

Accepted Manuscript

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

Authors: Osama Ayadi, Rami Al-Assad, Jamil Al Asfar

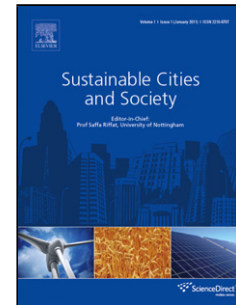
PII: S2210-6707(17)30769-2
DOI: <https://doi.org/10.1016/j.scs.2018.02.011>
Reference: SCS 978

To appear in:

Received date: 30-6-2017
Revised date: 11-2-2018
Accepted date: 11-2-2018

Please cite this article as: Ayadi, Osama., Al-Assad, Rami., & Al Asfar, Jamil., Techno-economic assessment of a grid connected photovoltaic system for the University of Jordan. *Sustainable Cities and Society* <https://doi.org/10.1016/j.scs.2018.02.011>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



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

Osama Ayadi, Rami Al-Assad, Jamil Al Asfar

Mechanical Engineering Department,

The University of Jordan

Amman, Jordan

o.ayadi@ju.edu.jo ramianton@gmail.com jasfar@ju.edu.jo

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

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات