The PARITY project has received funding from the EU's Horizon 2020 research and innovation programme under grant agreement No 864319

Project Acronym:	**PARITY**
Project Full Title:	**Pro-sumer AwaRe, Transactive Markets for Valorization of Distributed flexibilITY enabled by Smart Energy Contracts**
Grant Agreement:	**846319**
Project Duration:	**42 months (01/10/2019 – 31/03/2023)**

DELIVERABLE D8.2

Report on activities for engaging and training pilot participants and related material

Work Package:	**WP8 – System Integration, Demonstration and Impact Assessment**
Task:	**T8.2 – Community engagement, pilot participant recruitment and integration into local flexibility market**
Document Status:	**Final v1.0**
File Name:	**PARITY_D8.2_Report on activities for engaging and training pilot participants and related material_R1_V1.0_MERITCH**
Due Date:	**July 2021**
Submission Date:	**December 2021**
Lead Beneficiary:	**MERITCH**

Dissemination Level	
Public	X
Confidential, only for members of the Consortium (including the Commission Services)	

The PARITY project has received funding from the EU's Horizon 2020 research and innovation programme under grant agreement No 864319

Authors List

Leading Author				
First Name		**Last Name**	**Beneficiary**	**Contact e-mail**
Theodoros		Kakardakos	MERITCH	th.kakardakos@meritconsultinghouse.eu
Co-Author(s)				
#	**First Name**	**Last Name**	**Beneficiary**	**Contact e-mail**
1	Aris	Amplianitis	MERITCH	a.amplianitis@meritconsultinghouse.eu
2	Aggeliki	Baritantonaki	MERITCH	a.baritantonaki@meritconsultinghouse.eu
3	Despoina	Delistathi	MERITCH	d.delistathi@meritconsultinghouse.eu
4	Georgios	Mourkousis	MERITCH	g.mourkousis@meritconsultinghouse.eu
5	Nikoleta	Pataki	MERITCH	n.pataki@meritconsultinghouse.eu
6	Ismini	Dimitriadou	HYPERTECH	i.dimitriadou@hypertech.gr
7	Daniele	Farrace	AEM	dfarrace@aemsa.ch
8	Kuriakos	Mihalopoulos	BFS	kmihalopoulos@bfs-ae.gr
9	Diego	Casado Mansilla	UDEUSTO	dcasado@deusto.es
10	Ioulia	Minda	E.ON	iulia.minda@eon.se
11	Jorge	Rueda Quintanilla	CUERVA	jruedaq@grupocuerva.com
12	Samuel	Wingstedt	CHECKWATT	samuel.wingstedt@checkwatt.se
13	Stylianos	Zikos	CERTH	szikos@iti.gr
14	Stavros	Koltsios	CERTH	skoltsios@iti.gr
15	Lucía	Garín	URBENER	lucia.garin@urbener.com

Reviewers List

Reviewers			
First Name	**Last Name**	**Beneficiary**	**Contact e-mail**
Guntram	**Pressmair**	**E7**	**guntram.pressmair@e-sieben.at**
Jon	**Legada**	**UDEUSTO**	**jlegarda@deusto.es**

Version History

Version	Author	Date	Status
0.1	**Aris Amplianitis, MERITCH**	**10 September 2021**	**Initial draft (TOC)**
0.2	**Aris Amplianitis, MERITCH**	**29 October 2021**	**Partner initial input was integrated to the document**
0.3	**Aris Amplianitis, MERITCH**	**3 November 2021**	**Improvements made and several comments addressed**
0.4	**Aris Amplianitis, MERITCH**	**17 November 2021**	**Input by CUERVA and URBENER incorporated. Ready for internal review**
1.0	**Aris Amplianitis, MERITCH**	**1 December 2021**	**Input by reviewers incorporated to the final version, ready for submission**

Legal Disclaimer

The PARITY project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864319. The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the Innovation and Networks Executive Agency (INEA) or the European Commission (EC). INEA or the EC are not responsible for any use that may be made of the information contained therein.

Copyright

Executive Summary

PARITY will demonstrate all its results in four demonstration sites with varying characteristics in terms of climatic zones, proliferation of Renewable Energy Sources and demand device types, regulatory frameworks, and market codes as well as culture and environmental consciousness. To facilitate the tool validation process, achieve wide communication & dissemination of the PARITY results as well as to obtain feedback from major stakeholders, end-users and targeted beneficiaries throughout project duration, various interactions have been foreseen with relevant pilot site actors. Such interactions are foreseen to be implemented during the entire project duration and are going to be reported here as well as in future updated versions of this deliverable.

Before reporting on actual engagement activities and interactions, a concise summary is provided about the actual pilot sites. Locations, equipment, and buildings used as the PARITY pilot sites are being reported in the present document. Furthermore, characteristics and demographics of the actual users as physical persons are also provided. Next, the first engagement activities and actions that took place in the pilot sites are reported. Finally, foreseen actions to take place in the coming months are also reported.

Table of Contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

Term	Description
BoM	Bill of Materials
DER	Distributed Energy Resources
DG	Distributed Generation
DR	Demand Response
DSO	Distribution System Operator
EV	Electric Vehicle
GDPR	General Data Protection Regulation
GIS	Geographic Information System
KPIs	Key Performance Indicators
LFM	Local Flexibility Market
LV	Low Voltage
P2P	Peer to Peer
R&I	Research and Innovation
RES	Renewable Energy Sources
RES	Renewable Energy Sources
SCADA	Supervisory Control and Data Acquisition
VPP	Virtual Power Plant

1. INTRODUCTION

1.1 Scope and objectives of the deliverable

This document is the first version of a series of deliverables which scope is to continuously report all the activities implemented by the PARITY consortium members towards initial identification and continuous engagement of all the PARITY pilot site actors and users under the project's User Driven Innovation Approach. More specifically, overall scope is the identification of the main actors per site as persons and the means to engage them into all business cases defined in PARITY. The identified persons will be members of the PARITY user group and will provide their insights regarding the system functional design and how its user acceptance can be enhanced. Furthermore, they will also participate during the pilot testing phase, they will provide their feedback on system operation, they will participate into the energy exchange mechanisms, and they will identify possible gaps that could provide useful feedback for PARITY tools' re-adaptations.

In the present deliverable, the characteristics of the finalized PARITY pilot sites are being reported together with relevant demographics about the involved pilot users. Furthermore, the first implemented engagement actions are reported together with the planning of relevant future actions to be implemented as the project progresses.

1.2 Structure of the deliverable

The deliverable begins by providing an overview of the PARITY project as well as its goals end expected outcomes. Then the PARITY User Driven Innovation Approach Methodology is presented according to which principals the user engagement activities foreseen in the project and reported in this deliverable are scheduled, implemented, and evaluated. More details and insights are given about the available approaches to inform users about the benefits of Demand Response which is the core technological framework that the PARITY tools/technologies are foreseen to serve.

The following section gives an extensive overview of the PARITY pilot sites where all the developed PARITY technologies will be deployed, validated, and evaluated in the course of the project. Scope of the section is to provide a first thorough mapping of the pilot sites as well as the adjacent pilot users as physical persons together with relevant demographic information.

In the final section, the user engagement activities that have been implemented so far per pilot site are being reported together with actions foreseen or scheduled to take place in the coming months of the project.

1.3 Relation to other tasks and deliverables

The present deliverable as well as its future versions will be reporting on the user engagement activities that are implemented during the various phases of the project under task 8.2. However, scheduling of these activities as well as monitoring and evaluation KPIs have been previously established in other tasks of the project. More specifically, the scope, approach as well as the intended outcomes of the user driven innovation methodology followed by the PARITY project, were clearly defined in task 9.1 and subsequently reported in D9.1 submitted by M6 of the project. Furthermore, the monitoring and

evaluation KPIs to be used are being reported and continuously updated in the various versions of the Dissemination and Communication Plan deliverables issued approximately every 12 months.

2. PARITY COMMUNITY ENGAGEMENT APPROACH

2.1 PARITY project overview

The PARITY project addresses the "structural inertia" of Distribution Grids (DGs) by delivering a transactive flexibility framework that will increase durability and efficiency of the electrical grid, while simultaneously enabling the adoption of more Renewable Energy Sources (RES) through enhanced real time control of Distributed Energy Resources (DER) flexibility combined with novel Active Network Management functionalities. PARITY will go beyond the traditional "top-down" grid management practices by delivering a unique local flexibility management platform through the seamless integration of Internet of Things (IoT) and Blockchain technologies. By delivering a smart-contract enabled market platform based on blockchain technology, PARITY will facilitate the efficient deployment of local micro-transactions and reward flexibility in a cost-reflective and symmetric manner, through price signals of higher spatio-temporal granularity based on real-time grid operational conditions. Finally, by deploying advanced IoT technology, PARITY will offer distributed intelligence (DER profiling) and self-learning/self-organization capabilities (automated real-time distributed control), orchestrated by cost reflective flexibility market signals generated by the blockchain Local Flexibility Market platform (LFM platform). Within PARITY, DER will form dynamic clusters that essentially comprise self-organized networks of active DER nodes, engaging in real-time aggregated & P2P energy/flexibility transactions.

More in detail, the PARITY project aims to enable the set-up and operation of local flexibility markets at the distribution network level via a holistic offering encompassing:

- A smart contract enabled, blockchain based LFM platform, which will facilitate both peer-to-peer energy/flexibility transactions as well as the sell/purchase of flexibility to Smart Grid actors.
- IoT enabled DER Flexibility management tools - both in a peer-to-peer distributed fashion, but also through a centralized aggregator.
- Smart Grid monitoring and management tools to enable the Distribution System Operation (DSO) to optimally manage the low voltage distribution network in the presence of increasing intermittent RES penetration and with the aim to contain the problems they create to the grid stability.

In parallel to the aforementioned technology solutions that are under development and will be demonstrated in the project, PARITY also delivers all the necessary additional elements that are critical for the effective deployment, replication, and proliferation of the PARITY solution. These include:

- The investigation of market coupling mechanisms that will enable to bundle and trade local flexibility potential in the national energy and ancillary service markets when it exceeds the needs of the local market and when it can be monetized at higher levels of the grid.
- The definition of LFM actors and the associate business models that will ensure seamless LFM operation.

- The innovative retail energy commercial arrangements and contracts, which will enable the automated provision and trading of flexibility in the LFM that will ensure grid stability.
- The policy reform recommendations to shape the regulatory frameworks that will enable LFM creation in a financially sustainable manner.

PARITY will demonstrate all its results in four demonstration sites with varying characteristics in terms of climatic zones, proliferation of RES and demand device types, regulatory frameworks, and market codes as well as culture and environmental consciousness. The sites are located in Granada and Saragossa, Spain; Athens, Greece; Malmo, Sweden and Massagno, Switzerland.

2.2 Overview of PARITY User-driven Innovation Methodology

Within PARITY's methodological approach, end-users, and main project beneficiaries (DSOs, Prosumers, Aggregators, Retailers) are collectively placed at the centre of all research, innovation, demonstration, and communication activities of the project, which will adopt a User-Driven Innovation Approach towards addressing emerging end-user and market needs, critical for a successful project implementation and the realization of its anticipated impacts. More specifically, the User-Driven Innovation Approach aims at involving beneficiaries and buildings occupants throughout all stages of the project life cycle, as key enablers of the PARITY innovation process, towards encouraging active and collaborative contributions in the development of a unique flexibility market ecosystem. Continuous interactions between beneficiaries, end-users and project team members will be encouraged to minimize deviations between expectations and outcomes, as well as to divide the project final outcome into intermediate marketable results.

The establishment of the PARITY Living Labs will further support the User-Driven Innovation Methodology, Approach, and Agile Development of PARITY. Its creation is motivated by the understanding that it can provide an excellent network for experience sharing and exchange towards user and business-driven open innovation. The PARITY Living Labs activities will be oriented towards fulfilling the following objectives:

- Widely disseminate the project outcomes towards end-users, beneficiaries, and energy stakeholders to generate a broad awareness and engagement/ involvement in the project activities.
- Create opportunities for further exploitation and replication of the project results after completion.
- Obtain feedback from major stakeholders, end-users, and targeted beneficiaries throughout project duration to optimize all project developments, so as to directly address critical needs of stakeholders involved in the operation of the PARITY framework.
- Support knowledge and experience sharing with international partners together with other selected stakeholders from the country.

The Living Labs methodology involves end-users and beneficiaries from the very beginning of a new idea, creating the motivation to share and discuss their experiences and requirements. This collaborative environment, where all stakeholders evaluate, appraise, and disseminate solutions and learnings, will lead to a natural acceptance by users who will be empowered not only to test, evaluate, and report their

own experience with the PARITY solutions, but mainly to live with it, smoothly accept and incorporate PARITY in their everyday lives and operations.

Implementation of the foreseen actions under the above-mentioned Living Lab methodology are foreseen to take place under task 8.2 and subsequently reported in the present deliverable along with its updated versions foreseen until the end of the project.

2.3 Approaches to inform users about the benefits of Demand Response

According to the office of electricity from the US energy department [1] demand response provides an opportunity for consumers to play a significant role in the operation of the electric grid by reducing or shifting their electricity usage during peak periods in response to time-based rates or other forms of financial incentives. Demand response programs are being used by some electric system planners and operators as resource options for balancing supply and demand. Such programs can lower the cost of electricity in wholesale markets, and in turn, lead to lower retail rates. The EU counterpart [2] argues that Demand Response can increase the system's adequacy and to substantially reduce the need for investment in peaking generation by shifting consumption away from times of high demand. It can act as a cost-effective balancing resource for variable renewable generation. Adding stability to the system, it lowers the need for coal and gas fired spinning reserves – most running power plants burn fuel continuously in order to be ready to supply power at short notice. Furthermore, it decreases the need for local network investments, as it shifts consumption away from peak hours in regions with tight network capacity.

In the same report from the office of electricity of US, they provide initial insights about engaging mechanisms for fostering demand response: *"[…]methods of engaging customers in demand response efforts include offering time-based rates such as time-of-use pricing, critical peak pricing, variable peak pricing, real time pricing, and critical peak rebates. It also includes direct load control programs through automation and remote control which provide the ability for power companies to cycle air conditioners and water heaters on and off during periods of peak demand in exchange for a financial incentive and lower electric bills.*"

As can be observed, most of the incentives for enhancing the adoption of demand response, if not all, are of pecuniary nature. Thus, it seems that other kind of motivations such as pro-environmentalism, fighting against the climate change or fostering the energy transition and the associated electrification & decarbonisation are less relevant. However, the EU commission is putting efforts towards enhancing citizen and collective engagement through different strategies. One example of such an objective was the specific funding call on consumer engagement and demand response [3] or the BRIDGE initiative which has a subgroup on consumer and citizen engagement [4] PARITY is member of the BRIDGE project and some of the partners of the PARITY consortium have been active and leading the last report titled "Exploration of citizen engagement methodologies in European R&I projects" [5].

Drawing from the research literature, a recent study [6] states that the main classifications of demand reduction and demand response schemes respond to the ones presented in the Figure 1.

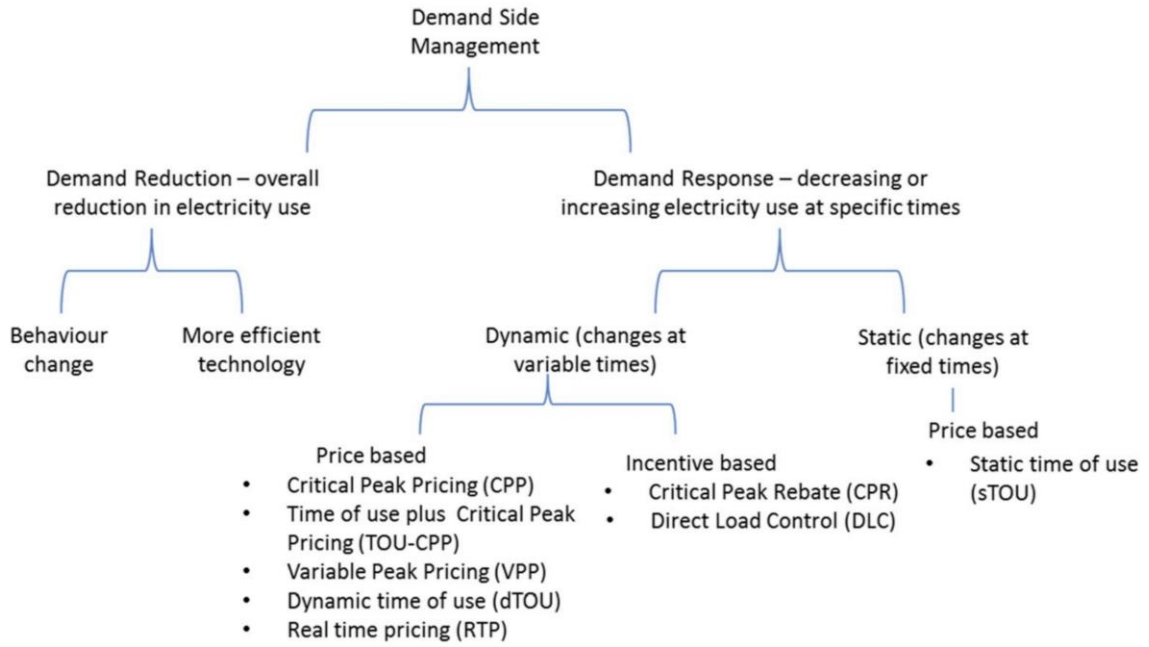


Figure 1. Classification of main demand response schemes.

The abovementioned article conducted a systematic review of the body of knowledge in engagement for demand response finding that, again, the financial and, in a lesser extent, environmental benefits were the most common motivations identified. However, it is important to consider that according to the article "*[..] there is some evidence that after enrolling users continue to weigh up the potential financial savings against effort, time, convenience and comfort when deciding whether to change their electricity use*". That is, there is a need for understanding the engagement along the process from adoption to maintenance. In this regard, the authors from the referred article found that the main categories serving as enablers and barriers of demand response are familiarity and trust, perceived risk and perceived control, and complexity and effort, and those may change along the life of the end-users (see Figure 2). This schema mimics the idea of the stages of change and other incentivisation and behaviour change models such as the Transtheoretical Model of Behaviour change [7] that more and more is used in pro-environmental and sustainability field [8].

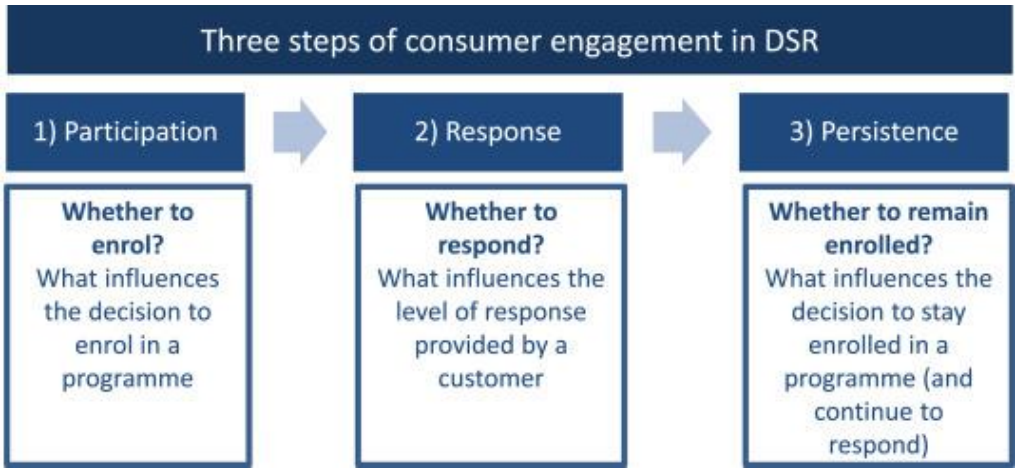


Figure 2. Stages of consumer engagement in Demand Response.

Following a similar rationale, in this task different engagement strategies will be proposed to consumers and citizens of the different pilot sites according to their stage of change. As an example, obtained from the UX Collective [9], in Figure 3 we can observe how different strategies can be used in different stages of consumer engagement in (e.g., awareness, adoption or retention that are like those above in Figure 2).

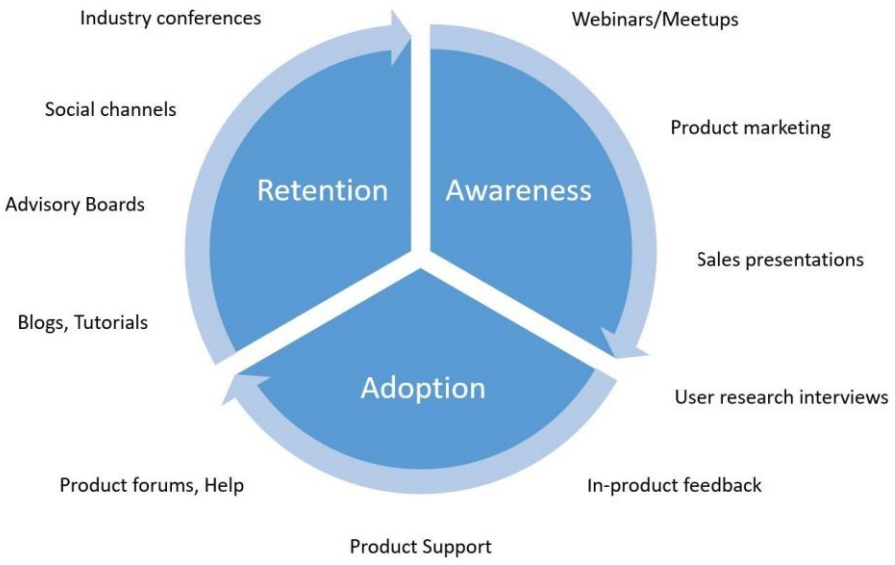


Figure 3. Potential strategies to be used according to the stage in which an end-user might be.

Therefore, to undertake such a task, we will start reviewing the findings provided in D4.1 "*Analysis of obstacles to Innovation under current & future regulatory & socio-economic context for LFM proliferation*" and D4.2 "*Design of next-generation smart-contract-enabled energy contracts*" of barriers and risks for participating in a local flexibility market and the role of the emerging technologies for adopting them. Having the barriers and associated risk identified (Figure 5 and Figure 6) we can find the best engagement strategies and drivers to overcome them according to the objectives separated in Figure 1. Thus, if the objective is the demand reduction, in the pilots we will have to test different

behaviour change strategies such as nudges, persuasion, need for cognition or values-based incentivisation for each of the barriers. However, if the objective is DR *per-se* leaded by financial incentives, we will explore the role of fixed and variable pricing and tariff schemes like those presented in the right part of the schema in the Figure 1 extracted from Parrish et al. work [10]and how users can be better informed of the benefits of DR in their local places (aka. PARITY pilot sites). Figure 4 shows the description of each of the price-based schemas.

Price based schemes	Description
sTOU (static time-of-use)	Prices vary by time of day between fixed price levels and over fixed periods. These may vary by season.
CPP (critical peak pricing)	Prices increase by a known amount during specified system operating or market conditions. This applies during a narrowly defined period and is usually applied only during a limited number of days in the year.
TOU-CPP (time of use plus critical peak pricing)	Critical peak pricing overlaid onto time of use pricing. TOU-CPP therefore has two pricing components – daily time of use pricing, and occasional critical peak pricing applied during critical system events.
VPP (variable peak pricing)	Similar to time of use, but the peak period price varies daily based on system and/or market conditions rather than being fixed.
dTOU (dynamic time of use)	Prices vary between fixed price levels, but the timing of different prices is not fixed.
RTP (real time pricing)	Price can differ on a daily basis and change each hour of the day (or more frequently) based on system or market conditions.
Incentive based schemes	Description
CPR (critical peak rebate)	Similar to CPP, but customers are provided with an incentive for reducing usage during critical hours below a baseline level of consumption.
DLC (direct load control)	Customers are provided with an incentive for allowing an external party to directly change the electricity consumption of certain appliances. Customers can usually override control although they may lose some incentive. DLC may also be combined with time varying pricing.

Figure 4. Types of pricing and other economic incentives [10] **.**

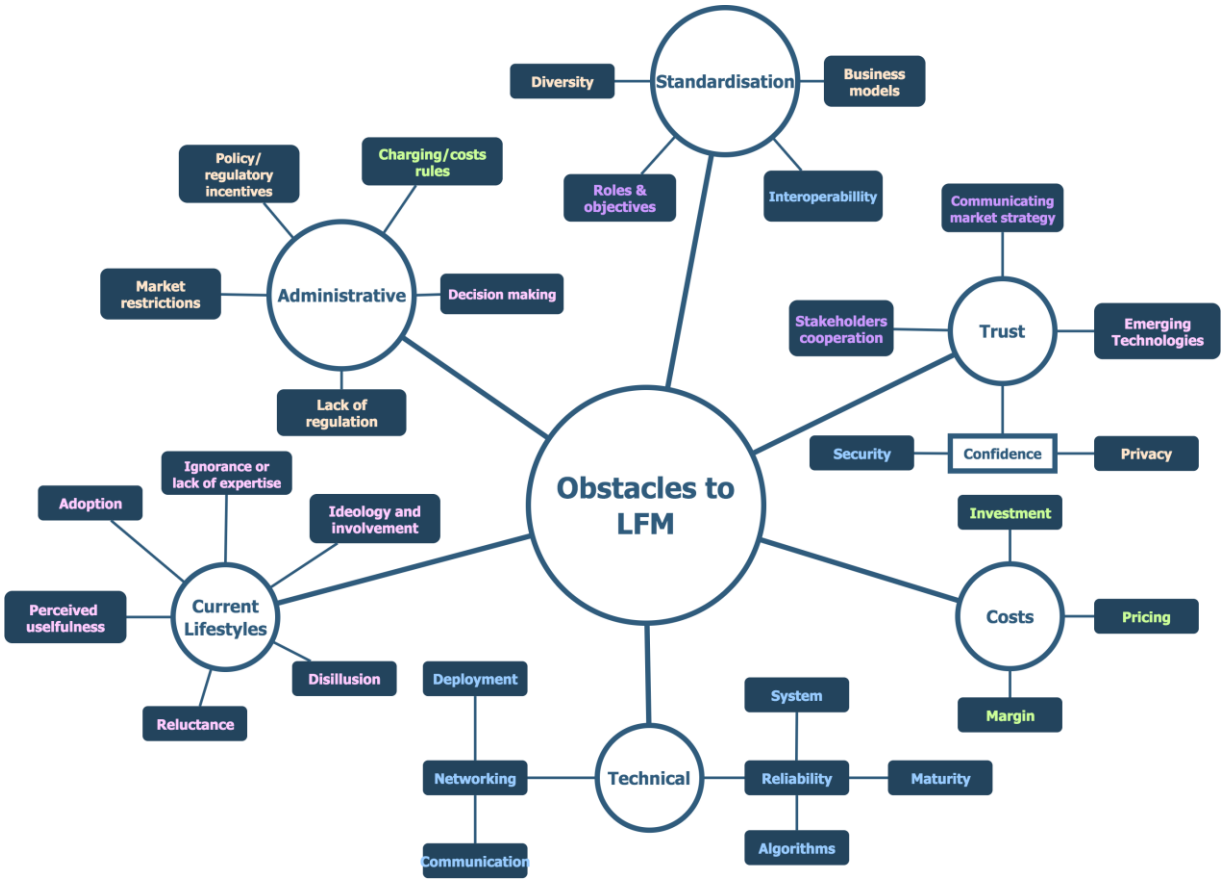


Figure 5. Main barriers for adopting Local Flexibility Markets [11].

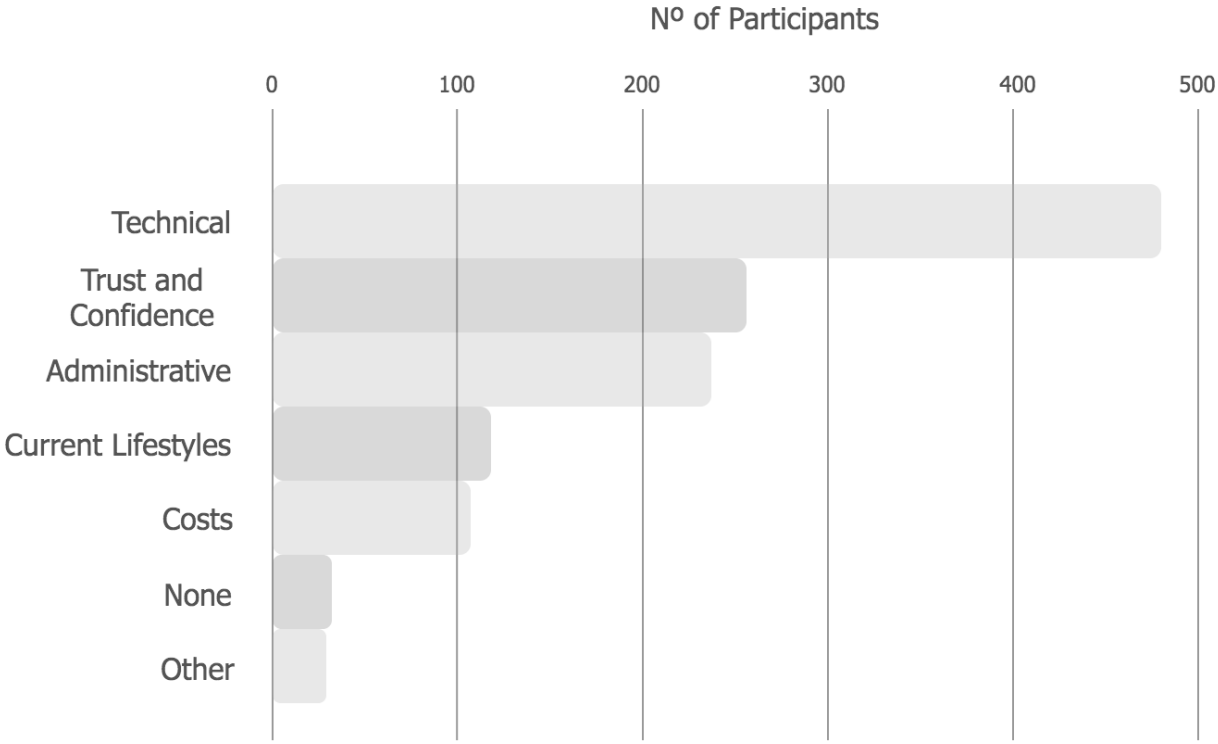


Figure 6. Main perceived risks associated to the adoption of Local Flexibility Markets and Demand response driven by emerging technologies such as smart contracts [11]**.**

3. PARITY PILOT SITES & PARTICIPANTS

Based on the finalized pilot sites, a mapping/description of the physical sites as well as the involved stakeholders is provided in this section along with relevant demographics.

The actual names of the pilot occupants cannot be shared but information about their age, gender or any other relevant information that has been collected is reported here in an effort to describe the PARITY User Group with as much detail as possible. Overall scope is to clarify which is the group of people the PARITY project shall be engaging during the entire project lifetime (from tool deployment to validation) and with which type of capacity they are going to be engaged (residents, users, owner operators etc.).

This detailed mapping of the total number of PARITY users will also be later used as a performance KPI to evaluate to what extent the PARITY users were reached compared to the available pool.

3.1 Pilot sites in Spain

3.1.1 Granada pilot site

The Spanish Pilot led by Grupo CUERVA is located in the South of Spain, in the province of Granada, as part of the distribution network operated by them will be used as the main electricity infrastructure to set the Spanish demo site. The area of the pilot will be the "Escuzar" community, a small village located near Granada). This areathat counts 273 supply points and a peak load close to 0,35 MW. The LV distribution grid serves mostly residential consumers and near the village, there are 2 PV plants of 4 MW and 1.8 MW each one connected to the Medium Voltage grid. In the area there are also deployed 4 residential households with self-generation PV (3 kWp each one), 1 household with a private EV charger (7,4 kW) + self-generation PV(3 kWp). Besides, it is expected the deployment of a small-scale PV plant around 50 kWp for shared self-consumption between the public supply points owned by the city townhall. This PV plant is committed for PARITY project and is expected to be operational by Q1 of 2022. In addition, an EV charging is also available in the town, it is a fast charger of 22 kW, also they are analysing the deployment for V2G chargers in some households.

Pilot infrastructure

For the project, data from several endpoints of the CUERVA distribution grid will be considered:

- 100% Smart meter penetration to the customers of the company; monitoring all parameters from smart meters in an hour granularity.
- Smart metering technologies to monitor RES generation & storage at the distribution network.
- Feeder mapping technologies by using Advanced Low Voltage Supervisor in order to monitor all parameters from transformers at the LV network, with five minutes granularity (working to reduce the granularity to one minute).
- SCADA & GIS data will be made available to create a pool of electrical data from the local network.
- A complete digital twin model of the Low Voltage Grid for the whole town is available.
- 1 public EV Charger of 22 kW.
- 4 prosumers with PV self-generation (3,3 kWp each one)
- 2 PV plants connected to MV; 4 MWp and 1,6 MWp each one.
- Small-scale PV plant for shared self-consumption of 50p kW. Not available now, planned on Q1 2022.

3.1.2 Granada pilot-site users/participants

As mentioned before, the Granada pilot will count 273 supply points and around 420 inhabitants related with these supply points.

Table 1. Granada pilot-site characteristics.

Supply point type	Residential	Tertiary: Commercial and public buildings
Total	240	33
No. of PV installations	4[1]	0[2]
Total power PV	13,3 kWp	50 kWp
No. of EV	1	1

Household composition of the residential buildings supply points are reported in the table below.

Table 2. Granada residential building composition.

Household composition	Nr.	%
Under 18 years old	75	17,9
18-30 years old	45	10,7
31-44 years old	85	20,2
45-54 years old	61	14,5
Over 54 years old	154	36,7
Total	**420**	**100.0**

Regarding the composition and social information of the prosumers included in the demo-site, it is the following:

Prosumer 1:

- Residential household.
- Number of inhabitants: 3
- Age: +65 all
- Educative level: Secondary
- Profession: Retired all of them.

Prosumer 2:

- Residential household.
- Number of inhabitants: 4
- Age: 2 adults between 35-45 and 2 teenagers under 18
- Educative level: Secondary
- Profession: Agriculture

[1] More installations are planned for 2022, around 15 more.

[2] Planned for Q1-2022.

Prosumer 3:

- Residential household.
- Number of inhabitants: 5
- Age: 1 adult +65; 2 adults between 35- 45 and 2 teenagers under 18
- Educative level: Licenciature
- Profession: Financial assessment

Prosumer 4:

- Residential household.
- Number of inhabitants: 3
- Age: 2 adults between 35- 45 and 1 teenager under 18
- Educative level: Secondary
- Profession: Currently unemployed.

Other relevant stakeholders are:

- CUERVA, DSO. It manages and ensures the transport of electricity in the territory where the demo site is located.
- Escuzar Townhall, social agent that will be engaged to dissemination and social actions derived by the project.
- Turning Tables. Third party of CUERVA, in charge of the Living Lab Community, they are leading the social engagement and participation in the project.

3.1.3 Zaragoza pilot-site

Pilot-site in Zaragoza consists of URBENER´s headquarters and ACESA´s building, located in the same city, at a distance of 10 km. URBENER´s annual consumption is 9000 kWh and the cost in euros are 2156.64€. On the other hand, ACESA´s building annual consumption is 5040 kWh and the cost in euros is 3584.12€.

URBENER headquarters

The location of URBENER´s offices is in the city centre. They are located on the fifth floor of an emblematic building of the city.

URBENER main power connection is 3-Phase and four spaces are available for the development of PARITY activities at URBENER´s offices. Table 3 shows the relationship between the sizes of the spaces destined to PARITY activities and the number of people located in those spaces.

Table 3. URBENER headquarters' characteristics.

OFFICE NUMBER	SIZE	NUMBER OF WORKERS
1	35 m^2	4
2	46 m^2	6
3	15 m^2	No one – meeting room
4	18 m^2	1

URBENER´s pilot plant is intended to control the climate in order to provide flexibility solutions. For this purpose, URBENER has an HVAC system composed of 2 Hitachi outdoor units connected to 4 indoor units located in each of the areas selected for PARITY activities.

The model of the outdoors units are:

- Hitachi air conditioner model RAS-5FSVNE
- Hitachi air conditioner model RAS-5FSVNME

To control the HVAC system we have an Intesis-Hitachi gateway mode INMBSHIT016O000 and different devices installed for HVAC control.

ACESA building

ACESAs´s building is located on the outskirts of the city of Zaragoza, in an industrial estate called PLAZA. ACESA´s building main power supply is 3-Phase and also, four zones are destinated to PARITY activities. Table 4 shows the relationship between the size of the spaces destined to PARITY activities and the number of people located in those spaces.

Table 4. Space area and users of the ACESA building pilot.

OFFICE NUMBER	SIZE	NUMBER OF WORKERS
1	30 m^2	No one - Hall
2	20 m^2	1
3	40 m^2	4
4	30 m^2	1

ACESA´s building pilot plant is indented to control also the climate. They have 4 HVAC systems. Table 5 shows the connection between the outdoors units and the indoors units with the models of each one and the location.

Table 5. HVAC characteristics of ACESA building.

LOCATION	OUTDOOR UNIT	INDOOR UNIT
1	Fujitsu AOH24LMAKL	Fujitsu AUG24UI - Cassette
2	Fujitsu AOH24LMAKL	Fujitsu AUG24UI - Cassette
3	Fujitsu ARH54LUAK	Fujitsu ACY125UIA - Split
4	Panasonic CS-7Z35TKEW	Panasonic TZ35TKE - Wall Split

To control HVAC system we have 3 Intesis-Fujitsu gateway model INWMPFGL001R00 and one Universal-Panasonic gateway model NWMPUNI001I00 and different devices installed for HVAC control.

3.2 Luggagia innovation community, Switzerland

3.2.1 The pilot site

The finalized Swiss pilot site consists of a residential neighbourhood and an administrative Municipality building with offices.

The residential pilot site is located in the north-east suburbs of Lugaggia, a small village nearby the town of Lugano, and consists of 12 eligible residential dwellings (6 of the 18 dwellings stated in the GA were determined to be ineligible for the PARITY demonstration). The majority of the building stock are typical two-storey family houses constructed between 2010 and 2015. The building stock hosting approximately 50 residents and covering a total area of approx. 18'000 sqm. All the dwellings cover their energy needs by utilising electricity as source with a total annual consumption of approx. 135'000 kWh. The residential pilot site has an installed capacity of 65 kWp of PV power, as there are 4 PV systems on the roofs of 4 residential buildings and 1 PV on the roof of the local nursery. An electricity storage system (electric battery) with a capacity of 60 kWh is also installed in the neighbourhood to increase self-consumption. Heat pumps (total of ca. 17 kW) and electric boilers (total potential of ca. 50 kW) are installed to meet heating and hot water needs.

The administrative building, on the other hand, is a four-storey office dwelling and represents the Capriasca town hall, also located nearby Lugano, and is outside the self-consumption community LIC. The building, with an annual electricity consumption of about 32'420 kWh, is equipped with 6 internal and 2 external HVAC units. It houses up to 50 employees in a total area of 1'580 m².

Each end-user has its own smart meter providing consumption and production data every 15 minutes through a dedicated broadband communication. Pilot sites detailed information is reported in the tables below.

Table 6. Swiss pilot site detailed information.

Building type	Residential		Administrative
Name	LIC		Municipality building
No. of buildings	12		1
No. of dwellings	12		1
No. of end-users	50		Up to 50 (30 on average)
Average number of end-users per dwelling	4		-
Average square meters per dwelling	180 sqm		1'580 sqm
Total annual electricity consumption	135'000 kWh		32'420 kWh
Average annual electricity consumption	11'250 kWh		-
No. of rented dwellings	2	17%	-
No. of owned dwellings	10	83%	1

No. of heat pumps	5	42%	0[3]
Total power heat pumps	17 kW		-
No. of electric boilers	10	83%	-
Total power electric boilers	50 kW		-
No. of PV installations	5		0[4]
Total power PV	65 kWp		-
No. of EV	2		-
No. HVAC external units	0		2
No. HVAC internal units	0		6
Average year of construction of the buildings	1999		1900[5]

3.2.2 The users/participants

As mentioned before, the Swiss pilot sites include around 80 end-users: approximately 50 users live in the residential buildings and around 30 people (on average) work in the municipality building.

The households' composition and employment information of the residential buildings end-users are reported in Table 7.

Table 7. Household composition and employment information of the Swiss pilot residential buildings.

Residential buildings					
Household composition	Nr.	%	Employment information	Nr.	%
Under 18 years old	13	25.5	Employed full time	22	43.1
18-30 years old	5	9.8	Employed part time	1	2.0
31-44 years old	2	3.9	Self-employed	3	5.9
45-54 years old	15	29.4	Unemployed	1	2.0
Over 54 years old	16	31.4	Student	15	29.4
			Homemaker	3	5.9
			Retired	6	11.8
Total	51	100.0	Total	51	100.0

[3] The building will be connected to a district heating network in 2022.

[4] Planned for Q3/4-2022.

[5] Renovated last time in 2017.

Other relevant stakeholders are:

- AEM, DSO. It manages and ensures the transport of electricity in the territory where the pilot sites are located and operates the energy community LIC.
- LIC, self-consumption/energy community. The company that represents the self-consumption community LIC (residential pilot site). The company is owned by AEM.
- Capriasca municipality. The municipality where the Swiss pilot site is located (both residential and commercial/administrative) and one of the municipalities where AEM supplies electricity. The Capriasca municipality hall represents the administrative pilot site.

3.3 BFS facilities, Greece

3.3.1 The pilot site

As for the Greek pilot site three different categories of pilot buildings are anticipated according to the DoA. Those three categories are 40 houses to be used as residential pilots, 3 petrol stations – charging points as commercial pilots and one large commercial pilot, for which a part of the central company offices was designated.

For the residential part of the pilot, a pool of 50 buildings was established, all of which were retail customers of NRG Energy supplier, which is committed to supporting PARITY and is part of the same conglomerate as BFS. To arrive at those 50 buildings, a larger number of buildings were initially chosen by performing a high-level filtering of the available company portfolio against the project's requirements, always keeping in mind the potentiality and limitations of each building due to its characteristics and specific equipment. After that, a round of communication with the building owners/users was done to see if they wished to engage in the project willingly. The users were told that participating in the project would provide them with various benefits, but that there would also be certain responsibilities as a result of their participation. Then, the buildings that their users agreed with the specifications were screened again, resulting in a final pool of 50 buildings. Those buildings were those that had a user agreement to participate in the project and met the majority of the established requirements by the project. Finally, from this pool of 50 buildings, the 40 most relevant to meet the project needs were chosen as final pilots, with the remaining 10 serving as a reserve list in case any revisions were needed before installation. The final selected buildings of the pilot are individual houses distributed in the metropolitan area of the Greek capital Athens and are not connected to the same grid.

Regarding the commercial pilots, three car service stations were chosen for PARITY, based on the project requirements and their availability. For this filtering a pool of approximately 500 car service stations in Greece, for which BFS is responsible for the facility management, renovation plan and business extension plan, were used. The selected stations were equipped with EV chargers (ABB Terra multi-standard DC charging station - 50kW DC) and are located in the wider metropolitan area of Athens.

Finally, for the large commercial pilot, an area inside the group of companies' headquarters was designated, by filtering the available spaces in the building with the specified requirements of the project. The building is located in the north suburbs of Athens, Greece and is a five-storey office building with total covered area of about 24,000 m^2 and two underground floors for parking, electromechanical

plants, and storage. The building also includes a bank brunch, a café, a medical clinic, and a post office. The whole building is used daily by about 650 employees. The final selected part of the building includes a space of 4 separate offices and is permanently used by 6 employees. It is equipped with 4 heat pumps (A/C split units) which are used both for heating during the winter and cooling during the summer, while it is illuminated with LED troffers.

In the following table the characteristics of the pilot buildings are presented in summary.

Table 8. Greek pilot building characteristics.

Building type		Residential		Commercial (Petrol stations)	Commercial (Headquarters)
No. of buildings		40		3	1
No. of end-users		106		5 employees >100 customers / day each	6 employees >10 visitors / day
Average annual electricity consumption		5.005 kWh/annually per dwelling		36.144 kWh/annually per station	10.650 kWh/annually for the designated area 2.820.000 kWh/annually for the whole building
Dwelling Tenancy regime	Rented	18	45%	2	0
	Owned	22	55%	1	1
Type of dwelling	Detached	5	12,5%	-	-
	Semi-detached	4	10%	-	-
	Apartment	33	82,5%	-	-
Size of dwelling	< 50 m^2	5	12,5%	-	-
	50 m^2-100 m^2	12	30%	-	-
	100 m^2-150 m^2	19	47,5%	-	-
	150 m^2-200 m^2	3	7,5%	-	-
	200 m^2-250 m^2	0	0,0%	-	-

	250 m^2 >	2	2,0%	-	-
Average size		103 m^2		230 m^2	60 m^2
Building construction year	<1979	6	15%	-	-
	1980-1989	13	32,5%	2	1
	1990-1999	6	15%	1	-
	2000-2009	12	30%	-	-
	2010>	3	7,5%	-	-
Average construction year		1991		1987	1982

3.3.2 The users/participants

As presented above, in the residential buildings which are used as pilots, 106 residents live in, while the petrol stations are used by over 100 customers per day each and by 5 employees. The commercial office is used daily by 6 employees and about 10 visitors per day.

For the residential pilot, the end-users have been informed about the project and agreed to be recruited as end-users under the framework of the project and have also answered the questionnaires of task 3.1 and task 3.2 which mapped, among others, the demographics of the PARITY pilot participants. The same applies also for the permanent users of the commercial pilot buildings (employees). The result of this mapping for the residential buildings is available in Table 9 and depicted in Figure 7, Figure 8 and Figure 9.

Table 9. Demographics of Greek pilot site participants.

Residential buildings								
Household composition	Nr.	%	Employment information	Nr.	%	Digital skills	Nr.	%
Under 18 years old	31	29%	Employed full time	48	45%	Not familiarized	0	0%
18-30 years old	2	2%	Employed part time	2	2%	PC owner	40	100%
31-44 years old	51	48%	Self-employed	12	11,5%	Tablet owner	26	65%

45-54 years old	13	12,5%	Unemployed	4	4%	Smartphone Owner	40	100%
Over 54 years old	9	8,5%	Student	21	20%	Smart home Devices Owner	16	40%
			Homemaker	0	0%			
			Retired	9	8,5%			
			Other	10	9%			
Total	106		Total	106		Total	-	

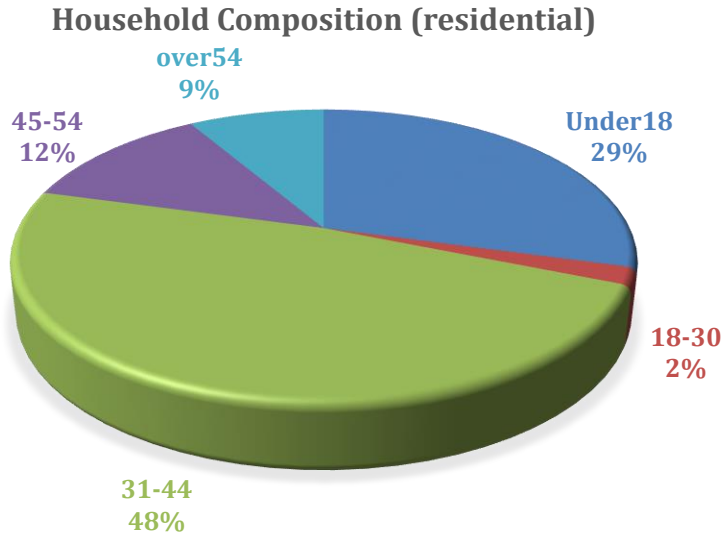


Figure 7. Household composition of the Greek residential pilot.

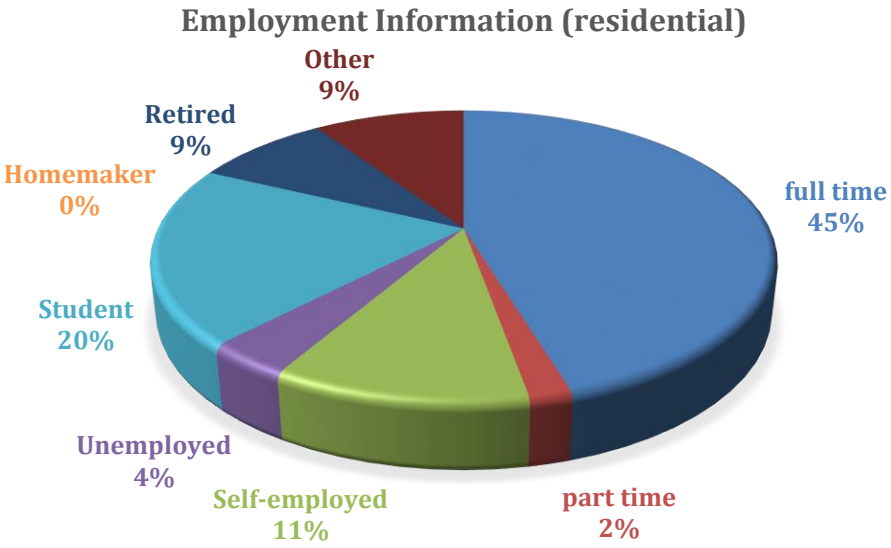


Figure 8. Employment information of the residential pilot users.

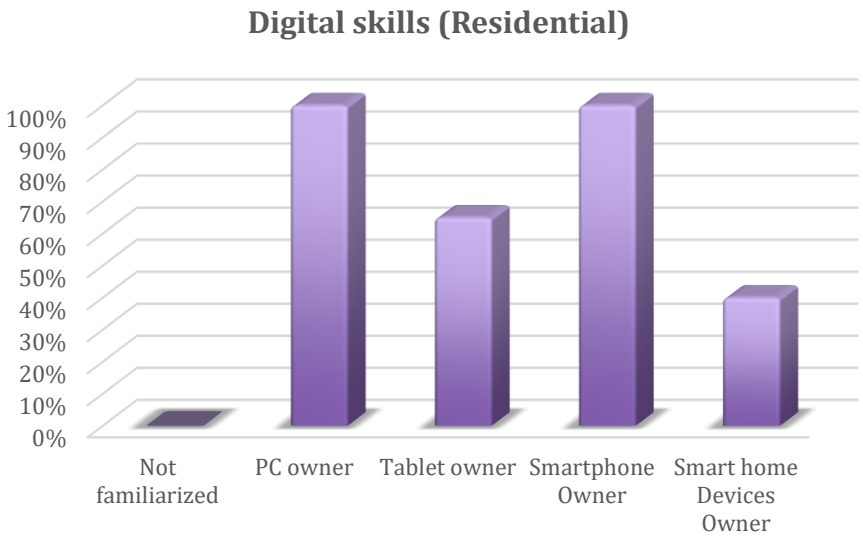


Figure 9. Digital skills of the residential pilot users.

For the commercial pilots the result of the mapping is available in Table 10.

Table 10. Demographics of the Greek commercial pilot site participants.

Commercial pilots								
Car service stations								
Employee composition	Nr.	%	Employment information	Nr.	%	Digital skills	Nr.	%
Under 18 years old	0	0%	Employed full time	15	100%	Not familiarized	0	0%
18-30 years old	12	80%	Employed part time	0	0%	PC owner	12	80%
31-44 years old	3	20%	Self-employed	0	0%	Tablet owner	4	27%
45-54 years old	0	0%				Smartphone Owner	15	100%
Over 54 years old	0	0%				Smart home Devices Owner	2	13%
Offices								
Employee's composition	Nr.	%	Employment information	Nr.	%	Digital skills	Nr.	%
Under 18 years old	0	0%	Employed full time	6	100%	Not familiarized	0	0%
18-30 years old	0	0%	Employed part time	0	0%	PC owner	6	100%
31-44 years old	4	67%	Self-employed	0	0%	Tablet owner	4	67%
45-54 years old	2	33%				Smartphone Owner	6	100%
Over 54 years old	0	0%				Smart home Devices Owner	3	50%

3.4 South Sweden facilities, Sweden

3.4.1 The pilot site

The PARITY pilot located in the south of Sweden comprises of two separate locations, a residential and a commercial site. The two locations are separated geographically by approximately 165 km, but both fall within the SE4 Swedish electricity sector, thus sharing the same electricity tariffs. In addition, both sites share the same Balance Responsible Party (E.ON) with implications on aggregation towards wholesale electricity and ancillary services markets.

Figure 10. The BRF Kalkbrottet building complex.

In more detail, the residential site is the BRF Kalkbrottet building complex in Klagshamn, a neighbourhood within the Malmö municipality. This complex is a cluster of 3 buildings comprising of apartments spanning a total of 4400 m^2 living area, each equipped with a roof mounted PV installation of 40 kWp, as well as EV charging stations.

