

MARKET ENABLING INTERFACE TO UNLOCK FLEXIBILITY SOLUTIONS FOR COST-EFFECTIVE MANAGEMENT OF SMARTER DISTRIBUTION GRIDS

Deliverable: D11.3

Workshops/Training Sessions



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Document

D11.3 Workshops/Training Sessions

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Executive Summary

EUniversal Project will enable the transformation of the electricity grid by overcoming existing limitations in the use of flexibility by DSOs through the implementation of a Universal Market Enabling Interface (UMEI). Based on this transformative concept, grids will become capable of accommodating future scenarios through the active use of grid services, fostering innovative market mechanisms, and bring additional value to society.

Work Package 11 aims to: [1] Implement dissemination, communication and training strategies integrated within the Dissemination Plan. [2] Identify, design and carry out dissemination and communication activities during the project's lifecycle. [3] Create synergies among similar EU-funded projects through the BRIDGE initiative based on solid cooperation. [4] Increase social awareness and acceptance of EUniversal innovative solutions fostering an energy transition.

The main goal of task T11.3. Coordination with similar EU-funded projects through the BRIDGE initiative is to boost synergies among similar EU-funded projects through the BRIDGE initiative based on solid cooperation.

The aim will be to analyse together policy relevant issues and obstacles for novel initiatives in terms of regulation, business models, data management and consumer engagement in order to foster knowledge exchange and dissemination.

Throughout the project execution, EUniversal will provide outputs to the BRIDGE Working Groups. This cooperation will include at least 3 dedicated workshops with other BRIDGE initiatives in order to set the conclusion of the project results.

The main goal of deliverable D11.3 is to organize and promote a dedicated workshop with other BRIDGE initiatives in order to set the conclusion of the project results.



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1 Introduction

1.1 EUniversal project

The EUniversal project is a response to the call LC-SC3-ES-1-2019, entitled "Flexibility and retail market options for the distribution grid" of the Horizon 2020 programme. It is coordinated by EDP Distribuição and has 19 partners from eight countries - Portugal, Spain, Germany, Poland, Belgium, Norway; United Kingdom and Cyprus - who will work together until August 2023 to demonstrate a replicable solution for the interaction of the Distribution Network Operator with the new flexibility markets - Universal Market Enabling Interface (UMEI).

Started in February 2020, it has an expected duration of 42 months and foresees the development of solutions that allow the integration of flexibility in the operation and planning of the distribution network, through market mechanisms and innovative services.

The objective of the project is to allow the massive integration of renewable production through services that allow the participation of flexible resources such as storage systems and electric vehicles, consumers and energy communities.

The solutions developed within the scope of the project will be demonstrated in three heterogeneous pilots (in Portugal, Germany and Poland), with different distribution networks and different regulatory frameworks.

1.2 Objectives and structure of the deliverable

The main goal of deliverable D11.3 is to organize and promote at least 3 dedicated workshops along the project lifecycle with other BRIDGE initiatives to set the conclusion of the project results.

These workshops will target several stakeholder groups to inform them about the benefits, best practices and specific adaptions for their needs, besides disseminating the project outcomes.



2 EUniversal Workshop 2021 (M18)

The workshop was successfully organized by E-REDES, INESC TEC, COMILLAS, E.DSO, VITO and MITNETZ and allowed us to gather useful insights from relevant stakeholders in an online meeting (Microsoft Teams) on the 6^{th} of July 2021 – 10h30 to 13h00 (CET).

Several meetings and training sessions were held previously, gathering speakers and organization members.

2.1 Objectives

Deliverable D11.3, part of the dissemination task 11.3, reports on the organization and promotion of a project workshop.

This first project workshop main objective was to disseminate the project results and achievements during the first eighteen months of the project and to promote synergies and collect insights from relevant stakeholders.

2.2 Target Audience

The workshop took place in month 18 (M18), as planned, and was deeply disseminated by the partners towards relevant stakeholders, namely, related BRIDGE projects, International Advisory Board Members and other relevant initiatives.

2.3 Communication Strategy

An invitation was sent by e-mail to all partners project team members and disseminated directly to all relevant stakeholders.

With the consent of all participants, the session was recorded and made available in the project Sharepoint.

To promote the Workshop main conclusions dissemination, a news was published on the project website making available the session presentation for download: https://euniversal.eu/euniversal-workshop-2021/



**Euniversal project organized is 1th workshop 2021

**Euniversal project organized is 1th workshop with emphasis on the project results and advicements of the discussion a

Figure 1- EUniversal Workshop news

Posts were also promoted on the project social media channels and the content was highlighted in the 4^{th} project newsletter.

