



ECONOMIC VIABILITY OF BUSINESS MODELS FOR PHOTOVOLTAIC SOLAR GENERATION IN BRAZIL: STUDIES OF CASES

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Abstract

In the last years, worldwide, more capacity of solar energy has been added than any other type of electric power generation technology. The current expansion market is largely due to the increase in market competitiveness of photovoltaic solar energy and demand for electricity. However, the markets continue to be driven largely by government or regulatory incentives and not by innovative business. Therefore, this paper presents: (i) overview of photovoltaic systems regarding the most adopted business models in Brazil; ii) business model economic viability case study. The results presented shows that the acquisition model has the best investment indicators. For the Acquisition and Rental models, all case studies were economically viable, but in the Shared Solar Generation model the Consumer Units C1 and C2 were considered unfeasible by Levelized Cost of Energy - LCOE criterion.

Key-Words

Solar Energy, Distributed Photovoltaic Generation, Business Models, Economic Viability.

1. Introduction

In recent years, there has been an increase in significant problems related to environmental degradation, greenhouse effect, global warming and the human-caused climate change, which are strongly linked to the growth of energy consumption and the economic development of the countries.

The use of renewable energy sources is growing over the years due to environmental concern, sustainable socioeconomic development, rising oil prices, scarcity of materials for non-renewable energy sources and policies directed at sustainability. The harnessing of energy sources for electricity generation is linked to the technical and economic feasibility analysis and the associated environmental impacts.

In this aspect, Geissdoerfer [1] claims that the ability to move between new business models quickly and assertively is a key competitive advantage in developing the

sustainability of a modern organization. More and more companies are committing to the sustainability of their business.

Many definitions have been made for Business Model. According to Huijben, Verbong [2], they are both tools of innovation and competitive advantage for a company. According to Shoettl, Lehmann-Ortega [3], these mechanisms allows the creation of value through a proposition to customers. In other words, Osterwalder and Pigneur [4] believe a business model is how a company creates, delivers and captures value.

This last definition, according to Richter [5] has been extensively tested in practice and has been successful in the field of renewable energy. Therefore, this very definition will be used in this study.

According to Kind [6], the disruptive properties of photovoltaic generation make it stand out from other renewable energy sources, and this justifies the fact of its exponential growth in recent years.

The Renewable Global Energy Status Report published by the Renewable Energy Policy Network for the 21st Century [7] showed that 2017 was a mark for photovoltaic solar energy: the world has added more solar power capacity than any other type of power generation technology. However, markets in most places continue to be driven largely by government or regulatory incentives rather than innovative business models.

The purpose of this paper is to present an overview on photovoltaic systems (PVS) regarding the most adopted business models in Brazil. Then the economic indicators will be calculated and presented, such as Net Present Value - NPV, Internal Rate of Return - IRR, Profitability Index - PI Payback - PB and Levelized Cost of Energy - LCOE for study cases in order to determine the viability of the systems.

