

ENERGY COMMUNITY: THE ITALIAN SCENARIO WITHIN THE PAN-EUROPEAN FRAMEWORK

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ABSTRACT

The paper focuses on the new European proposals and current Italian laws, in terms of energy aggregation for local assets, the possible boundaries between energy communities and DSOs, and some preliminary considerations about the allocation of system costs. A comparison with the Swiss framework, related to a non-EU member and characterized by some forms of energy communities are done.

INTRODUCTION

In November 2016 it was presented by the European Commission a package of proposals which goes by the name of "Winter Package". It contains, among other documents, the [1] which was later integrated with the comments received by Member States.

The proposal recalls the "Local Energy Community" (LEC) concept as an option to facilitate the integration of renewable energy sources. The LEC is defined as a legal entity, based on a voluntary and open membership, which is effectively controlled by members (be they shareholders, such as local authorities and small-micro-enterprises SMEs or individuals).

The discussion on local energy community is still open, starting from the exact definition of "local" term that is nowadays avoided in favour of "Energy Community" (EC) term. Secondly, it is discussed how ECs should act as a distributor. Besides, the community must ensure that their members can maintain their rights as individual passive or active consumers, and must allow them to leave the community when required. These issues are then strongly related to the evolution of the flexibility markets (i.e. possibility of small customers to provide ancillary services, also in an aggregated form), to the investments on grid infrastructures and to the manner of allocating system costs on bills.

The Italian regulatory framework is very complex, but primitive towards the implementation of ECs concept. In fact, the main current system considered is the "Closed Distribution System" (SDC), a private electricity network which distributes electricity within a geographically confined area towards industrial, commercial or shared services sites [2].

The paper will focus on the new European proposals and current Italian laws, in terms of energy aggregation for local assets, the possible boundaries between energy communities and DSOs, and some preliminary considerations about the allocation of system costs. In

this context, a comparison with the Swiss framework is useful. Switzerland, even if participating to the continental European electricity market, has not de facto yet adopted the European "unbundling" directive that prescribe the split between Distribution System Operators (DSOs), owners of electricity networks, and energy suppliers. This mixed role permits to Swiss DSOs to manage energy flows also for residential and SME's customer as energy communities like, by the sub-metering procedure ("peer-to-peer" energy management).

THE EUROPEAN LEGISLATION

The "Clean Energy Package" directive

In November 2016 a new package of measures, [3], which covers the areas of renewable energy, energy efficiency, electricity market and sustainable mobility has been presented by the European Commission. The package places emphasis on the role of consumers, which will be the central players in the energy markets of the future. Across the EU, in the next future they will have the possibility to choose the best supplier, to access to tools for comparing energy prices and be able to produce and sell its own energy. The Commission proposes to reform the energy market in order to strengthen the position of consumers and allow them to better control their choices in the energy field. For companies this will imply a rising competitiveness among them. The first step consists in providing them better information on their energy consumption and related costs, the right of using smart meters, clear invoices and more viable conditions for changing supplier, removing penalties.

The innovative aspects introduced by the package about the expected transition from a centralized conventional production towards decentralized, interconnected and intelligent markets, will help consumers to produce, store, share, consume or resell energy directly or by new market subjects like the "aggregators" to the market or to cooperatives. In general at this time only largest entities, such as industrial customers, are able to sell their flexibility to manage independently their energy amount. The "aggregation" way, defined as the act of different subjects (consumers and / or producers) of a same electrical system to operate as one entity that operates in the electricity markets (both wholesale and retail) for energy sale and purchase, gives the opportunity to exploit the potential flexibility of small residential and commercial customers.

The “Internal Electricity Market” directive

The 18 December 2017 [4] has set out a framework for the establishment, within the member states of the energy community, eliminating the previous "local" term, and referring more generally to what is achievable efficiently by distributed resources and new consumer attitudes.

At first stage the EU commission has defined the mean “Energy Community” as a legal entity which is based on voluntary and open participation, effectively controlled by shareholders or members who are natural persons, local authorities, including municipalities, or small and micro-enterprises. The primary purpose of an energy community is to provide environmental, economic or social community benefits for its members or the local areas where it operates rather than financial profits. An energy community can be engaged in electricity generation, distribution, supply, consumption, aggregation, storage or energy efficiency services or providing other energy services to its shareholders or members.