Figure 2 - LinkedIn Post



Figure 3 - Twitter Post





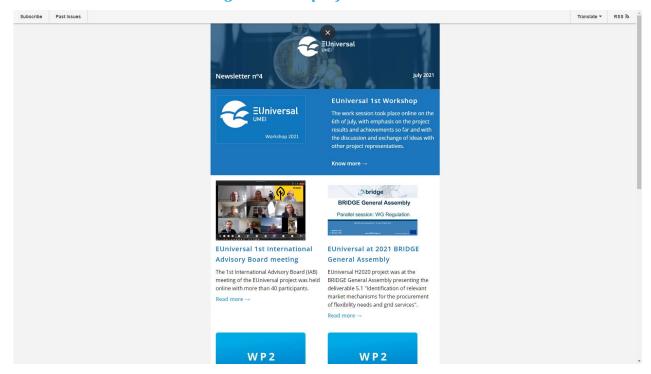


Figure 4 - 4th project newsletter

2.4 Agenda

The Workshop started with a plenary session which gave an overview of the project and introduced the breakout sessions. Afterwards, the session was divided into 3 different breakout sessions and participants were invited to join the work session of their choice.

In the end, conclusions were shared with all the audience in the main meeting.



Figure 5 - Agenda

EUniversal Workshop 2021 - Agenda (CET)



10:30 | Welcome and opening
Luís Vale Cunha (E-REDES)

10:35 | Plenary - EUniversal presentation
Pedro Marques – Proj. Coordinator

10:45 | Introduction to the Breakout sessions
Clara Gouveia (INESCTEC); Pedro Marques (E-REDES); Kris Kessels (VITO)

11:15 | Breakout sessions (BS)

BS1. Flexibility in distribution networks: DSO perspective
Clara Gouveia; José Villar (INESCTEC); Maik Staud (MITNETZ)

BS2. DSO Interfaces for enabling market-based flexibility
Pedro Marques (E-REDES); Catarina Augusto (E.DSO)

BS3. Local market and flexibility product design
Kris Kessels; Janka Vanschoenwinkel (VITO); José Pablo Chaves (COMILLAS)

12:15 | break

12:30 | Plenary – Sharing conclusions + Q&A

13:00 | Closure
Luís Vale Cunha (E-REDES)

2.5 Registration & Questionnaire

The invitation was sent by e-mail by the project team to all stakeholders.

Registration was free but mandatory and 131 registrations were received.

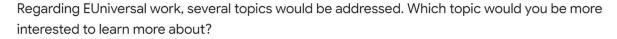


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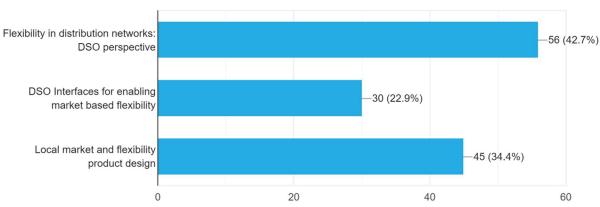
Figure 6 Registration form snapshot

In the registration form, participants were invited to choose a topic to learn more about:

Figure 7 Registration form question for topic selection









These 3 topics were the main subject of the 3 breakout sessions:

BS1. Flexibility in distribution networks: DSO perspective

This breakout session was focused on the DSO approach and tools foreseen for enabling the use of market-based flexibility services. The most relevant needs, barriers, procedures and required tools for integration of flexibility as an effective grid support asset were discussed.

This session was organized and moderated by INESC TEC and MITNETZ and had 56 participants registered.

BS2. DSO Interfaces for enabling market-based flexibility

This breakout session addressed the data interchange between DSO, TSO, Maker platforms and aggregators, namely open generic interface vs mediation platform paradigm, and to what extent the need for a flexibility register and secure transactions may influence the future best option.

This session was organized and moderated by E-REDES and E.DSO and had 30 participants registered.

BS3. Local market and flexibility product design

This breakout session discussed several topics on the market-based procurement of flexibility to cover (future) DSO needs and the related challenges, which should be considered when designing these markets and solutions.

This session was organized and moderated by VITO and COMILLAS and had 45 participants registered.

After the registration, participants were invited to fill in a questionnaire to prepare for and feed the debate for the Workshop breakout sessions (see Annex I - EUniversal WS 2021 Questionnaire).

From the participants registered in the workshop 13 answers were submitted (see Annex II - EUniversal WS 2021 Questionnaire responses).



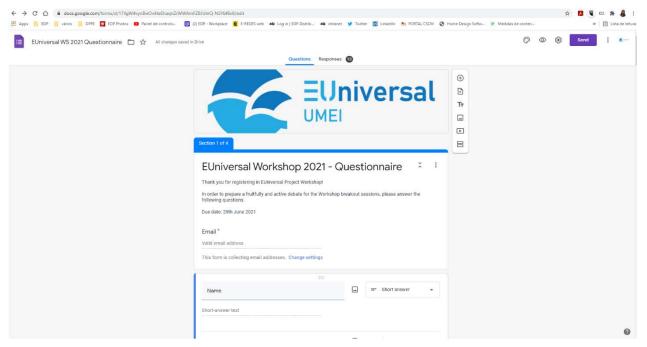


Figure 8 Questionnaire form snapshot

2.6 Workshop main & breakout sessions

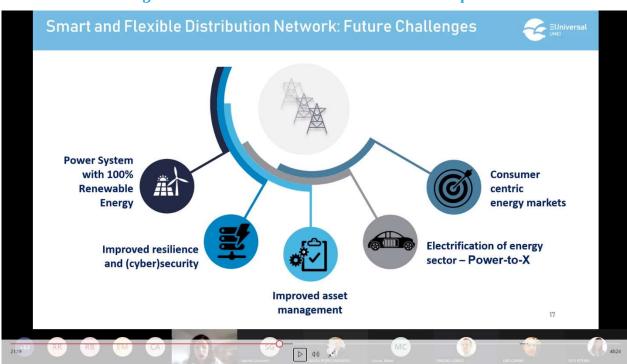
The event was held online via Microsoft Teams and presentations were made by the project team members, engaging the audience on a quick project overview and introducing the 3 breakout sessions.



