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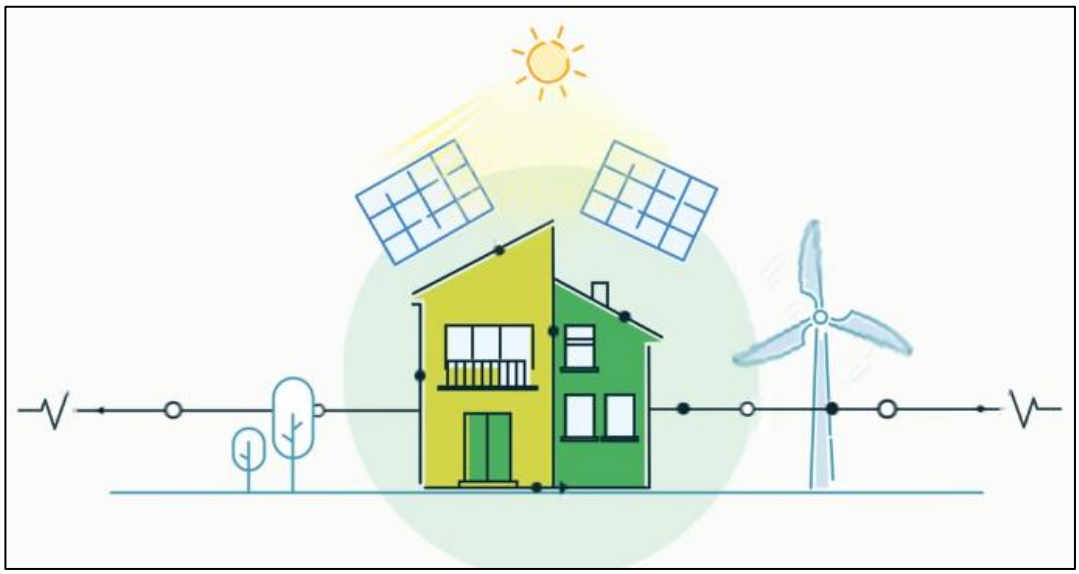

EMERGING FRAMEWORKS FOR AGGREGATORS IN THE EU

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1 INTRODUCTION

During the past 20 years, the regulatory framework of the European electricity markets has constantly been changing. It is important to note that today's electricity market structure differs fundamentally from the market structure of only five years ago (EC, 2015). From the 1990s up to around 2005, changes were substantially characterized by regulatory intervention to promote competition in the power industry, while during the last decade the great challenge is the integration of renewable energy sources (RES) into the system. In its efforts to promote a single energy European market, the European Union has energy rules set at the European level, but in practice they are implemented through 28 national regulatory frameworks. Market access of smaller market actors, such as aggregators providing flexibility from demand response or distributed renewable energy is limited in most EU countries, with some notable exceptions as shown in this policy brief based on the work of the FP7 INCREASE project.

In the INCREASE project, we have developed innovative solutions for control of distributed renewable energy sources (DRES) and of demand response (DR) units. The solutions include advanced inverters for small-scale PV generation, as well as the hierarchical multi-agent system (MAS) for their control. The supervisory control level, the scheduling control, is in charge of the flexible energy portfolio optimization, where demand response units' flexible energy is optimized to maximize the value of the ancillary services (AS) provided in the electricity markets. Aggregators play the key role in providing the solutions to the market.

2 THE ROLE OF THE AGGREGATORS

The main function of aggregation is to identify and gather ("aggregate") the flexibilities of consumers and other flexible resources. Aggregators create agreements with industrial, commercial, institutional and residential electricity consumers to aggregate their capability to adjust energy and/or shift loads on short notice (SEDC, 2015). Their goal is to build up sufficient capacity of flexible resources in their portfolio to provide flexible energy products as services to the markets. We observe the establishment of aggregators in several EU countries, such as Belgium, Germany, Slovenia or Austria. The regulatory frameworks however are not always supportive for demand side management or participation of distributed renewable generation. This related for example to minimum bid sizes or scheduling periods (Ecofys, 2015). PV, for example, can only bid into the market at certain hours a day. The maximum flexibility depends on the weather. Consumption patterns allow shifting of demand also only for certain timeframes (Ecofys, 2015). Industrial and commercial consumers have in some EU countries, e.g. Germany or Austria, started to provide flexibility such as tertiary reserves. This includes for example demand response activities in cement production (Germany) or refineries (Austria).