The commercial pilot site is an office building, of approximately 700 m^2 area located in the town of Karlshamn. The office building is currently occupied by the employees of Solar Supply Sweden AB and Energimontagegruppen AB. There is a planned 30kWp PV installation, 6 EV charging stations and already available HVAC and lighting systems.

On average, the pilot sites have a total annual electrical energy consumption of approximately 190 MWh amounting to 22,000 €/year in cost of electricity.

In order to validate the Storage-as-a-Service PARITY toolset, the two pilot sites will be supported by the installation of stationary battery energy storage systems. The residential site installation will total approximately 57 kWh NiMH battery capacity, while the commercial site installation will total roughly 114 kWh NiMH battery capacity, together with 33 kW and 66 kW bidirectional converters respectively. The installation of the battery energy storage systems is aimed at improving the two building's local energy and power balancing capabilities in order to achieve self-sufficiency optimisation and optimisation based on various power tariff schemes including LEM/LFM price signals. Moreover, the

installed battery systems will provide additional flexibility to achieve the proposed trading schemes within the Swedish frequency regulation ancillary markets via the PARITY developed VPP.

3.4.2 The users/participants

The residential site is made up of 48 apartments divided as follows: 12 four room apartments, 24 three room apartments, 9 two room apartments and 3 studios. Approximately 100 residents live in these apartments and will benefit from the PARITY solution, making up the residential site pilot users. Below is a table summarising the demographics available for the 75 adults that have declared their address at the BRF Kalkbrottet building complex.

Table 11. Demographic information for the Swedish residential pilot site participants.

Age range	Identify as Male	Identify as Female
Unspecified	9	12
18 – 29	1	6
30 – 39	4	6
40 – 49	9	10
50 – 59	8	7
60 – 69	2	1

In addition to the pilot participants, the following stakeholders will play an important role in the validation of the PARITY solution at the residential pilot site:

DSO – The grid is owned and operated by E.ON Energidistribution AB

Aggregator – The role of the aggregator will be fulfilled by CheckWatt AB

TSO – Svenska kraftnät, as the TSO, is responsible for the maintenance and development of the Swedish national grid for electricity

BRP – The balance responsible party with the authorisation and responsibility to place bids on the ancillary frequency regulation markets is E.ON Energilösningar AB

As mentioned above, the commercial pilot site is an office building that provides both shared and individual workspaces for the employees of Solar Supply Sweden AB (Solar Supply) and Energimontagegruppen AB (EMG). The total number of employees that make use of the office is 44, 8 of whom are Solar Supply employees and 36 of whom are hired by EMG. Exact demographic data is not available to be presented, but of the Solar Supply employees, approximately 5 identify as male and the remaining 3 identify as female. Furthermore, of the EMG employees, approximately 35 identify as male, while 1 identifies as female. We have estimated the average age of the employees, and therefore pilot users, to be 43 years for Solar Supply and 35 years for EMG. On average, in Sweden, the working week comprises of 40 hours excluding lunch breaks. We can therefore generalise to estimate that these employees are in the office from Monday to Friday from 8:00 to 17:00.

In addition to the employees that make up the commercial site user group, student groups will also be demonstrated the PARITY solution. Available showrooms and training facilities will be used for workshops to present the benefits of the PARITY solution and engage both employees and visiting students. We anticipate that approximately 10 – 15 school groups will be visiting the showroom and learning centre. Each school group will be made up of approximately 15 – 20 students in the 14 to 19-year-old age range. Through these workshops, the PARITY solutions will be taught, and the value of this innovation imparted on future generations.

In addition to the pilot participants, the following stakeholders will play an important role in the validation of the PARITY solution at the commercial pilot site:

DSO – The grid is owned and operated by Karlshamn Energi AB

Aggregator – The role of the aggregator will be fulfilled by CheckWatt AB

TSO – Svenska kraftnät, as the TSO, is responsible for the maintenance and development of the Swedish national grid for electricity

BRP – The balance responsible party with the authorisation and responsibility to place bids on the ancillary frequency regulation markets is E.ON Energilösningar AB

Property Owner – Since the building is leased by the two companies, the property owner will be included in all major decisions pertaining to installation and commissioning of hardware on his premises

The Swedish building complexes are the perfect candidates to validate and demonstrate the PARITY framework, especially aspects related to building self-sufficiency and PV self-consumption, the local energy market formulation by utilising the existing local generation and storage and demand flexibility from the pilot users. The Swedish pilot sites also provide a unique opportunity to promote the PARITY solution and allow the implementation of the human-centric aspect of the PARITY project.

4. REPORT OF PARITY COMMUNITY ENGAGEMENT ACTIVITIES

4.1 Initial mapping of end-user needs & requirements

The first attempt during the project duration to engage with potential end-users of the technologies to be developed was under task 3.1 “Elicitation and analysis of business/use cases and requirements for the PARITY tool suite”. Subsequently a comprehensive study was made by which identified needs of targeted end-users and their main requirements and functionalities for the PARITY solutions.

However, as the PARITY pilot sites where not yet finalized and the actual PARITY User Group could not yet be identified, a 3-step approach was implemented: (i) information extracted by previous projects and partners’ experience, (ii) Participatory process with targeted end-users: building users surveys and tool users’ interviews, and (iii) internal (Project consortium partners) and external stakeholders’ discussion groups.

The first information source for the PARITY main requirement elicitation focused on the previous project partners’ experiences. For this purpose, demo leaders and the main technical partners contributed with knowhow and experiences acquired in previous projects related to demand response management and the main objectives of the PARITY project.

As a second step, an, a participatory process was proposed with the aim to engage and gather feedback from different internal and external PARITY stakeholders. Surveys were designed to extract information from flexibility providers involved in the project such as residential customers, tertiary building users and building managers. Besides, a number of interviews were conducted with flexibility users and traders such as aggregators and DSOs both involved with the pilot sites and external to the project. These interviews and surveys have been the main information source to set users’ needs, requirements, and functionalities for the PARITY tool suite.

At this point of the project, the pilot sites along with the linked users as physical persons have been finalized and engagement with them will be targeted and recurring to achieve the set goals.

4.2 Engagement activities during initial hardware infrastructure deployment & integration in pilot sites

Once the PARITY pilot sites, together with the PARITY User Group, were identified, next step was the planning and installation of the foreseen equipment. During this phase, appropriate interactions have taken place and will continue to take place until all equipment is installed and running. This section reports on pilot participant engagement activities that took place or are scheduled to take place under T8.3.

4.2.1 General material prepared for all pilot sites

4.2.1.1 PARITY project presentation

A general presentation of PARITY for pilot users was created to be used at the workshops in all pilot sites. Apart from generic information about the project, such as the vision, concept, impact, and website/social media addresses, various other practical topics are included. These are the following:

- List of prosumer's benefits
- Prosumer applications to be used, describing the main functionalities of each application along with screenshots
- Information about participation in pilot testing (e.g., use of software tools, participation in workshops, evaluation)
- Characteristics of the equipment to be installed at prosumers' premises for communication, monitoring and control
- Data protection measures and user rights in compliance with GDPR, as well as list of data to be collected and processed

Key points of the presentation are available in the present document in ANNEX B: PARITY PROJECT PRESENTATION FOR PILOT USERS.

4.2.1.2 Informed consent form

A template document of the PARITY informed consent form was created. The form has to be filled appropriately and signed by each pilot participant who is willing to participate in the study. The informed consent form is composed of two parts. The first part provides information to the participant about the study and the piloting phase. In particular, the following sections are included:

- Purpose of the study
- Participant's involvement
- Time required for participation
- Benefits
- Confidentiality
- Voluntary participation
- Contact information

The second part is the voluntary participation form, which contains the fields that must be filled by the participant: Participant's information, study information, a short list of statements that must be confirmed by the participant, and placeholders for date and signature. The informed consent form will be translated to the local language of each pilot. The form is available in ANNEX C: PILOT PARTICIPANT INFORMED CONSENT FORM.

4.2.2 Luggagia innovation community, Switzerland

4.2.2.1 Actions Implemented

Auditing and citizen engagement

End-user recruitment and available infrastructure auditing are two essential steps toward the demonstration phases of PARITY.

To this end, AEM defined an engagement strategy based on two steps:

1. PARITY Workshop
   As a first step, AEM organized a workshop with all potential end-users to introduce the PARITY project and promote its goals and benefits. All questions and concerns were addressed, and awareness of the energy transition was largely raised.
2. One-to-one meetings and auditing
   As a second step, AEM staff conducted one-to-one meetings with all potential end-users of the pilot sites. The purpose of these meetings was to answer additional questions, gain end-user buy-in for the project, and audit all homes in terms of available infrastructure (spaces, flexibility, DERs).

This approach led to the recruitment and audit results presented in the previous chapter.

4.2.3 BFS facilities, Greece

The engagement of pilot participants is considered of crucial importance for the successful implementation of the pilot testing as it is based on two main pillars. Firstly, it will help and support the residents understand the project technologies, their importance, their main features and the advantages of their use. From the other hand, this recruitment will also be important from the project perspective, as it will provide constant feedback on the workability, importance, benefits, and disadvantages of the technologies, directly from real end-users. This procedure lies in the heart of the user centric design approach that project have adopted and will provide the ability to adopt the PARITY toolkit to be more end-user friendly.

4.2.3.1 Actions Implemented

During the first period of the project the pilot sites were selected according to the procedure described in section 3.3.1. During this selection procedure, for the residential pilots, the building users were informed remotely about the project technologies to confirm which of them will agree to participate. This session was done online with each residential building user due to the restrictions because of the outbreak of COVID-19 health crisis. In order to achieve the best results, one on one teleconferences were organized on time slots that were convenient for the end-users. The sessions included a presentation of the project prepared in advance, which analysed the project benefits, the equipment to be installed and the obligations that the end-users would have upon agreeing to participate. After the presentation, a 15-minute slot for open discussion was foreseen, to answer any questions and provide clarifications. Then, for the end-users that agreed to participate, an on-site audit was arranged to map the pilot site

characteristics (under task 3.2) and answer any additional questions of the end-users. During this audit, both the pilot building and the demographics of the end-users were mapped.

Following this procedure, and after the finalization of the exact houses that will be used as residential pilots, the demo responsible partner was in constant communication with the building users, to keep them informed about the project progress and provide more details about the project technologies. Moreover, in the summer of 2021 during the Bill of Materials (BoM) creation for each pilot sites, the end-users were constantly engaged and participating in a feedback loop, giving extra information for the already installed equipment in their houses, where needed, and providing their preferences and comments regarding the proposed by the project equipment to be installed.

For the commercial pilots, a visit was arranged on each building, targeting mainly to map the characteristics of the installed equipment and inform the building permanent users about the project technologies, the benefits that the users will have and what will be needed from them. In this case also, a presentation was prepared in advance, to inform the users more effectively.

4.2.3.2 Actions foreseen

Following the user-centric design approach of the project, it is anticipated that the end-users will be constantly engaged in the project and participate in the live feedback loop of the project living lab activities.

To that end, a series of actions is foreseen to be implemented as follows:

- **First round of living lab workshops**. A first round of workshops will be organized by the pilot responsible partner right after the finalization of the installations. This workshop will be held online and include at least one participant for each pilot building for the residential sites and all the end-users of the commercial sites. The scope of this workshop will be to train the end-users on the project technologies and how to use them and receive their initial feedback and comments regarding the equipment.
- **Constant communication with end-users.** A designated employee of the pilot site responsible will be available to answer to any questions of the end-users and provide clarifications. In parallel the end-users will receive communication by BFS in regular intervals, to receive their feedback and comments regarding the project technologies.
- **Final round of living lab workshops.** A second round of workshops will be organized by the pilot responsible partner closer to the end of the project. The main goal of this workshop will be to receive feedback from the end-users regarding the technologies of the project that they will have tested for more than a year. Again, the workshop will be held online and include at least one participant for each pilot building for the residential sites and all the end-users of the commercial sites.

Finally, under the living lab umbrella more actions might be proposed or come up during the project implementation, in order to receive the end-users' comments and apply the user centric design more effectively.

4.2.4 South Sweden facilities, Sweden

Some of the pilot participant engagement activities have already been carried out and a number are planned to take place. E.ON has taken the responsibility to inform the relevant actors in both the residential and commercial pilots with as much information as possible verbally and in writing before signing pilot site agreements during February and March 2021. Accessibility of the sites to carry out the installation is deemed to be good.

The installation time plan is only preliminary and is communicated with the pilot site users on an ongoing basis. As of October 2021, the expected dates for the start of installation are 15 November 2021 for the commercial site and 29 November 2021 for the residential site. We expect that each installation will take approximately 2 – 4 weeks initially. It is foreseen that ensuring correct ventilation could require additional improvements. We therefore plan to monitor the ambient conditions in the battery room for an extended period of time in order to make a well-informed decision about the quality of ventilation required.

The biggest concerns that we have discussed with the pilot site users has been around the safety regarding large stationary battery storage installations. We have been proactive in obtaining fire safety documentation and recommendations from an external third-party consultant service. Furthermore, we are constantly updating our knowledge on regulations and insurance of battery storage to ensure we provide installations with correct fire safety and ventilation.

Due to the complicated nature of stationary storage equipment, we will not allow pilot site users control of the batteries. Rather, CheckWatt will be responsible for remote control of the installed EMS which comprise all regular operational control, and an E.ON certified electrician will take care of any potential physical intervention in the system.