Figure 9 Project Overview snapshot



Figure 10 Breakout session 1 introduction snapshot





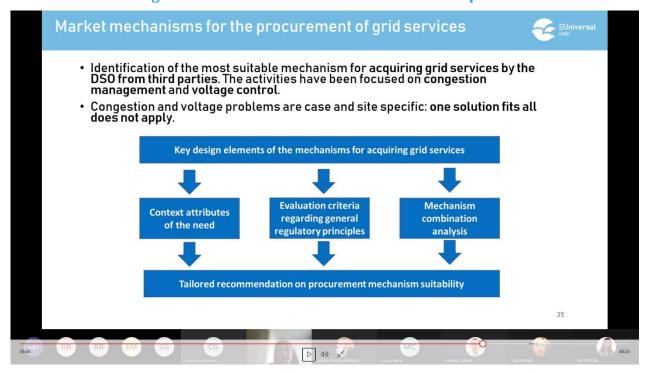
UMEI is a concept that conveys an agnostic framework for the provisioning of flexibility services to system operators

The UMEI concept translates into open specifications of flexibility services and data exchange procedures between system operators and market parties, as well as other parties involved in the process

OSO 305 MARKET PLATFORM PRATFORM P

Figure 11 Breakout session 2 introduction snapshot

Figure 12 Breakout session 3 introduction snapshot





Outcomes and lessons learned from the EUniversal project were shared and interaction promoted with the audience throughout the different breakout sessions (via Slido and Questions & Answers slot times).

Figure 13 Breakout session 1 snapshot

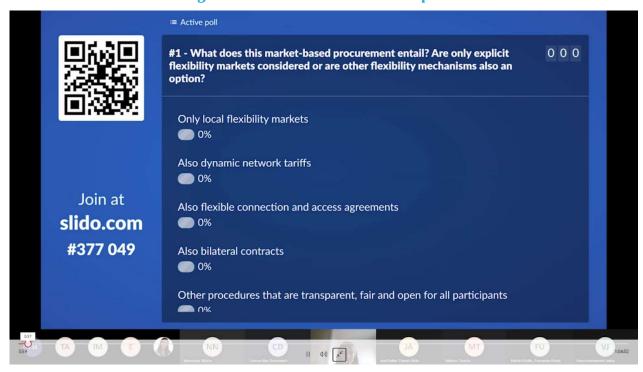




Obstacles to manage flexibility exchange communications between DSO and multi-markets platforms without mediation EUniversal 3. What are the obstacles to manage flexibility exchange communications between DSO and multi-market platforms without a mediation platform? 12 responses a. The need for a single flexibility -3 (25%) register -5 (41.7%) b. DSO-TSO coordination c. The possibility of having 10 (83.3%) different market mechanisms in... d. Competition between market--5 (41.7%) platforms in the same area e. Other role (please answer 3.1) -0 (0%)

Figure 14 Breakout session 2 snapshot

Figure 15 Breakout session 3 snapshot





In the end, all participants met again in the main meeting and conclusions and insights debated in the 3 sessions were shared (see "4.5 Conclusions").

2.7 Impact Assessment

For attending the Workshop registration was free but mandatory.

A total of 131 registrations were received and the event itself had a total of 86 Users participating in the general session which were divided by the 3 Breakout Sessions (some of them visited several sessions) as follows:

Table 1 Breakout Session 1- Total Number of registrations

Meeting Summary	
Total Number of Participants	47
Meeting Title	BS1
Meeting Start Time	7/6/2021, 10:17:16 AM
Meeting End Time	7/6/2021, 5:57:32 PM

Table 2 Breakout Session 2 - Total Number of registrations

Meeting Summary	
Total Number of Participants	20
Meeting Title	BS2
Meeting Start Time	7/6/2021, 10:10:36 AM
Meeting End Time	7/6/2021, 11:30:26 AM

Table 3 Breakout Session 3 - Total Number of registrations

Meeting Summary	
Total Number of Participants	32
Meeting Title	BS3
Meeting Start Time	7/6/2021, 10:10:46 AM
Meeting End Time	7/6/2021, 12:32:09 PM

The participants that were registered for the Workshop are working on 45 related projects or activities:



Table 4 Participants registered per project/activity

Project / Activity	N. Participants registered working in the proj./act.
ATTEST	9
BD4NRG	2
CoordiNet	16
OneNet	27
Spear	2
5G	2
Flexibility related Working Groups	4
DSO Observatory	1
Ebalance plus	6
ReDREAM	1
EDDIE	1
PLATONE	4
Electric Mobility	1
ERIGrid2	1
EU projects consulting	1
EU-FleXunity	1
EUniversal	35
INTERCONNECT	15
SCALE	1
EU-Sysflex	1
GPDER	1
Grid2C	1
i-Autonomous	1
In-house	1
INTERRFACE	2
FLEXITRANSTORE	1
TWINERGY	1
NorFlex	1
SthImflex	1
Smart Senja	1
IntraFlex	1
OSMOSE	4
GIFT	2
Open Networks	1
PARITY	7
BEYOND	2
DELTA	1
INTERPRETER	1



Project EDGE	3
SINERGY	1
DRIMPAC	1
Renewable plants integration	1
Smart Grids Product Manager	1
Flexon platform	1

2.8 Conclusions

The workshop, which was the scope of deliverable D11.3, was successfully organized and promoted, with a good range of attendance from relevant stakeholders.

 $65,\!65\%$ of the registered participants attended the session.

The work developed by the project team between the M1 and M18 was successfully shared and useful insights and feedback were gathered from related projects and pertinent stakeholders.

During the Breakout Sessions (BS) several questions were addressed and discussed with the participants, collecting fruitfully insights on several topics as follows:

2.8.1 BS1. Flexibility in distribution networks: DSO perspective - Main conclusions

1. Flexibility needs and services

- Congestion and voltage regulation are considered the most relevant and feasible services in short-term.
- Being able to assess impact of flexibility services on network planning and investment deferral

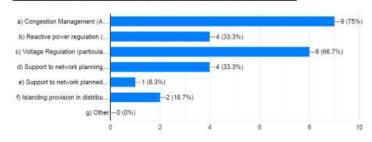


Figure 16 Breakout session 1 main conclusions - slide 1

Breakout Session 1: Flexibility in distribution networks: DSO perspective Final Conclusions



Topic 1 – Flexibility needs and services



Congestion and voltage regulation are considered the most relevant and feasible services in short-term.

Being able to assess impact of flexibility services on network planning and investment deferral

Most relevant characteristics:

- · Preventive time-frame (day-ahead)
- · Preventive framework is particularly challenging for LV
- · Testing real-time markets (blockchain) may expose DSO to high price variability

2. DSO toolbox for flexibility

- Pre-qualification considered relevant for flexibility procurement (particularly for islanding/blackstart)
- Technical prequalification would involve DSO and aggregator
- Factory compliance of inverters and controllers could reduce the technical pre-qualification process
- Relevance of IA and data analytics for LV network, for dealing with errors and poor characterization of the topology and network characteristics
- Tools that promote coordination between actors and participation of DER in multiple projects
- Definition of Congestion zones considered very relevant and that should be dynamic
- Consider also the local grid support services enabled by advanced power electronic interfaces



Figure 17 Breakout session 1 main conclusions - slide 2

Breakout Session 1: Flexibility in distribution networks: DSO perspective ∃Universal **Final Conclusions** Topic 2 – DSO toolbox for flexibility · Pre-qualification considered relevant for flexibility procurement (particularly for islanding/blackstart) Technical prequalification would involve DSO and aggregator Factory compliance of inverters and controllers could reduce the technical pre-qualification process a) Real-Sime monitoring of MVI to the Real-Sime monitoring in LV I. d) Real-Sime monitoring of LV I. d) Smart metering data (individ. e) Installation of own equipment (I, LV Load and generation for h) Exploit data-driven algorithm (i) Power flow and optimal power. If Dower flow and optimal power (ii) Power flow and optimal power. If Power flow and optimal power. Relevance of IA and data analytics for LV network, for dealing with errors and poor characterization of the topology and network characteristics · Tools that promote coordination between actors and participation of DER in multiple projects Definition of Congestion zones considered very relevant and that should be dynamic Consider also the local grid support services enabled by advanced power electronic interfaces

3. Drivers and barriers for using flexibility

- National regulation are progressing particularly for congestion and voltage regulation
- Define the incentives for DSO to use flexibility in distribution network
- Define adequate and clear mechanisms to promote consumers participation in local mflexibility markets
- Define adequate coordination mechanisms for DSO/TSO
- Define guidelines to deal with data processing

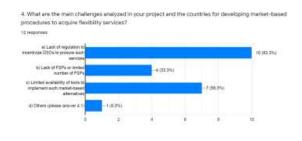


Figure 18 Breakout session 1 main conclusions - slide 3

Breakout Session 1: Flexibility in distribution networks: DSO perspective Final Conclusions



Topic 3 – Drivers and barriers for using flexibility



- National regulation are progressing particularly for congestion and voltage regulation
- Define the incentives for DSO to use flexibility in distribution network
- Define adequate and clear mechanisms to promote consumers participation in local mflexibility markets
- · Define adequate coordination mechanisms for DSO/TSO
- · Define guidelines to deal with data processing

2.8.2 BS2. DSO Interfaces for enabling market-based flexibility - Main conclusions

1. Does the introduction of flexibility service providers introduce additional security needs besides the already existing for retailer switching? If Yes, which ones?

50% "Yes" and 50% "No" as answers in the questionnaires.

"Yes", in the BS as final answer.

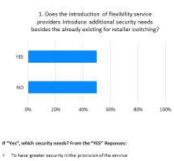
- Points added in the BS2:
- a. Security of operations brings additional security needs to the SO.
- b. DSOs are more concern with the mismatch of the flexibility services



Figure 19 Breakout session 2 main conclusions - slide 1

BS2 Conclusions: DSO Interfaces for enabling market based flexibility





1.Does the introduction of flexibility service providers introduce additional security needs besides the already existing for retailer switching? If Yes, which ones?

50% "Yes" and 50% "No" as answers in the questionnaires. "Yes", in the BS as final answer.

- · Points added in the BS2:
 - . Security of operations brings additional security needs to the SO.
 - . DSOs are more concern with the mismatch of the flexibility services

- If "Yes", which security needs? From the "YES" Regionses:
- Over and under service provision mismatch
- . Monitoring to detect (undect) gaming of critical infrastructure

2. Do you foresee the need for the existence of Distributed Ledger technology (eg. Blockchain) for the exchange of flexibility? For what specific purpose(s)?

Yes for 58% answers in the questionnaire. Accepted in the Breakout Session.

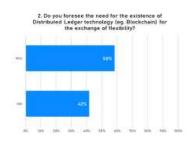
- Points added in the BS2:
- a. Registration of DER Devices using blockchain could be a possibility that would give additional security to DSO operations
- Financial Transactions could also be done by using blockchain
- Energy transaction should need blockchain but platforms for exchange.



Figure 20 Breakout session 2 main conclusions - slide 2

BS2 Conclusions: DSO Interfaces for enabling market based flexibility





f "Yes", for what specific purpose(s)? From the "YES" Reponses

- To assure and certify the exchange
- Data Privacy
- Automated and secure transaction, use of smart contract with clear rule
- Baseline, measuring, validation and settlement
- For Peer-to- Peer transactions within the local energy community.

2. Do you foresee the need for the existence of Distributed Ledger technology (eg. Blockchain) for the exchange of flexibility? For what specific purpose(s)?

Yes for 58% answers in the questionnaire. Accepted in the Breakout Session.

- For Peer to Peer transactions with local energy community Interconnect project
- · Points added in the BS2:
 - Registration of DER Devices using blockchain could be a possibility that would give additional security to DSO operations
 - · Financial Transactions could also be done by using blockchain
 - Energy transaction should need blockchain but platforms for exchange.

3. What are the obstacles to manage flexibility exchange communications between DSO and multi-market platforms without a mediation platform?

- 1st) The possibility of having different market mechanisms in place
- 2nd) DSO-TSO coordination
- 3rd) Competition between market-platforms in the same area
- 4th) The need for a single flexibility register

All the 4 obstacles are equally important to manage flexibility exchange communications between DSO and multimarket platforms without a meditation platform.

4. In order to have competition between local market platforms in the same area, who should be able to select the best offer?

- 1st) The DSO (8/12)
- 2nd) The Market data operator (4/12)
- 3rd) The SO (TSO and DSO) (1/12)



Another perspective would be in case of a Local Energy Community (in determined area or a building managing batteries, PV) this could be manage inside the community to propose/bid to the DSO in a bottom up approach.

In microgrids this operation could also be done through bottom up approach. This could an interesting Use Case to address for this study.

2.8.3 BS3. Local market and flexibility product design - Main conclusions

1. Products to cover DSO needs and services

- **Feedback**: Focus of the presentation is highly on DSO needs. One should also look at the "offer-side".
- This is what we will do in EUniversal project. In the end, both the supply-side and demandside will be brought together to have the full picture and define the products.
- The level of product standardization still needs to be further specified (choosing a common list of product attributes, or also setting specific values for these attributes shared by DSOs)

2. Different flexibility solutions to cover DSO needs

- Flexibility solutions
 - Not only local flexibility markets
 - Other mechanisms, which are transparent, fair and open
 - **Feedback:** mechanism depends (for instance) on the type FSP
 - EV → flexible connection agreement

3. Markets for DSO services: separate vs common

Feedback:

- In case of separate markets; A potential risk was indicated; How to implement different local markets without agents being able to "play around" and game different markets.
- If every buyer of flexibility organizes its own market, this could lead to market fragmentation and lack of (price) transparency; actors also need to know which offers they can place at which market => aggregators play an important role to hide the complexity for the final consumer.
- Main issue when integrating markets: the existing markets are well streamlined (e.g.
 TSO AS markets), whereas locationality is very important for the DSO. Building
 separate, locational markets can be seen as a necessary pre-step before integrating
 with other markets.



Figure 21 Breakout session 3 main conclusions - slide 4

3. Markets for DSO services: specific characteristics DSO markets - challenges



4. Markets for reactive power

- Coordinet:
 - Boundaries in the pilot need to be defined
 - ➤ It would be good to have different service providers depending on the need
 - > But in the pilot, they always need to have the same FSPs, which makes it hard to define the boundaries.
- Maybe reactive power market is not needed for DSO?
 - Liquidity perspective: hard
 - Technical perspective: depends on the characteristics of the network
 - ➤ RP not useful for voltage control in all networks, it depends on electric parameters
 - ➤ Enhanced observability and controllability is required, especially in some distribution networks
 - Changes in network topology transform the procurement area
 - Topic is very case specific

5. Challenges for developing market-based procurement

• One solution does not fit all



- Different principles have to be taken into account:
 - Which principles should get more weights?
- Economic efficiency is the most relevant criterion

Figure 22 Breakout session 3 main conclusions - slide 6

Breakout Session 3: Local market and flexibility product design Final Conclusions



5. Challenges for developing market-based procurement

- One solution does not fit all
- Different principles have to be taken into account:
 - Which principles should get more weights?
- Economic efficiency is the most relevant criterion





Figure 23 Breakout session 3 main conclusions - slide 7

Breakout Session 3: Local market and flexibility product design Final Conclusions



5. Challenges for developing market-based procurement

- One solution does not fit all
- Different principles have to be taken into account:
 - Which principles should get more weights?



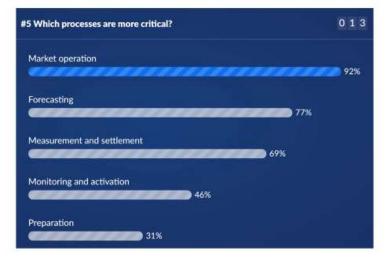
Figure 24 Breakout session 3 main conclusions - slide 8

Breakout Session 3: Local market and flexibility product design Final Conclusions



5. Challenges for developing market-based procurement

- Which processes are more critical and more challenging to implement?



15



6. Assessment methods to analyse market-based solutions

- Changing from qualitative assessment to quantitative assessment: what is the challenge?
 - Quantitative assessment requires simulation
- What are flexible connections? An agreement between the DSO and grid users to limit the power injections or withdrawals under specific conditions (e.g. specified time, at predefined remuneration, etc.)

All created content relating to the workshop is available at the project SharePoint.



3 EUniversal Workshop 2022 (M30)

The workshop was successfully organized by E-REDES, INESC TEC and VLERICK and allowed us to gather useful insights from relevant stakeholders in an hybrid session (Porto, Portugal at EDP Headquarters and Microsoft Teams) on the 9th of May 2022 – 14h30 to 17h00 (WET).

Several meetings and training sessions were held previously, gathering speakers and organization members.

3.1 Objectives

Deliverable D11.3, part of the dissemination task 11.3, reports on the organization and promotion of a project workshop.

This second project workshop's main objective was to disseminate the project results and achievements for the second reporting period, from July 2021 (M18) to July 2022 (M30), and to promote synergies and collect insights from relevant stakeholders.

3.2 Target Audience

The workshop took place in May - month 28 (M28) – and was deeply disseminated by the partners towards relevant stakeholders, namely, related BRIDGE projects, International Advisory Board Members and other relevant initiatives.

3.3 Communication Strategy

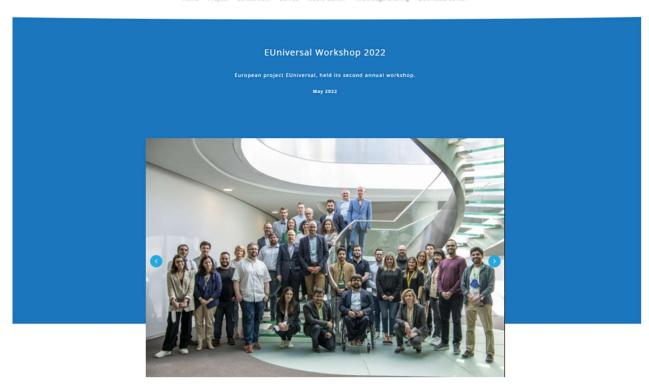
An invitation was sent by e-mail to all partners project team members and disseminated directly to all relevant stakeholders.

With the consent of all participants, the session was recorded and made available in the project Sharepoint and on the project website.



Figure 25 - EUniversal 2022 Workshop news





European project EUniversal held its second annual workshop.

The objective was to inform its main stakeholders about the work that the consortium has been developing, in a hybrid session that brought together some team members at E-REDES premises in the city of Porto, while others participated remotely.

Posts were also promoted on the project social media channels and the content was highlighted in the $4^{\rm th}$ project newsletter.



Figure 26 - LinkedIn Post

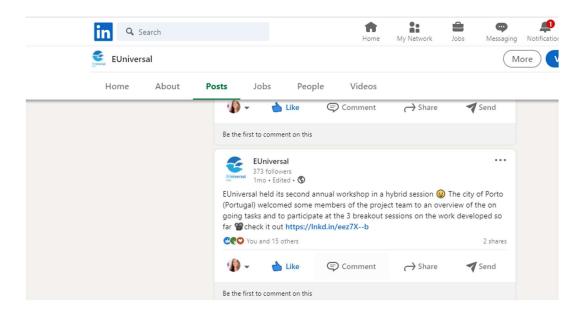


Figure 26 - Twitter Post

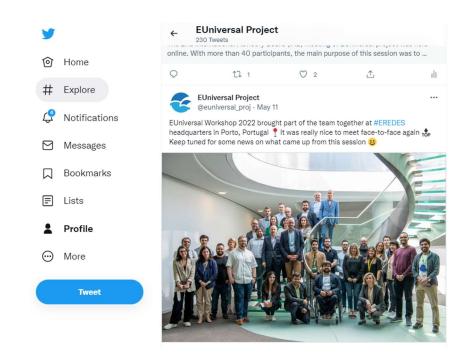




Figure 27 - 6th project newsletter

3.4 Agenda

The Workshop started with a plenary session which gave an overview of the project and introduced the breakout sessions. Afterwards, the session was divided into 3 different breakout sessions and participants, both participants online and in Porto, were invited to join the work session of their choice.

In the end, conclusions were shared with all the audience in the main meeting.



Figure 28 - Agenda



MAY 9, 2021 | 14H30 - 17H00 (WET) PORTO, PORTUGAL



EUNIVERSAL WORKSHOP 2022

14h30 Welcome note and opening

Luís Cunha (E-REDES)

14h40 EUniversal project main on going work and outputs

Pedro Marques (E-REDES)

15h00 Breakout sessions:

- Regulatory and policy issues Ellen Beckstedde (VLERICK)
- Presentation of the UMEI and its compatibility with the market platforms
 Carlos Silva (E-REDES)
- Technical session focused on DSO tools Clara Gouveia (INESC TEC)

16h00 Coffee break

16h15 Breakout sessions wrap up

16h45 Final note

Luís Cunha (E-REDES)



3.5 Registration & Questionnaire

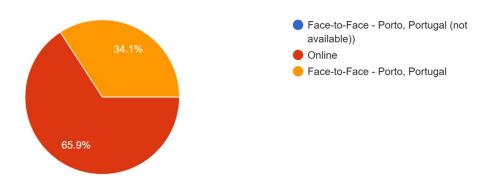
The invitation was sent by e-mail by the project team to all stakeholders.

Registration was free but mandatory and 82 registrations were received.



Figure 29 Registration form snapshot

How will you attend EUniversal #2 Workshop? 82 responses



In the registration form, participants were invited to choose a topic to learn more about. These 3 topics were the main subject of the 3 breakout sessions that discussed three themes around some of the main project outputs in the last 12 months:

Figure 30 - Breakout Sessions Topics

Regulatory and policy

D1.3 Challenges and opportunities for electricity grids and markets
 D3.3 System-level assessment framework for the quantification of available flexibility
 D10.3 Regulatory recommendations



The UMEI and its compatibility with the market platforms

future D2.6 UMEI API management and documentation



Technical session focused on DSO tools

D4.1 Multi-level preventive control of flex resources in distrib grids + cooperation with TSO D4.2 Improvement of observability, control and operation of distribution grids in real-time future D4.3 Self-healing & dynamic islanding schemes for resilient distribution grids future D4.4 Resilience enhancement methodologies and tools for distribution grid planning





3.6 Workshop main & breakout sessions

The event was held in a hybrid format – on site at EDP Headquartes in the city of Porto, Portugal, and online via Microsoft Teams. Presentations were made by the project team members, engaging both audiences on a quick project overview with the work developed so far and introducing the 3 breakout sessions.

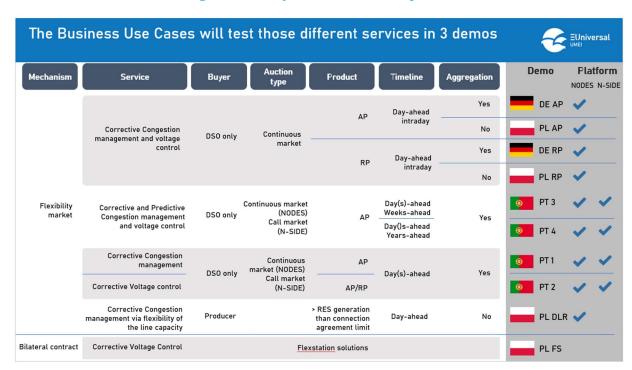


Figure 31 Project Overview snapshot

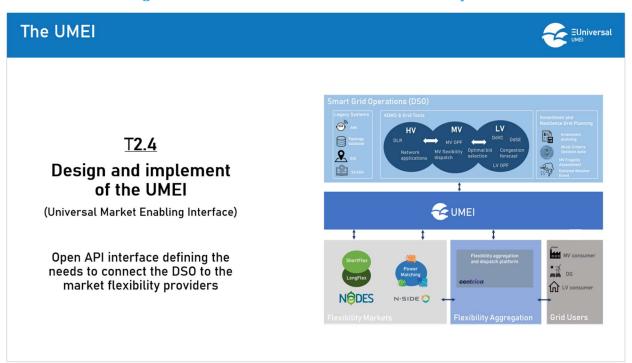


Figure 32 Breakout session 1 introduction snapshot



1. Setting the scene: challenges and opportunities for distribution networks up to 2050 2. Local flexibility markets: characterizing the main flexibility needs and solutions based on two test networks 3. Beyond flexibility markets: regulatory sandboxes to test flexibility in practice