3 THE UPCOMING EU MARKET DIRECTIVE

To address these challenges the European Commission is preparing an ambitious legislative proposal to redesign the electricity market. The idea of the new legislative proposal is to increase security of supply and ensure that the electricity market will be better adapted to the green energy transition which

will bring in a multitude of new producers, in particular of renewable energy sources, as well as enable full participation of consumers in the market, notably through demand response. The new electricity market design being developed will allow innovative companies, such as aggregators, with new business models, to emerge and compete on the market.

4 REGULATORY FRAMEWORKS FOR AGGREGATORS IN SELECTED EU COUNTRIES

In several EU countries aggregators are entering the electrical energy or reserve markets, and regulatory frameworks are slowly being reformed in order to better enable their market access.

In **Austria** there is no DR participation in the spot markets. In 2014 however the technical prequalification in the reserve market of the minimum pool-size for tertiary reserve was decreased from 10 MW to 5 MW, making it easier for smaller aggregators to participate in the market. Currently, between 5 and 10 aggregators are active on the Austrian market, some of them providing tertiary reserve from industrial processes.

In **Germany** a first step towards demand side flexibility was made with the ordinance for interruptible loads (IL) introduced in 2012 and taking place in an organized market by regular tenders. Pursuant to the ordinance, large electricity consumers shed loads in cases of bottlenecks, thus stabilizing the grids. In return they receive a compensation that is passed on to electricity consumers. Those units are characterized by drawing large amount of electricity at any time, being able to quickly reduce their consumption of power automatically according to the actual frequency or by remote control for a certain period of time.

Germany is currently revising its regulatory framework with new provisions for the secondary and tertiary reserve to be adopted in 2016. It aims to allow additional actors providing flexibility from renewables. The access of demand side management providers and storage providers to the reserve markets was simplified. A daily tender opened each working day for the secondary reserve will enable a better market access to actors with small renewable generation parks, or actors that provide flexibility from production processes. They could for example better forecast the capacities they could offer.

In **Belgium** in regard to the primary reserve (R1), the Belgian TSO Elia has developed a combination of asymmetric and symmetric Frequency Containment Reserve (FCR) products in order to allow demand side participation.

Furthermore R1 requires 30 seconds for the entire volume to be delivered, unlike, for example, the Nordic markets that allow only 5 seconds to reach the entire volume.

R3DP (tertiary reserve dynamic profile) is a product of Elia for balancing purposes on the distribution grid. Until 2015 this product was tendered yearly, but since 2016 there is also a monthly tendering, in order to follow the European trend to move towards short term sourcing to increase liquidity in the balancing market. Elia also has plans to move toward a weekly tendering. For 2016, the yearly volume is 700 MW and the monthly volume is 70 MW. Elia also on the longer term plans to tender flexibility from storage.

Slovenia has among different products for tertiary reserve also one product that can be provided by dispersed production sources, and consumers who can provide demand response (Product DSM). The minimum offer size is 1 MW. The tender is annual, and due to the small

size of the market there is currently no possibility to offer shorter-term tenders (e.g. weekly or daily). All together 134 MW are tendered with 15 MW reserved for DSM.

In **Italy** the wholesale market operators can act as demand aggregators (dispatching users). However, there are no independent demand response aggregators in Italy today. Regarding the balancing market, the regulatory framework for aggregated Demand Response participation is not yet in place (SEDC, 2015).

Aggregation is not legal in **Spain** and there is only one scheme allowing demand response. For demand response at low level (residential or small communities) with aggregators, there is no regulation yet.

France needs a Frequency Containment Reserves (FCR) of 572 MW. This is also symmetrical but the market is not completely open. Instead, each generator is required to provide capacity at a regulated price of €18 per MW per hour.

Recently, the market opened up via bilateral agreements for DR participation (in 2014) and for traders (in 2015) (Verpoorten et al., 2016).

5 OUTLOOK

As this policy brief has shown, the market access for aggregators is improving in some EU countries, while others are still lagging behind. Often the regulatory frameworks are not supportive for demand side management or participation of distributed renewable generation.

Important adjustments of market regulations as we observe in a few countries is the reduction of the minimum bid sizes to allow small renewable generations to participate in tenders, or shorter scheduling periods. However in several EU countries no suitable frameworks for aggregators yet exist.

At the same time emerging new technical solutions will allow market actors to provide new services. The upcoming new EU electricity market directive will be an important step towards more decentralized electricity markets with a range of new actors and business models, and may trigger the reform of national regulatory frameworks.

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PROJECT

This policy brief was created within the FP7 project INCREASE:

http://www.project-increase.eu/index.php

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