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A POSSIBLE SYNTHESIS OF THE RESULTS

The analyses performed within the seven developed pilots demonstrated that, under appropriate assumptions, the improving of renewable sources to generate electricity, and in some case also heating, locally consumed is not only energy efficient but also economically profitable.

The performed simulation, based on measured profiles of local loads and internal generation systems, have shown that the implementation of microgrids within a more open and flexible electrical system is possible and convenient.

The intermittence of RES sources can be overcome either through exchanges with the network or by using storage systems which are still too expensive but in the short term can be of considerable interest since they would allow the microgrid to perform supporting services to the grid.

It has been verified through "production and consumption on site" (a more correct concept than that of self-consumption which presupposes the uniqueness between the producer and the consumer) can induce a series of positive effects on the electricity system, from the reduction of network losses to the deferral over time of investments related to the enhancement of the network when it is weak or has to face load increases, especially if they are peaks.

Even in financial terms, the microgrids were viable: in many cases, the requested capital costs have been considered to be on the responsibility of the microgrids, through equity or loans repaid over time, other times with the need for a certain grant. But in all cases the reduction of the bills of consumers aggregated in the micro-network was positively verified.

If it was necessary to demonstrate the validity of the solutions proposed by the European's Commission Package entitled 'Clean Energy for All Europeans' towards decarbonization goals of 2050 year and a central role of the citizens into the future energy market, the results emerging from the PEGASUS project fully confirm.

There are regulatory barriers still to be removed to promote the development of microgrids but the new European directives “Renewable energy community” and the “Citizen energy community” require the national Authorities regulating the electricity market to adjust the terms of participation in the market by local energy communities.

Through dedicated meetings and questionnaires, the stakeholder feedbacks were collected as well as the public understanding and perception of micro-grids.

For all pilots a strong feeling of the residents with the local community has been verified as well as the opportunity of an effective generation based on renewable sources is widely recognized.

With some exceptions mainly due to insufficient specific knowledge, the concept of energy communities is highly appreciated by the local residents who are also interested to act as energy community members to the extent that the local energy community can improve service quality and reduce billing.

In all cases, the lack of adequate regulation in support of micro-networks to allow the benefit not only of incentives related to the use of renewable sources, but also the reduction of burdens that are not objectively justified (e.g., transport and distribution costs for locally generated and consumed energy). Also, the low political eagerness is felt as a brake on the development of local energy communities.

Similar to that of politicians is the almost common position of the encountered Energy Regulators. They motivated their caution towards microgrids, and in general concerning collective consumption schemes, in the unability of the electrical system to cope with a widespread diffusion of microgrids or in possible financial risks of the current incumbent electricity system operators.

This position is partly motivated by the current situation in which Member States have to transpose at national level the European directives "Renewable Energy Community" and "'Citizen Energy Community"; on the basis of the policy choices made in each country, Regulators need to prepare the new regulatory environment that must necessarily take into account new players in the electricity system such as microgrids and local energy communities.

Overall, it can be said that the PEGASUS project has effectively demonstrate the advantages and benefits of microgrids in developing energy communities especially in rural areas and islands, providing a punctual series of indications on the technical, administrative and financial conditions for making the evolution of microgrids and energy communities a reality towards the energy transition and the meeting of 2050 target for a low carbon economy.

As further demonstration of the validity of the work carried out within the PEGASUS project, two significant events are to be noticed:

- during the development of pilot of Saint Julien en Quint, a citizen-owned local cooperative, called SAS Centrales Villageoises ACoPrEV Val de Quint, has been established in June 2018; this energy community will bear the investments in the RES plant and will operate as the legal entity allowing the local collective self-consumption scheme; the microgrid consumers will be shareholders of the local energy community;
- the solution developed in the pilot of the Municipality of Potenza was implemented in the last months of 2019 years and will be fully operational in early 2020 year.