4.2.4.1 Actions Implemented

Residential site:

To facilitate infrastructure deployment, several visits to the pilot sites where done on multiple occasions to assess the space provided for the stationary battery installations in terms of fire safety, ventilation, electrical installation, and general placement of hardware. During these visits meetings and discussions took place with 4 members of the housing association board about the project and upcoming installations These members will be among the pilot site users.

To make sure the appropriate people would be notified to open their spaces for the necessary equipment installation, communication via telephone and email was established with the 4 members of the housing association which have been assigned as the main contact points.

Similarly the communication with the pilot site users, general residents of BRF Kalkbrottet, has been facilitated via their selected representative board. The board members have already been informed of what will be installed via communication with the chairperson. In addition, a pilot site agreement has already been signed by multiple members of the board, as well as a representative of E.ON. We do not take responsibility for the communication between the board members and the remainder of the residents.

Commercial site:

Multiple visits took place at the pilot site on multiple occasions to assess the location in which the batteries will be installed as well as to plan the electrical installation. By working together with the employees which make use of the office space, as well as the property owner, we have begun planning the construction of a battery safe room with correct fireproofing and ventilation. Necessary communication has been implemented via telephone and email with the employees making use of the Office space as well as the property owner. Since the two companies which occupy the premises at the commercial pilot site are daughter companies of E.ON, the communication with the pilot site users has already been facilitated at team meetings during the course of 2021. Additionally, the property owner has also already been informed about the equipment which is to be installed and a pilot site agreement has been signed by both E.ON and himself.

4.2.4.2 Actions foreseen

Residential site:

Regarding the planned interactions with pilot actors/users to facilitate infrastructure deployment, these are:

- Additional meetings with the 4 members of the housing association board are foreseen during the installation phase.
- Furthermore, a workshop/ information session is planned to take place in the conference venue adjacent to the residential buildings in January 2022. All persons living at BRF Kalkbrottet, and therefore all pilot site users, will be invited to attend. At this workshop/information session we aim to present the PARITY solution as well as details pertaining to the hardware installed in their premises, as well as use cases and benefits which will result from the full-scale PARITY pilot validation.

Relevant people be notified to open their places via:

- Communication via telephone and email with the 4 members of the housing association which have been assigned as our contact point.
- There is a possibility that the E.ON employee assigned as PARITY pilot site commissioner could sign for keys and have access to the battery installation room.

Commercial site:

Regarding the planned interactions with pilot actors/users to facilitate infrastructure deployment, these are:

- collaboration with employees which make use of the office space as well as the property owner to ensure that they are part of the stationary storage installation process.
- Organizations of a workshop/ information session is planned to take place in the conference facility of the building at the start of 2022. All persons working at the office building, and therefore all pilot site users, will be invited to attend. At this workshop/information session we aim to present the PARITY solution as well as details pertaining to the hardware installed in their premises, as well as use cases and benefits which will result from the full-scale PARITY pilot validation.

4.3 ENGAGEMENT ACTIVITIES DURING PRE-VALIDATION TASKS

Pre-validation tasks and activities, constitute the first opportunity to engage with pilot users in the co-creation framework foreseen under the PARITY User Driven Innovation approach. Through the co-creation activities that the Living Lab methodology has outlined, scope is to gather actual user feedback for the under-development technologies.

Based on the project planning so far, as well as the partner discussions within the WP8 monthly progress meetings, the first opportunity for such co-creation interactions will arise once the Small-scale testing activities foreseen under T8.4 have run and pilot participants have used certain of the PARITY early prototypes long enough to be in a position to provide feedback that can be used to improve the under-development technologies.

In the above explained framework, certain preparatory engagement activities will be implemented in order to prepare small scale users for the deployment of the technologies at their spaces. These may include virtual of physical presentations of what is planned to happen in user spaces, what is needed/expected by them, what is the scope of the PARITY project etc.

After the small-scale tests have been fully deployed, the first round of Living Lab workshops will be implemented (1 per pilot site) and user feedback will be gathered. This will be done by questionnaires and/or interviews with the users. The content of the feedback gathering material will be chosen by the technology developing partners to best understand user experience and subsequently implement changes in their tools. A template of the questionnaire for preliminary solution evaluation is provided in ANNEX A.

As pre-validation activities are still in a preparatory stage, we provide in this section an overview of the planned steps towards their implementation.

4.3.1 Pre-validation activities

The second phase of the pre-validation activities[6] foreseen under Task 8.4 includes the deployment of necessary, off-the-shelf infrastructure and the initial version of some of PARITY's solutions at the premises of a small pool of participating customers in Switzerland and Spain.

The purpose of the small-scale deployment and test activities of the PARITY solutions is twofold. On the one hand, it will help identify - early in the process - possible solution bugs and glitches and fix them before proceeding to the full-scale deployment, as well as minimise any system integration and interoperability risks, normally arising during the demonstration phase of a project. On the other hand, through engagement activities with the participants of the small-scale trials (such as the living lab activities), valuable feedback will be gathered with regards to the PARITY solution installation and commissioning process, as well as the solution itself. This will possibly allow for improving the former

[6] The first phase of the pre-validation activities includes the testing of the PARITY solution under a controlled environment. More specifically, the deployment and testing of the PARITY solution at available test bed facilities in Greece: i) the nZEB – DIH test bed of CERTH, an unoccupied smart home, and ii) the Hypertech office premises.

process in time for the full-scale deployment and also for implementing key solution improvements before the release of the final versions of the PARITY toolset.

Therefore, based on the aforementioned and under the framework of the small-scale test activities carried out within the PARITY project, opportunities for engagement with end-users of the PARITY solution will include:

- During the installation and commissioning process of the PARITY project: Participating customers will be engaged in order to be informed of the activities that will be carried out for installing and commissioning the PARITY solution and the type of equipment that will need to be deployed at their premises. Consent will be sought for gaining access to the customer premises for carrying out the aforementioned activities.
- Throughout the small-scale trials, end-users can voluntarily share their feedback with the pilot partners of the PARITY project. The end-users can also seek support and guidance from the aforementioned partners should any problems arise.
- Prior to the full-scale deployment of the PARITY solution, feedback from the end-users engaged in the small-scale trials will be actively sought. The feedback should cover the whole user experience to date, i.e., the auditing process prior to the deployment of the project's solution, the installation and commissioning of the PARITY solution at the end-user premises, and the experience gained from the day-to-day use of the PARITY toolset. Emphasis will be given on reports of key issues raised at any point of the aforementioned user journey in order to improve it or specific problems faced by the user with regards to the toolset deployed and tested at their premises. User feedback will be used for refining the process that will be followed during the full-scale solution deployment and improving the PARITY toolset.

4.3.2 Engagement actions foreseen for Luggagia innovation community, Switzerland

For the small-scale (pre-validation) demonstration, a reduced pool of end-users was selected: 2 users having electric boilers, 1 user having a heat pump, and the municipality hall with all the available HVAC systems. This small-scale demonstration serves to test the developed technologies in real-world conditions and in a more controlled environment, in order to ensure reliability and scalability of the PARITY solution. These users have already been contacted by AEM and the project goals as well as trial expectations have been discussed. The following technical requirements have been assessed and, where possible, pre-tested:

- internet connectivity options
- gateway compatibility
- heat pump cloud connectivity (service subscription)
- interfaces with Hive Power hardware infrastructure
- HVAC IR connectivity and compatibility

The Billing of Material (BoMs) for the small-scale tests have been prepared and finalized by Hypertech, and the technical installation and commissioning workshop has been conducted. Next, equipment installation and commissioning will follow, following the steps below:

- Procure equipment as detailed in the BoMs

- Contact end-users (preferably by phone call) to
    - Provide high-level information on dedicated PARITY solution and required equipment
    - Set up a date and time for the installation and commissioning
- Single pilot site visits with end-users, with the aim of
    - Providing more detailed information on equipment that will be installed
    - Providing information on the specific and dedicated PARITY solution
    - Distributing available material on project scope (e.g., leaflet) and, where necessary, equipment manuals
    - Installing and commissioning the PARITY solution
- Feedback collection from end-users
    - Organization of Living Lab workshops with end-users
    - Collection of user feedback on solution user-friendliness, features, bugs, etc. at (to be) defined time periods through on-site visits and/or questionnaires
    - Users will have the possibility to contact AEM at any time in case of malfunctioning

AEM's goal is to have a single user visit to present the PARITY framework and to commission the required infrastructure. The persons involved during this process are the pilot director, the pilot commissioner, the end-user and, if necessary, Hypertech support personnel (online). The exact timeline will however depend on users' availability.

Full-scale demonstration

The users participating in the full-scale PARITY demonstration have been also defined. The BoMs are prepared, and equipment installation and commissioning will follow afterwards. The next steps are the same as for the small-scale deployment.

5. CONCLUSIONS

In this first version of the deliverable, an overview of the PARITY pilots was presented along with the involved pilot site users/participants that the project shall be engaging from now on to achieve the best possible adaptation of the PARITY tools under development to their needs and expectations. Pilot site characteristics in Spain, Switzerland, Sweden and Greece were presented in detail and were linked with demographic data about the involved physical users.

So far the relevant engagement activities that have taken place are limited due to the fact that changes had to be made to three of the four pilot sites mainly due to the ongoing health crisis, and their finalization had been delayed. Once finalized, the implemented engagement activities revolved mostly around onboarding of the users and familiarization with the project and its more specific goals. Currently hardware installation in the pilot sites is under way and once this phase concludes, users shall begin engaging with the project technologies and procedures. Once this phase has run for an adequate time, following the user driven innovation approach principals, more targeted engagement shall take place with the scope to gather end-user feedback for improving the developed technologies. Among these actions, the Living Lab workshops foreseen and described in D9.1 shall take place. All the detailed engagement activities to be implemented in the coming months of the project shall be reported in detail in the second version of the present deliverable due at the end of the project (M42).

6. REFERENCES

[1] O. of Electricity, "Demand Response." https://www.energy.gov/oe/activities/technology-development/grid-modernization-and-smart-grid/demand-response.

[2] B. Zancanella, P., Bertoldi, P. and Kiss, "Demand response status in EU Member States," *Publ. Off. Eur. Union*, vol. EUR 27998, 2016, doi: 0.2790/962868.

[3] "TOPIC ID: LC-SC3-EC-3-2020, Consumer engagement and demand response, Funding & tender opportunities." https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/lc-sc3-ec-3-2020.

[4] H. P. Bridge, "H2020 BRIDGE Project Working Groups: Consumer and Citizen engagement." .

[5] "Exploration of citizen engagement methodologies in European R&I projects, Consumer & Citizen Engagement Working Group, H2020 BRIDGE." [Online]. Available: https://ec.europa.eu/energy/sites/default/files/documents/bridge_wg_consumer_and_citizen_engagement_report_2020-2021.pdf.

[6] S. Parrish, B., Heptonstall, P., Gross, R., "A systematic review of motivations, enablers and barriers for consumer engagement with residential demand response," *Energy Policy*, vol. 138, no. 111221, 2020.

[7] C. C. DiClemente, "Conceptual models and applied research: The ongoing contribution of the transtheoretical model.," *J. Addict. Nurs.*, vol. 16, no. (1-2), pp. 5–12, 2005.

[8] E. M. He, H. A., Greenberg, S., & Huang, "One size does not fit all: applying the transtheoretical model to energy feedback technology design.," in *SIGCHI conference on human factors in computing systems*, 2010, pp. 927–936.

[9] "Customer engagement techniques, UX Collective." https://uxdesign.cc/customer-engagement-techniques-37c791b8f20c.

[10] Parrish, B., Gross, R., Heptonstall, P., "On demand: can demand response live up to expectations in managing electricity systems? .," *Energy Res. Soc.*, vol. 51, pp. 107–118, 2019, doi: https://doi.org/10.1016/J.ERSS.2018.11.018.

[11] Project PARITY, "D4.1 "Analysis of obstacles to Innovation under current & future regulatory & socio-economic context for LFM proliferation"."

