Market analysis into EU flexibility services

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Analysis introduction

MAS²TERING software is an ICT solution for prosumers to enable shifting of their flexible energy loads, and to participate in local flexibility markets via intermediaries such as aggregators for empowering both virtual & physical energy communities across several EU market models.

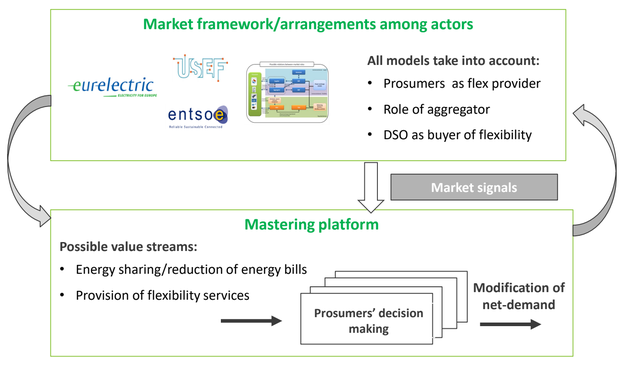
Market Models

Virtual energy communities

Physical energy communities

EC-Smart Grid Task Force

MAS²TERING Market Model Compatibility



Evaluated parameters

A literature review validated that the MAS²TERING software (hereafter called "MAS platform") could theoretically but realistically be viably deployed into any generic market model that includes the role of energy aggregator, and allows the DSO to buy flexibility. For assessing the market readiness of the MAS platform business models in the targeted countries, an initial market analysis was conducted. The 5 Member States selected for further MAS platform deployment feasibility analysis, reflect the project consortium members – namely: Belgium (Laborelec), France (CEA, Engie, Airbus Cyber-security & Defense), Italy (Telecom Italia, R2M Solution), UK (Cardiff Univ., SMS, Plc.), and Ireland (WIT).

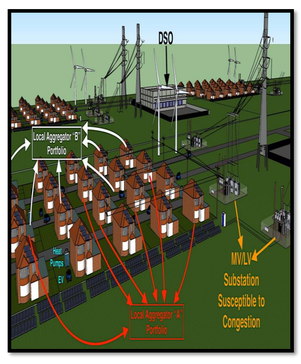
Evaluated parameters were: energy market policies and incentives; tariff schemes; distributed energy generation; distribution costs; and finally smart appliance penetration with a focus on Electric Vehicles and Heat Pumps.

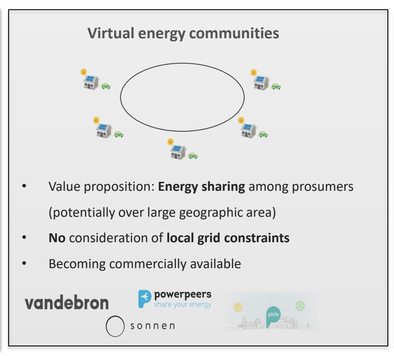
	Regulatory requirements for enabling flexibility	Tariffs schemes: ToU or dynamic pricing	DG Capacity (EVs, Heat Pump) penetration	Distribution Costs	EV/Heat Pump Penetration
GREEN (3)	Regulatory requirements are in place and commercial activities are underway	Dynamic pricing, ToU (Time-of-Use) with three time slots	DG share of total capacity in 2020 higher than 30%	Distribution costs between 30% - 40%	Penetration of EVs > 7.5 and/or Heat pumps capacity > 10 TWh
YELLOW (2)	Regulatory requirements are partially in place and commercial activities are preliminary or under development	Time-of-Use with two time slots (day & night)	DG share of total capacity between 20% - 30%	Distribution costs between 20% - 30%	5 <Penetration of EVs < 7.5 and/or Heat pumps capacity > 5 TWh
RED (1)	Regulatory requirements are not in place and commercial activities appear closed	Flat rate (24 hrs.)	DG share of total capacity lower than 20%	Distribution costs between 10% - 20%	Penetration of EVs < 5.0 and/or Heat pumps capacity < 5 TW

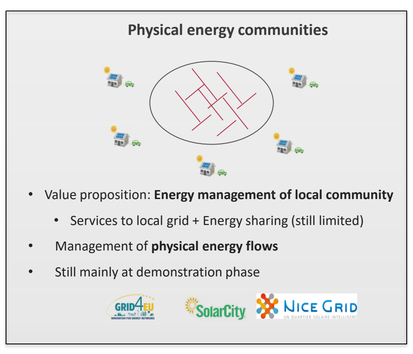
Ongoing results & validation activities

The market signal at local level is not yet defined by regulators, the platform may be able to support both local and virtual energy community patterns, and strengthen existing balancing mechanisms even up at TSO level (such as reserves). Market models create the framework for which energy communities can operate.

