

Distributed solar power economic adoption modelling

Issue

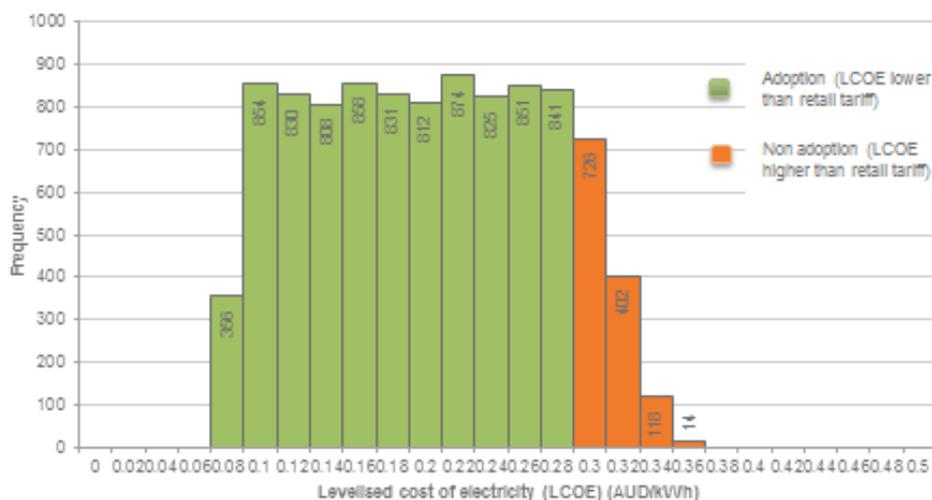
Photovoltaic (PV) systems, like most renewable energy resources, are characterised by large initial capital investments by the energy user. The high upfront cost is and will remain one of the main obstacles that need to be tackled in order to achieve a faster and greater deployment of the distributed PV technology in the residential sector as a local generation source. Understanding the economics of the residential PV installation is a key aspect to determine whether the financial investment in this sector is economically feasible and reasonable or not. Therefore, it is essential to conduct a comprehensive economic analysis to encourage residential consumers to be PV adopters.

Solution

The main purpose of this work is to present an Integrated Economic Adoption Model (IEAM) for distributed PV systems. This IEAM is composed of four modules, Financial Data, Technical Data, Economic Data and Environmental Data. The model is implemented on a real dataset for one year of PV generation and residential load consumption for 54 customers in the Ausgrid's electricity network, New South Wales (NSW), Australia, under the current market arrangements and PV support policies. The model is flexible and can be easily adapted to any location by changing the generation and load profiles and the relevant economic assumptions and electricity regulatory policies.

Impact

The outcomes of this IEAM is to guide the decision-makers in different distribution networks in designing their retail tariff structure and PV support policies and to conduct an economic feasibility analysis for residential and commercial PV projects with different sizes in different locations within their networks. The IEAM also answers the investment profitability questions for the household owners, to better provide them with knowledge analysing the whole complex picture at hand.



The model provides the client with a detailed evaluation including the probability for a positive adoption, as the LCOE is lower than the current retail tariffs.