7. ANNEX A: QUESTIONNAIRE FOR PRELIMINARY SOLUTION EVALUATION

QUESTIONNAIRE FOR PRELIMINARY SOLUTION EVALUATION

Pro-sumer AwaRe, Transactive Markets for Valorization of Distributed flexibilITY enabled by Smart Energy Contracts

This project has received funding from the European Union's Horizon 2020 Research and innovation programme under Grant Agreement: 846319

1. General information

Name of the pilot site	
Representative of the pilot	
Involved PARITY solution(s)	
Involved PARITY partners	
Date	

2. Participant's information

Name or Reference Id	
Age	☐ 18-24 ☐ 25-39 ☐ 40-59 ☐ 60 plus
Gender	☐ male ☐ female ☐ do not want to answer
Role	☐ prosumer ☐ DSO ☐ market operator ☐ other

3. Multiple choice statements

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
	1	2	3	4	5
1. Using the solution would improve my performance in doing my job.	☐	☐	☐	☐	☐
2. Using the solution would improve my productivity.	☐	☐	☐	☐	☐

3. Using the solution would enhance my effectiveness in my job.	☐	☐	☐	☐	☐
4. I would find the solution useful.	☐	☐	☐	☐	☐
5. Learning to operate the solution would be easy for me.	☐	☐	☐	☐	☐
6. I would find it easy to get the solution do what I want it to do.	☐	☐	☐	☐	☐
7. It would be easy for me to become skilful in the use of the solution.	☐	☐	☐	☐	☐
8. I would find the solution easy to use.	☐	☐	☐	☐	☐
9. I presently intend to use the solution regularly.	☐	☐	☐	☐	☐
10. The functionalities of the solution are clear to understand.	☐	☐	☐	☐	☐
11. I had the information and guidance required before using the solution.	☐	☐	☐	☐	☐
12. The solution provides adequate information to the user.	☐	☐	☐	☐	☐
13. The solution provides the configuration options that I need.	☐	☐	☐	☐	☐
14. The usage of the solution respects my privacy.	☐	☐	☐	☐	☐
15. The solution can increase my motivation to participate in energy transactions.	☐	☐	☐	☐	☐
FUNCTIONALITIES					
16. Functionality [X] that is provided by the solution is useful.	☐	☐	☐	☐	☐
17. Functionality [Y] that is provided by the solution is useful.	☐	☐	☐	☐	☐

4. Open-ended questions

4.1 Do you have to propose any new functionality to add that you think would be useful?

_____

_____

_____

_____

4.2 Do you have any other suggestion(s) for improving the solution?

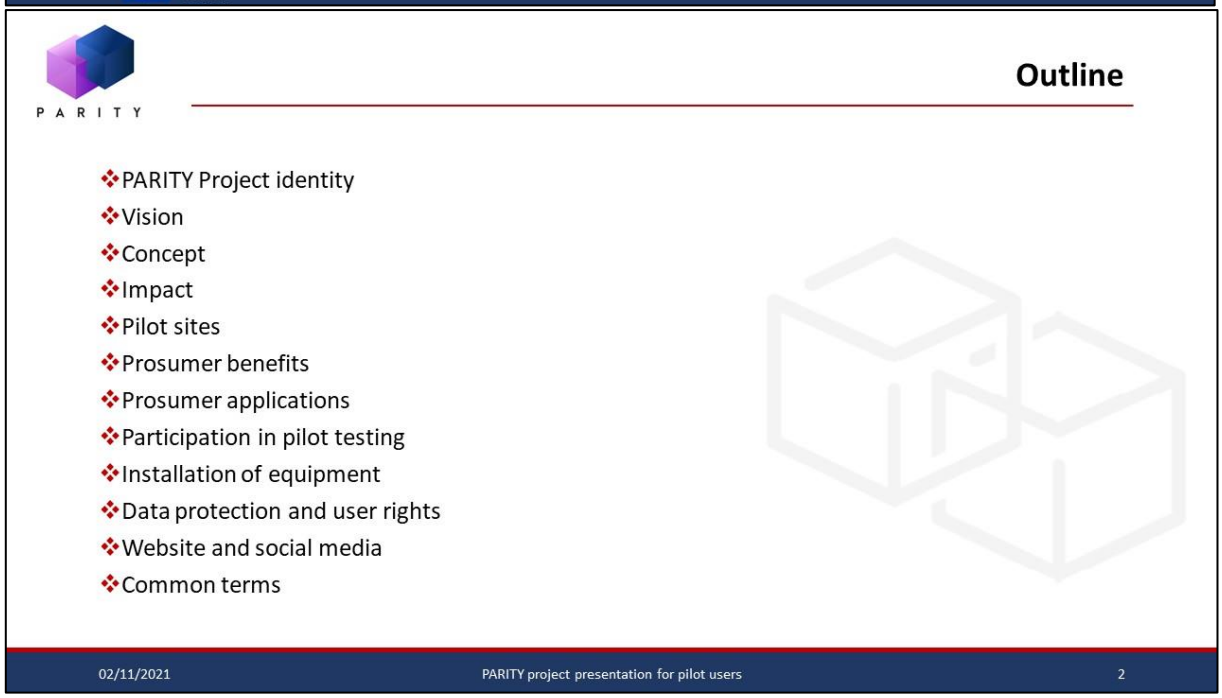
_____

_____

_____

_____

8. ANNEX B: PARITY PROJECT PRESENTATION FOR PILOT USERS

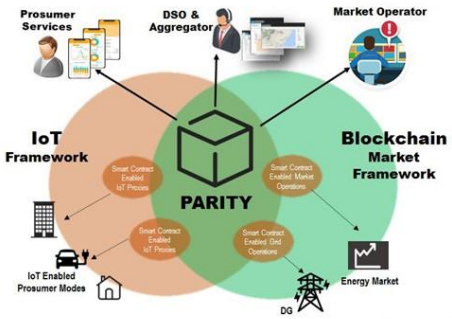


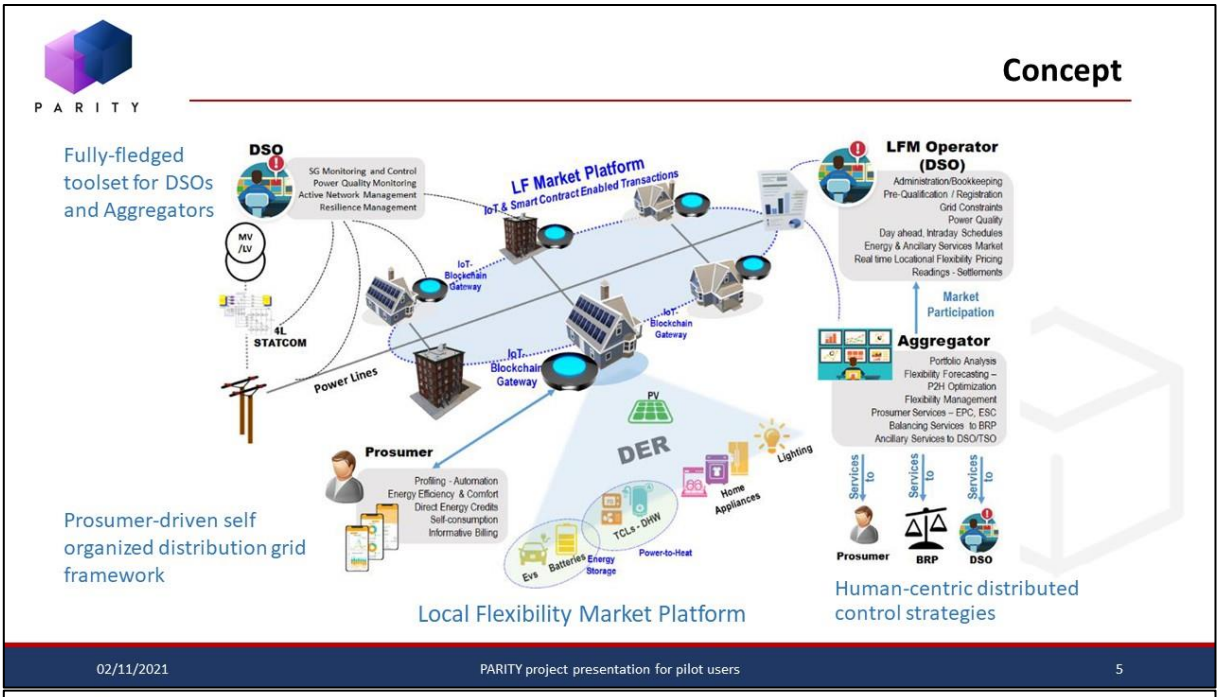
PARITY Project identity

- **17** Partners from **7** countries
- Project duration:
  42 months (10/2019 – 03/2023)

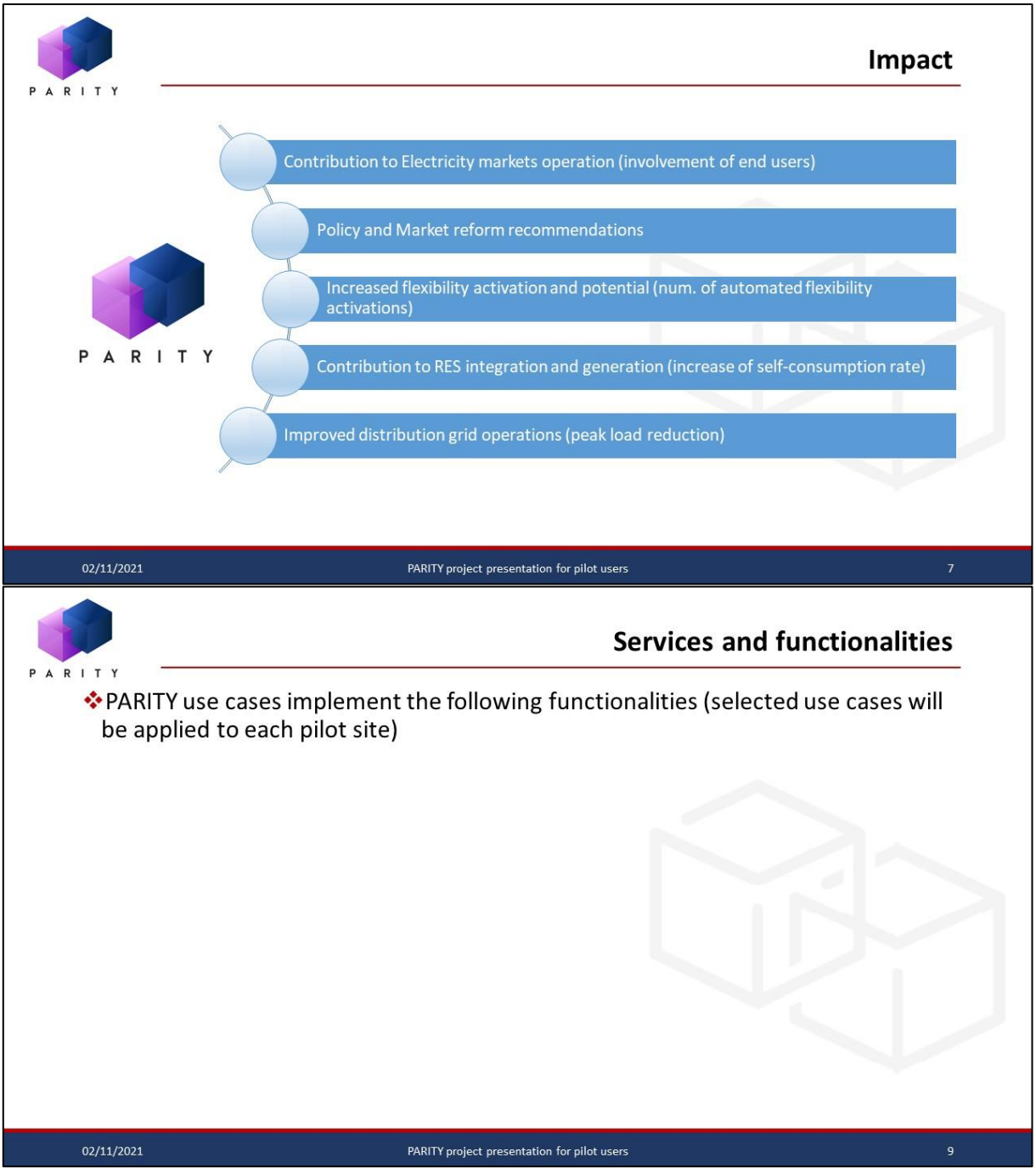
Vision

- PARITY **aims to enable the set-up and operation of local flexibility markets at the distribution network level** via the following **technology solutions**:
  - A **smart contract enabled, blockchain based local flexibility market platform (LFM)**
  - **IoT enabled DER Flexibility management tools**
  - **Smart Grid monitoring and management** tools to enable the **DSO** to optimally manage the **low voltage distribution network**
- Additional topics:
  - **Investigation of market coupling mechanisms**
  - **Definition of Local Flexibility Market actors**
  - **Innovative retail energy commercial arrangements** and **contracts**
  - **Policy reform recommendations**




PARITY
Concept
Fully-fledged toolset for DSOs and Aggregators
DSO
SG Monitoring and Control
Power Quality Monitoring
Active Network Management
Resilience Management
LF Market Platform
IoT & Smart Contract Enabled Transactions
LFM Operator (DSO)
Administration/Bookkeeping
Pre-Qualification / Registration
Grid Constraints
Power Quality
Day ahead, Intraday Schedules
Energy & Ancillary Services Market
Real time Locational Flexibility Pricing
Readings - Settlements
Market Participation
Aggregator
Portfolio Analysis
Flexibility Forecasting – P2H Optimization
Flexibility Management
Prosumer Services – EPC, ESC
Balancing Services to BRP
Ancillary Services to DSO/TSO
MV /LV
4L STATCOM
Power Lines
IoT-Blockchain Gateway
Prosumer
Profiling - Automation
Energy Efficiency & Comfort
Direct Energy Credits
Self-consumption
Informative Billing
PV
DER
Lighting
Home Appliances
TCLs - DHW
Power-to-Heat
Evs
Batteries
Energy Storage
Services to
Prosumer
BRP
DSO
Prosumer-driven self organized distribution grid framework
Local Flexibility Market Platform
Human-centric distributed control strategies
02/11/2021
PARITY project presentation for pilot users
5


PARITY
Concept
PARITY CONCEPT
IoT-enabled tools allow to accurately estimate and manage the available flexibility
Prosumer-driven self organized distribution grid framework
Human-centric distributed control strategies
Local Flexibility Market Platform
IoT & smart contract-enabled transactions
Fully-fledged toolset for DSOs and Aggregators
- Enhanced grid monitoring
- Active network management
- Flexibility forecasting and control
02/11/2021
PARITY project presentation for pilot users
6


