Net Energy Metering: A case study in Spain

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1. SUMMARY

Distributed generation and auto-consumption contributes to sustainable energy system opening a new scenario of employment and financial welfare and further liberalization of the electricity market. Net Energy Metering (NEM) can help, in a decisive way, to the feasibility of it. The emergence in recent years of new concepts, developments and systems may lead, in a gradual way, to the evolution from traditional electricity generation, to a model where the distributed electricity generation, mainly for small power facilities, begins to integrate effectively in the network as an element of efficiency, production and management. A case study of a particular installation analyzed under the new Spanish legislation is presented in this paper.

2. PURPOSE OF THE WORK

The work proposes the study of the socioeconomic impact of energy self-sufficiency with the concept of Net Energy Metering. This analysis of the economic and energy consequences of the implementation of a system of energy self-sufficiency for a 2240 W_p facility in a detached house in Burgos, Spain, both for the individual user and the energy system is proposed, using the possible guidelines that the long-waited Spanish legislative framework [1, 2] could introduce.

3. APPROACH

Net Energy Metering is an electricity policy which allows utility customers to offset some or all of their electricity use with self produced electricity from RES-E systems[3]. It is an interconnected network that can introduce or consume energy at times. The economic balance between the energy bought and sold to the grid by the individual user and the toll and interconnection costs determine the economic viability of the system. The possibility to balance theses factors with profitability for all stakeholders will determine the success of the implantation of this energetic system.

4. SCIENTIFIC INNOVATION AND RELEVANCE

Building today consume more energy (41%) than either of society's other broad sectors of energy consumption. The vast majority (70%) of building energy usage is in the form of electricity[4]. Smart policy support for distributed generation can help achieve a renewable energy future as cost-effectively as possible. In Spain, where energy consumption and production from renewable energies align quite well, it was expected than the net-metering scheme will allow for development of distributed generation and auto-consumption.

5. RESULTS

A 2240 W_p PV facility in a detached house in Burgos, Spain is used as case study. Known technical specifications, energetic consumption and production, surplus power management is done by net balance. With this procedure, the balance between energy consumed and fed into the network by the facility is done monthly. If this balance is negative for the user, it pays for the energy consumed and if it is positive, it generates "credit" for subsequent months that are usually settled annually. An analysis along 2.5 years of operation of the installation is done. Different possibilities of net energy metering are considered: ratios 1:1 and 1:2 between the price of exported and imported energy and with or without time horizon in the settlement of rights obtained by the user. As results, case 1:1 is not affected by the time horizon in the settlement. In the case 1:1, the temporary management of surplus energy fed to the grid does not affect the profitability of the plant. For the case 1:2, the temporary management of surplus energy implies that the user loses the rights of consumption and in the winter months his energy bill increases significantly. In this case, the system is inadequately sized.

6. CONCLUSIONS

Smart policy support for distributed generation can help achieve a renewable energy future as cost-effectively as possible. In the light of the results of this study, the size of the installation is critical to the performance of the system. It is essential the maximum adaptation of the consumption and supply so that the network contribution should be minimum. The net metering system is not designed for the cost-effectiveness of energy actors, but is based on energy savings in global terms.

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