In this manner, ECs offer an interesting opportunity for consumers to have a direct participation in the production, consumption and power sharing. In this framework they have been able to operate in the electricity market as the other similar bodies having the same rights and constraints of other power companies, without affecting the competition in the overall market.

The typical characteristic of an energy community, potentially extendable to domestic consumers, consists primarily on the supply of affordable energy for its members. This concept leaves in background any financial aspect; it remains anyway permitted the existence of other agreements between citizens such as those related to private negotiation.

The Directive aims then to regulate at the European level the concept providing a fair and a defined set of framework of rights and duties. It is also expected that domestic consumers and active customers are allowed to voluntarily sign up to an energy community so as to leave on a fair and transparent economic conditions, thus not losing their rights and the former obligations. It is therefore defined the access to an energy community, being this association open to all categories of subjects, but with the prescription that the decisions have not to be attributed to members involved for gain purposes.

The Directive forces Member States to remove any obstacle about taking advantage by the use of ICT technologies for sharing in energy communities based on market principles and on measuring points within the energy community’s perimeter (no spatial constraint). This final aspect has anyway to interfere with the usual payment of duties related to energy flows between members and generation facilities. Finally, the ordinance provides for the possibility for Members to allow an energy community to manage its own distribution system in ordinary mode or as an operator of a "Closed Distribution System" (CDS).

THE ITALIAN FRAMEWORK

The Italian scenario is characterized by the current absence of specific regulation about ECs. Differently to this aspect, the CDS (SDC, in Italian) concept in Italy has already been defined, according to [5], by the [6].

The CDS in Italian regulation is in general a system which distributes electricity within a geographically confined area to industrial, commercial or sharing services sites and either:

- for specific technical or safety reasons, operations or production processes integrated in the system;
- primarily for system owner’s electricity consumption.

Many sites like train station buildings, airports, hospitals etc. can include closed distribution systems because of the specialized nature of their operations. The SDC category is then divided into “Users’ Inner Networks” (RIU, in Italian) and “Other Closed Distribution Systems” (ASDC, in Italian) defined like SDCs except RIUs (figure 1).

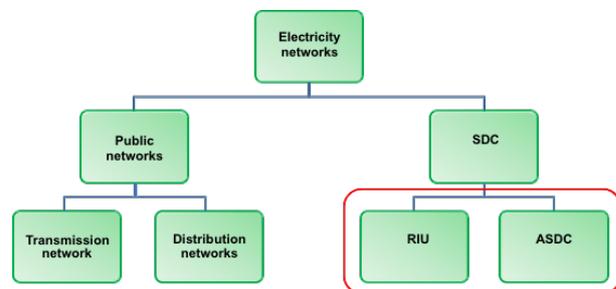


Figure 1: Italian electricity networks scheme

Anyway the Italian legislation on this type of system is nearing completion. Currently RIUs and ASDCs are characterized by the presence of a private electrical connection which serves for the distribution of electricity within the network and connects production facilities and consumption units. SDCs have as one of their main characteristics the fact of having, differently than RIUs, to be placed within only one municipality area. Therefore, RIUs, like other private networks, are comparable with distribution networks with duty of connecting third parties.

SDC operators are so considered as Distribution System Operators (DSOs) with the exception of having no constraints set by the Italian Energy Authority (ARERA) in applying connection, transport and measurement fees to its customers. Conversely, the SDC operators haven’t access to recognition of costs and equalization bonuses provided by ARERA.

In accordance with [7], the electricity price part covering overall grid charges have to be applied fully to the energy amount consumed by each SDC user while a lump application of 5% is set to the self-consumption energy. As established by ARERA, for the dispatching service is not provided a different treatment among RIU customers and ASDC ones. Several debates about the

possibility of creating new closed distribution systems related to renewables sources and storages with exemption of self-consumption duties recently took place. This aspect, if adopted, would need anyway new rules for the allocation of these costs and incentives for renewable energy sources.

