ELECTRICITY SUPPLIERS AND SOLAR PV PROSUMERS RELATIONSHIP

Electricity Supply Chain adaption to distributed solar PV sources. Sweden case study based on UK framework

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The increased number of distributed solar PV facilities in Sweden is forcing the electricity suppliers to manage the bi-directional flow. Prosumers, the new actors in the value chain, have an important role in the evolution of the electricity supply chain. Innovative relationships between suppliers and prosumers are being built for integrating the citizens' in the future sustainable electricity market.

This thesis aims to analyze and describe how is the bi-directional electricity flow managed and which business models the market can expect. The study is made in Sweden and the analysis is using the UK framework of business models.

A prosumer is a household (commercial or industrial) that produces, self-consume, and modulates its consumption of renewable energy. The increasing amount of electricity injected into the grid by the solar PV prosumers – the forecast is to increase even more in the future – is challenging the capacity of the Swedish grid.

For coping with this bi-directional flow, the distribution companies and electricity suppliers are reinforcing the grid with more cables and making it smarter. In the short-term future, a smarter grid will enable the use of flexible tariffs, offered by the electricity suppliers and used by the prosumers.

The flexible tariffs will enable better use of the electricity grid. The consumption will be encouraged when there is a high electricity volume circulating into the grid. The generation will be incentivized when there is a lack of generation. However, tariffs will not be a reality until the authorities give distribution companies subsidies to invest in this technology.

The new European legislation, *Clean Energy for All Europeans Package*, is forcing the electricity markets to evolve. The future is changing to a more sustainable value chain adapted to renewable sources. Sweden's situation is on a stand-by. The national authority – *Ei* – is working with the interpretation of the legislation. However, after interviewing several stakeholders, it is clear that the future is going to promote business models known as energy communities.

Energy communities are going to promote the collective self-use of electricity by enabling a group of prosumers to consume the electricity they generate in a collective form. These business models can have more than one possible scheme, yet to be regulated and developed by the *Ei*.

However, the current most popular business model is the basic prosumer. The electricity suppliers buy the surplus of electricity the prosumers do not use. It is also advantageous for grid owners. It helps to manage the capacity issues challenging the grid today.

But, incentives for the integration of solar PV facilities to the electricity market play the main role in triggering new prosumers to invest. Sweden has done a step forward this 2021. The tax deduction has been upgraded to 500 kW as the maximum value in which you can get a deduction.

The multiple political interests among the big players and the lack of incentives can slow down the evolution of the whole supply chain. Is yet to be seen whether the COVID-19 pandemic will be a barrier or an element that triggers the solar PV facility's investments.

This research project is a first attempt to contribute this scholar's knowledge of the electricity market from a supply chain management and collaboration point of view.