiency, while the economic analysis investigates the simple payback period and internal rate of return. The simulation was carried out using a Trnsys model that has been experimentally validated by the authors.

It was found that the most attractive choice is the EPC model using the fixed PV system for installation with 32% internal rate of return (IRR) and 3 years payback period. The required system size was 15030 kWp, with an estimated area of 150 thousand squared meters.

Keywords: *Grid connected PV; photovoltaic; techno-economic; Trnsys.*

1. Introduction

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