MAS platform enables features of virtual (middle) and physical (right) types of localized energy communities, allowing energy sharing among a high number of community members (scalability); and supporting grid constraint smoothing by the local flexibility aggregator (LFA) facilitating aggregated flexibility services to the local LV-grid (left).







Larger aims of the MAS²TERING project

A key aspect of Value Network Analysis (VNA) is the mapping of value flows as exchanges between network members in order to understanding where value resides in the network and the actor. collaborations needed to create that value. As a network analysis approach, VNA focuses not on the actor or the industry but the value-creating system itself, within which different economic actors perform roles – DSO, Supplier, Aggregator, Prosumer– who in essence work together to co-create value of local flexibility. Analysing the value flows along the multi-commodity flow chain perspective, including interactions and potential conflicting objectives provide us with a contextual understanding of how a networked economy or multi-sided business model platform could potentially materialise.

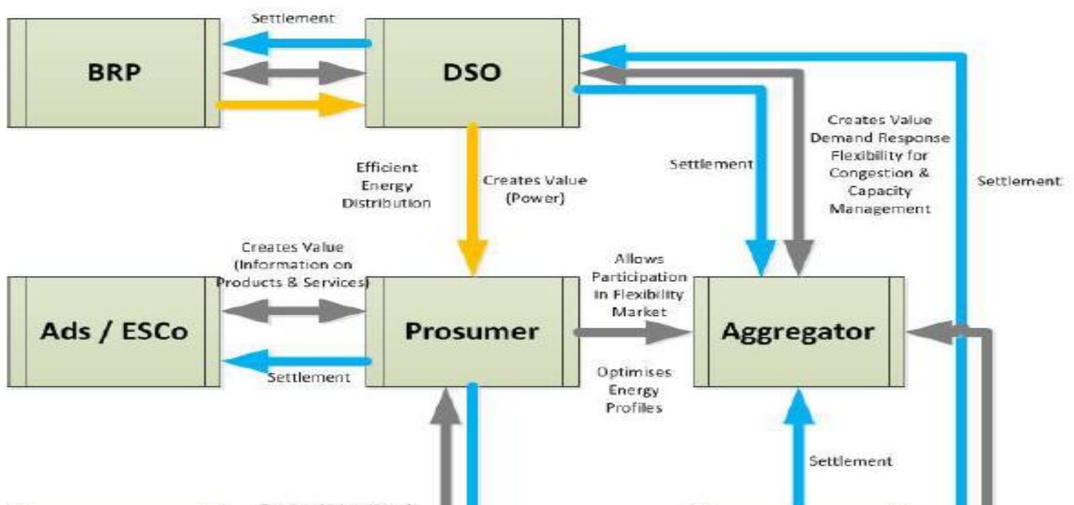
Assessment results

Higher penetration of electric vehicles and heat pumps have in some markets triggered DSO congestion problems, and the potential remains a given as renewables continue to decrease in costs. Thus high distribution fees could be reduced by using special night-time tariffs for high consumption appliances.

	Regulatory Requirement (commercial demand response activity detected by SEDC)	Distribution costs in bill (avg. 20% - 40% in EU electricity bills)	Type of Tariff		DG share of total capacity in 2020	Electric vehicles (%) + heat pumps (TWh) penetration		Weighted Score G = 3 Y = 2 R = 1
			Flat Rate	ToU (Time of Use)		EV penetration expected in 2020	Current heat pump penetration	
BELGIUM	DR-enabled	38%	24 hrs	Day: 8a-11p ToU night: 11p-8a	5%	8%	1.6 TWh	**19.5**
UNITED KINGDOM	DR-enabled	23%	24 hrs	Day: 8a-11p Night: 11p-8a	15%	4.5%	1.54TWh	**14**
ITALY	Partially DR-enabled	29%	24 hrs	F1: 8a-7p F2: 7a-8a/7p-11p F3: 12a-7a	25%	5.6%	22 TWh	**13.5**
FRANCE	DR-enabled	34%	24 hrs	Peak 8a-7p Off-peak: 7p-8a	13%	5.6%	22 TWh	**16.5**
IRELAND	DR-enabled	27%	24 hrs	Day 8a-11p Night: 11p-8a	35%	10%	N/D	**20**

Framework for a flexibility solution

VNA facilitated the visualization, analysis and insight into the business exchange flows and network relationships within the local flexibility market.



Contact & Acknowledgment

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