Impact
Contribution to Electricity markets operation (involvement of end users)
Policy and Market reform recommendations
Increased flexibility activation and potential (num. of automated flexibility activations)
Contribution to RES integration and generation (increase of self-consumption rate)
Improved distribution grid operations (peak load reduction)
02/11/2021
PARITY project presentation for pilot users
7
Services and functionalities
PARITY use cases implement the following functionalities (selected use cases will be applied to each pilot site)
02/11/2021
PARITY project presentation for pilot users
9

Prosumer benefits

- Participation in P2P energy transactions in an automated way
- Utilisation of all types of available assets (stationary battery, PV, EVs etc.)
  - BaaB concept
  - Power to Heat (P2H)
- Selling flexibility to DSO when needed for solving grid network problems
- Flexibility trading to Ancillary / Wholesale markets through the Aggregator
- Exploitation of EV flexibility (if available) and optimisation of EV charging by respecting driver's preferences
- Reduced electricity cost
- Increased self-consumption
- Financial benefits from flexibility exploitation and trading

02/11/2021 PARITY project presentation for pilot users 10

Prosumer applications

- Prosumer applications are web-based and are designed with data privacy and security in mind. They include:
  - BaaB App module
    - Monitoring of personal profiling data (energy consumption, comfort)
    - Perform control actions remotely
  - EV module
    - EV usage patterns
    - EV charging status / schedule
    - EV charging stations status
    - User preferences
  - Smart marketplace module
    - Information about energy transactions, amount of the earned flexible credits, active SLAs

02/11/2021 PARITY project presentation for pilot users 11

Participation in pilot testing

- Installation of equipment at prosumers' premises
- Participants will make use of prosumer applications (software tools)
- Data collection and processing
- Data protection measures and user rights
- Participation in 2 workshops
  - 1st during the development phase
  - 2nd at the end of pilot testing (final evaluation)
- Users will provide their feedback via questionnaires and surveys
  - on how the presented applications can be improved
  - to evaluate the final versions of the applications on multiple aspects

02/11/2021 PARITY project presentation for pilot users 18

Installation of equipment

- Only necessary equipment will be installed in an unobtrusive way
  - IoT Gateway
  - Energy meters
  - Sensors
  - Controllers / Actuators

02/11/2021 PARITY project presentation for pilot users 19

Data protection and user rights

- Data protection is a very important issue and refers to data privacy and data security
- PARITY Ethical Advisory Board (EAB) has been established. Its role is to:
  - provide ongoing support concerning ethical and legal issues, including support on privacy issues related to data collection in pilot sites
  - provide guidelines and recommendations to project partners, as well as to end users in the pilot sites
  - monitor and oversee the pilots, validation and evaluation of PARITY results in terms of ethics, security and privacy requirements
  - warrant that all technical activities, trials, data management and data processing will be carried out in an ethical way that respects privacy and regulatory constraints
- Compliance with **GDPR**: General Data Protection Regulation is a legal framework that sets guidelines for the collection and processing of personal information from individuals

02/11/2021 PARITY project presentation for pilot users 26

Data protection and user rights

- PARITY project will collect and store personal data only if it is absolutely necessary for achieving the project aim and will whenever possible process anonymized personal data only
- Data Sources / Types
  - measurements from smart meters and other IoT devices and sensors
  - energy consumption and generation monitoring data
  - forecasted energy flexibility data
  - transactions of prosumers in the local flexibility market based on smart energy contracts
  - responses of participants to surveys and questionnaires
- Measures on data privacy and security have been implemented
  - Authorized access
  - Anonymization
  - Use of secure communication protocols

02/11/2021 PARITY project presentation for pilot users 27

Data protection and user rights

- All participants will be informed and given the opportunity to provide their consent to any monitoring and data acquisition process

- Participants will receive in their own language in conformity with the GDPR:
  - A commonly understandable written description of the project and its goals
  - The planned project progress and the related testing and evaluation procedures
  - Advice on unrestricted disclaimer rights on their agreement

- The participants' consent will be obtained through a two-stage procedure:
  1. Oral description of the pilot in which people will be involved and will also carefully describe the level of privacy infringement that the pilot involves
  2. Participants will be required to read and sign an informed consent form that will explain what the experiment leader has already orally explained

02/11/2021 PARITY project presentation for pilot users 28

Data protection and user rights

- Confidentiality: the personal data of all participants that will be recruited through informed consents
  - will be never revealed in any document
  - will be completely pseudo-anonymised
  - will be erased after the completion of the project

- Personal data will be pseudo-anonymised, in a way that will not affect the final project outcome

- Pseudo-anonymization process: the personal data will be transformed to encrypted personal data and will **not** contain any of the following
  - Name, address, posts on social networking websites, phone/fax. number(s), e-mail address, full postcode
  - Any identifying reference numbers
  - Photograph or names of relatives
  - Medical information
  - Bank details
  - Computer IP addresses

02/11/2021 PARITY project presentation for pilot users 29

Data protection and user rights

- Important user rights under the GDPR
  - **The Right to Information**: Participants can ask what kind of data are collected and why they are needed
  - **The Right of Access**: Participants have the right to request and receive all the information collected about them
  - **The Right to Rectification**: Participants have the right to change or modify the data they provide when they believe the data is inaccurate or out-of-date
  - **The Right to Erasure**: Participants have the right to ask a data controller to erase their data without undue delay in certain circumstances
  - **The Right to Restriction of Processing**: Participants have the right to request the restriction of processing their data under certain conditions
  - **The Right to Object**: Participants have the right to object to data processing, including profiling, when it is on relevant grounds

02/11/2021 PARITY project presentation for pilot users 30

Website and social media

- The project web site: https://parity-h2020.eu/

02/11/2021 PARITY project presentation for pilot users 31

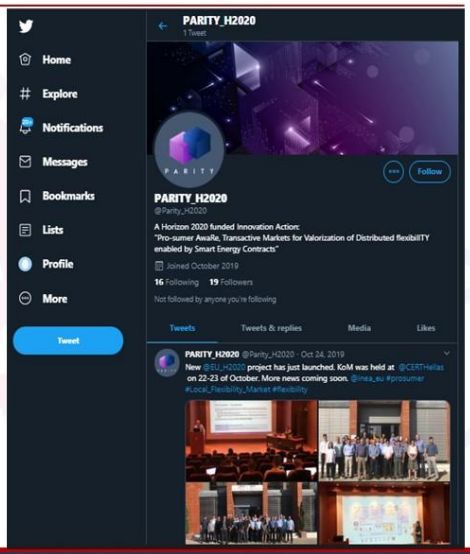
PARITY

Website and social media

❖The social media accounts:

Social Network	PARITY account	PARITY account URL
	PARITY_H2020	https://twitter.com/Parity_H2020
	PARITY_H2020	www.linkedin.com/company/parity-h2020
	PARITY	https://www.facebook.com/PARITYH2020/
	PARITY_H2020	https://www.youtube.com/channel/UCX_VKEf_LA_uNJ2wp7OYQ

You can follow PARITY on social media to get latest news and updates!



PARITY

Pro-sumer AwaRe, Transactive Markets for Valorization of Distributed flexibilITY enabled by Smart Energy Contracts

Questions & Answers

This project has received funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under grant agreement no 864319.

9. ANNEX C: PILOT PARTICIPANT INFORMED CONSENT FORM

INFORMED CONSENT FORM

Pro-sumer AwaRe, Transactive Markets for Valorization of Distributed flexibilITY enabled by Smart Energy Contracts

This project has received funding from the European Union's Horizon 2020 Research and innovation programme under Grant Agreement: 846319

Purpose of the study

This document was created on behalf of the PARITY project (Grant Agreement N°: 846319), funded by the European Union under Horizon 2020, with the main objective to develop Local Flexibility Markets and Smart Energy Grids through peer-to-peer and decentralized intelligence in a human-centric manner.

PARITY addresses the "structural inertia" of Distribution Grids and aims to enable the set-up and operation of local flexibility markets at the distribution network level. The main objectives are to provide: (1) A DER flexibility ecosystem seamlessly integrating Heterogeneous DER within a Unified Flexibility Management Framework, (2) A Storage-as-a-Service framework which will combine Actual Storage (EVs and batteries) and Virtual Energy Storage (Power-to-Heat), (3) A Smart Contracts Enabled Local Flexibility Market Platform through integration of IoT and Blockchain technologies and (4) Smart Grid monitoring and management tools to enable the DSO to optimally manage the low voltage distribution network. Additionally, PARITY will investigate and contribute to market coupling mechanisms and the definition of Local Flexibility Market actors.

The solutions that have been developed will be deployed and evaluated in four different pilot sites located in Spain, Sweden, Switzerland, and Greece. Human participants are foreseen to take part in the project's pilot testing and evaluation activities. In this context, it is necessary to collect data concerning energy consumption/generation related information from residential and tertiary prosumers that will allow the validation and evaluation of the PARITY envisioned solutions. These are solutions for customers/prosumers, aggregators, DSOs, and other actors. Indicative examples of performance indicators are the amount of energy consumption reduction, increase in Renewable Energy Sources utilization, and peak load reduction. Moreover, part of the collected data will be processed manually or in automated way, in order to be used as input to algorithms. To this end, you are invited to give your consent to participate to the project's pilot testing activities, including to the data collection and monitoring of various parameters, such as energy consumption of the building and of specific assets of your infrastructure (i.e. PV generation, HVAC status monitoring etc.).

Within PARITY, different types of data will be collected, such as data from surveys and interviews involving participants, raw data from pilot sites' sensors and devices, data entered by the participants (such as preferences), and data generated from software components that are being developed within the project. PARITY will collect and store personal data only if it is absolutely necessary for achieving the

project aim. To ensure data quality, pre-processing and data cleaning methods will be applied to the data that are automatically collected from the devices and sensors. Regarding data minimization, only personal data actually needed for our purposes will be collected. Stored data will be reviewed periodically, in order to delete data that are no longer needed.

Participant's involvement

Prior to actual data collection and validation, the necessary equipment will be installed at your premises, such as an IoT Gateway, sensors, and actuators, based on available devices. The equipment will allow automatic collection of measurements in a secure way, as well as automated control of specific assets / Distributed Energy Resources, such as for example air conditioning. Moreover, you will be requested to make use of prosumer applications (software tools) during the testing period, after a demonstration of their functionalities. User guides will also be provided for your convenience. Lastly, your participation in workshops and in short surveys/questionnaires will be requested in order to provide your feedback on the system and its final evaluation.

Time required for participation

This study (PARITY project) ends at the end of March 2023. Participants are expected to be involved during the whole time period until that date.

Benefits

Benefits for the users/prosumers come from their participation in the Local Energy Market / Local Flexibility Market. Proper amount of earned tokens from automated flexibility trading to various parties, are added in the personal digital wallet. Additionally, reduced electricity cost and increased self-consumption of the community are expected due to the interventions by the system. Moreover, the system is designed to allow automated control of assets without a negative impact on your thermal and visual comfort.

Confidentiality

Collected information are to be kept confidential. Data privacy and security measures have been implemented on the systems that are utilised in the PARITY project. For example, data processing will be applied on anonymised data. The procedures for data access and data processing that will be followed are in accordance with rules of the General Data Protection Regulation (GDPR). Safe data sharing is foreseen by fully enforcing and protecting user rights. For the data that will be shared only among the consortium members, authorization and authentication mechanisms will be used in order to restrict access and ensure that only the appropriate users can retrieve the data. Selected not sensitive and anonymized data may be made publicly available for scientific purpose. Special category data, e.g. personal data revealing ethnic origin, political opinions, genetic data, data concerning health, or criminal offence data, as defined in the GDPR, are not relevant to the project and will not be collected.

Voluntary participation

Participation in this study is completely voluntary. There will not be any negative consequences if you decide not to participate. Please be notified that if you decide to participate, you may terminate your participation at any time and you may decide not to answer any specific question.

Contact information

In case of any questions about this project or problems you may face, feel free to contact

Contact person: _____ E-mail: _____

Address: _____

Voluntary Participation Form in the PARITY project

1. Participant's Information

Full name	
Reference code[7]	

2. Study Information

Country	
Infrastructure type	
Infrastructure address	
Representative of the pilot	

3. Participant's Questionnaire

I have read the PARITY project information sheet and I have been informed about the purpose, expected duration and procedures of the study.	**Yes**	**No**
I was orally informed about the purpose, expected duration and procedures of the study by the responsible person.	**Yes**	**No**
I was informed of my right to refuse to participate or to leave the study.	**Yes**	**No**
I was notified of the contact person, in the case I have questions and queries about the study or about my personal data being collected.	**Yes**	**No**
I was given a copy of my filled in consent form.	**Yes**	**No**
I had enough time to decide on my participation in the study.	**Yes**	**No**
I understand that I can leave the study at any time, without having to justify it and to require deleting my personal data.	**Yes**	**No**
I have been informed of the recording equipment that will be installed in my environment for the purposes of data collection.	**Yes**	**No**
I was informed about the storage procedures of the study data.	**Yes**	**No**
I was informed about the personal data that will be collected, the processors and the procedures that will take place, as well as my rights according to the General Data Protection Regulation. Publication of study results does not disclose personal data. Always according to the principles of confidentiality, I allow researchers involved in the study and signing respective NDAs can utilize the information for the purpose of the study and only for this.	**Yes**	**No**

[7] *To be filled later by PARITY project representative*

I agree to the use of the collected data also after the termination of the PARITY project.	**Yes**	**No**

By signing this form, I am attesting that I have read and understand the information that have been provided above and I freely give my consent to participate in the study.	**Yes**	**No**

Date Reviewed & Signed: _____ Signature: _____