Finally it refers how, as a result of Civil Code 2013 reform, simplifying some bureaucratic procedures about the installations of electrical devices in shared areas (including PVs), a large amount of legislative proposals has been made about the transformation of every apartment block's resident in an individual "prosumer". According to these ones, buildings may own local electricity generation plants dedicated to supply not only shared areas loads, as currently, but also of individual consumers' ones, with allocation of costs and revenues through any sub-metering (similarly to heat plants, figure 2).

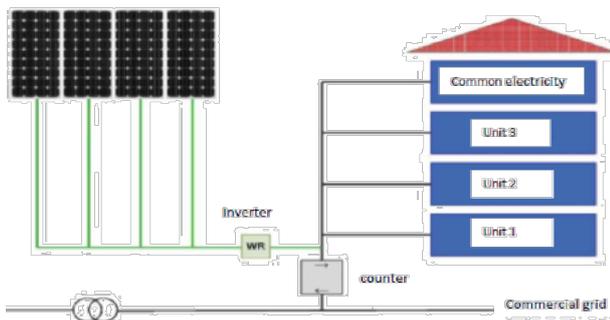


Figure 2: Apartment block electrical scheme proposal in Italian framework

In this case a sort of centralization of generation and storage plants from the aggregation of individual customer loads would obviate the difficulty of setting up independent manufacturing facilities with an advantage resulting by the charges reduction related to the plurality of individual contracts.

Anyway the current Italian legislation forbids, on the contrary of heat supply, any transfer or sale to third parties of any form of electricity in all contracts about the electricity supply for residential and SMEs loads (figure 3). This prescription is avoided only in case of hotels and boarding houses not being considered as residential loads.

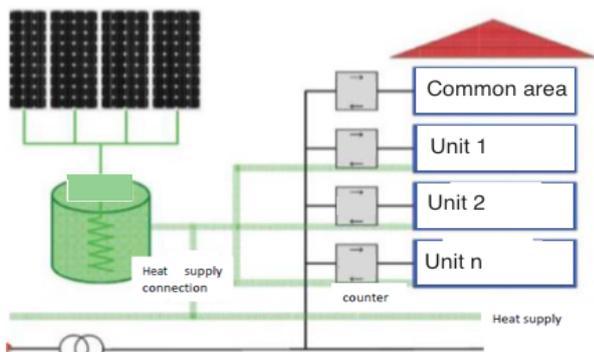


Figure 3: Common Italian electrical connections between third parties in comparison with heat supply

According to these facts, "hidden clients", i.e. final customers to which it is attributed a unit of consumption sharing a delivery point with other ones, are being currently contrasted by national authorities through penalties and denunciation to judiciary one.

Swiss framework benchmark

The Swiss framework is characterized by several peculiar aspects because this country is a non EU-member state that during years has on one hand adopted only some rules defined by EU about the electricity market.

Since 2007 Switzerland has been negotiating with the EU about a compatibility between Swiss and European rules and after that an impasse situation stayed. In particular the evolution of Swiss electricity market is locked since a referendum failing on this theme in 2002. In 2007 the federal Parliament adopted the [8] and the Federal Council passed the [9] and approved [10].

Even though [8] regulates unbundling in the area of distribution networks, this process seems to proceed in a slow way, being this aspect nowadays limited in the Swiss framework. This fact allows DSOs to play a key role in the national electricity market like owning and managing storage facilities or providing, even in consortium with other technical partners, services for domestic energy communities. This scenario is at the opposite in comparison with the Italian one. In particular the "Tiko" [11] commercial solution, proposed by a joint venture between an ICT company and a DSO, is able, taking advantage by sub-metering ("peer-to-peer" energy management), to optimize the domestic self-consumption and provide services towards the Transmission grid (power / frequency supply, peak shaving etc.) also within an energy community [12]. Virtual electricity storages based on a cloud platform are so constituted by a pooling of residential loads characterized by a flexible part (like boiler, heat pump etc.), controlled by ICT devices.

CONCLUSION

The paper has considered the development of ECs within the European framework and in particular in the Italian one. In this country only some kinds of them are permitted. In particular self-consumption between third parties based on sub-metering and energy exchange is forbidden. In comparison to this one, the Swiss context already considered forms of devices that subtend energy communities features. The excellent outcomes from these experiences demonstrate the real feasibility of ECs and could encourage in a next future the adoption of them also in the Italian scenario.

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