[*ENABLING RISK MITIGATION FOR PRICING STRATEGIES OF SOLAR ENERGY IN SOUTH AMERICA*]

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Overview

The technical potential of solar energy is higher when compared to other energy sources and could one day single-handedly meet the world's demand for electricity. Assessment of the cost structure of investment in solar energy lags behind the analysis of the cost of other sources of renewable energy, in part because of the complexity of testing the availability of energy sources and amounts used, and partly because of the lack of information provided by the investor. The difficulties are obvious and appear primarily in the form of undeveloped transmission mechanisms, upstream factors occuring before the electricity production, downstream factors relating to losses on the conversion and storage of energy, weather conditions, as well as the occurrence of irregularities in the process of maintaining power. The origin of the costs and causes of their emergence have not been adequately tested and varies, thereby the impression that none of the studies did not include all the relevant factors. Since the transportation costs are very low and the prices of PV cells formed on the international market.
Empirical rule specifies that a certain increase in cumulative production reflects the reduction of certain offenses defined price. If the price crosses a cumulative production on a double logarithmic scale, obtained by a linear function called learning curve (learning curve). Prices of PV cells since 2011, constantly falling, better technology of manufacture and the increase in the dimensions of photovoltaic cells with 0.5 square meters of early 1990s up to 2-3 meters square today reduce the formation of the space-dependent costs, which is also shown in the learning curve. The descriptive learning rate PV cells ranged in the range of 11% to 26% from 1976 to 2001, with an average historical learning rate of 20%. This means that the prices were reduced by 20% for each doubling of cumulative sales. The second part of the capital costs of PV system consists of BOS components, whose scope is defined by the origin of the costs incurred. For simple PV systems can reach only about 20%, while for systems beyond the reach of power grids are as high as 70%. The average value of BOS is between 1.6 USD / W and 1.85 USD / W. The largest part is the inverter, which is used to transform DC (direct current) to AC (alternating current) electricity, which costs from 0.2 USD /W to 1.10 USD /W. Consumption means the inventor is calculated per unit of capacity and decreases with increasing the size of the solar park.

Methods

Schedule of costs incurred to maintain the same as for other alternative sources of energy, with such things as solar parks system is periodically reviewed, usually on a three-year basis. The share of these types of variable costs is not great and makes up about 1% of investment costs of PV systems. Economic feasibility of PV solar park system is calculated according to the method mainly cash equivalents (cash equivalent method) because it's a long-term investment over 20 years. Method discounted cash equivalent of costs and revenues to the current value and, if the outcome is positive, then the investment is economically viable. In addition, pricing mechanism using double bid market, auction model, strategic bid price classification and auction game under single bid pricing will be calculated for relevant examples and used as an framework for risk mitigation within south American grid electricity market.

Results

A model to determine the optimum operation of a solar-powered microgrid with respect to a load demands, south American specific environmental requirements, as well as PV panel capacities will be constructed. The optimization problem includes the energy sources that are likely to be found in a microgrid. Constraint functions are added to the optimization problem to reflect some of the considerations found in a small-scale solar energy generation system.

Conclusion

From the results obtained, it will be clear that the model works well and that even a relatively small number of few cloudy days of the year play a very important role in increasing the cost vastly due to the timevarying nature of the load demand (to cover the load on just those few days, the system has to be made much larger). With the variation of the battery efficiencies, the system also becomes more complex—a smaller but more efficient battery can sometimes stand in for a larger of lesser efficiency. In all this, it is presumed that there exists a central controller able to continually respond to changing operational conditions. The responses and results are effected by several variables including weather conditions, PV power generation and, of course, the actual power demand in south America.