Figure 33 Breakout session 2 introduction snapshot





EUniversal Vision for Smart and Flexible Distribution Network =Universal Flexible | Enabling DER market Benefiting from DER participation flexibility services Define a-priori optimal Distributed self-healing operation plan strategies Predictive Resilient | Capable of forecasting Network vulnerability technical problems assessment and resilience planning 113

Figure 34 Breakout session 3 introduction snapshot

Outcomes and lessons learned from the EUniversal project were shared and interaction promoted with both audience (onsite and online) throughout the different breakout sessions (via Slido and Questions & Answers slot times).





Figure 35 Breakout session 1 – onsite and online







The state of the s

Figure 37 - Breakout session - onsite and online

In the end, all participants met again in the main meeting and conclusions and insights debated in the 3 sessions were shared (see "4.5 Conclusions").

Figure 38- conclusions presentations



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3.7 Impact Assessment

For attending the Workshop registration was free but mandatory.

A total of 82 registrations were received and the event itself had a total of 73 Users participating in the general session which were divided by the 3 Breakout Sessions (some of them visited several sessions) as follows:



Table 5 Breakout Session 1- Total Number of participations

Meeting Summary	
Total Number of Participants	21
Meeting Title	BS1
Onsite participants	9
Online participants	12

Table 6 Breakout Session 2 - Total Number of participations

Meeting Summary	
Total Number of Participants	25
Meeting Title	BS2
Onsite participants	11
Online participants	14

Table 7 Breakout Session 3 - Total Number of participations

Meeting Summary	
Total Number of Participants	38
Meeting Title	BS3
Onsite participants	13
Online participants	25

The participants that were registered for the Workshop are working on 18 related projects or activities:

Table 8 Participants registered per project/activity

Project / Activity	N. Participants registered working in the proj./act.
eNeuron	1
Interconnect	5
EUniversal	45
OneNet	11



Platone	1
FlexPlan	4
PARITY	6
ANM4L	1
INTERRFACE	2
BEYOND	1
FEVER	1
SERENE	1
SCALE	1
ACCEPT	1
EU-SysFlex	1
GPDER+	1
CoordiNet	6
ATTEST	1

3.8 Conclusions

The workshop, which was the scope of deliverable D11.3, was successfully organized and promoted, with a good range of attendance from relevant stakeholders.

89,02% of the registered participants attended the session.

The work developed by the project team between the M18 and M30 was successfully shared and useful insights and feedback were gathered from related projects and pertinent stakeholders.

During the Breakout Sessions (BS) several questions were addressed and discussed with the participants, collecting fruitfully insights on several topics as follows:

3.8.1 BS1. Regulatory and policy issues - Main conclusions

BS1 aimed to discuss regulatory and policy issues regarding local flexibility markets based on the outcomes of three EUniversal deliverables. For each deliverable, the main findings were summarized and discussed with the participants using poll questions. We will now go into more detail on the findings of the workshop

D1.3: Challenges and opportunities for electricity grids and markets.

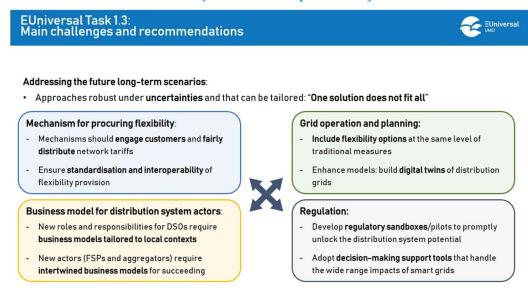
With this deliverable, we aimed to set the scene and examine the challenges and opportunities for distribution networks up to 2050. The deliverable consists of the following highlights:

- Analysis EU long-term strategy and 5 national plans (Belgium, Germany, Poland, Portugal, Spain). Define technology options to be adopted (25 technology options) and assess the potential impact on the distribution grid.
- Identification of future flexibility needs in 3 long-term scenarios for Europe (ELEC, H2/P2X, and EE). Assess the level of deployment of technology options in light of their impact on the distribution grid.
- Definition best practices and recommendations on distribution system planning and operation, new business models (for DSOs, aggregators, and FSPs), market arrangements and



regulatory mechanisms for the future distribution system, as shown in **Erro! A origem da** referência não foi encontrada.

Figure 39- Best practices and recommendations based on the analysis of EUniversal D1.3 (BS1 workshop slide 13)



The findings and main assumptions of the deliverable were tested with the participants of the workshop using three poll questions. The questions and responses can be found in **Erro! A origem da referência não foi encontrada.** to **Erro! A origem da referência não foi encontrada.**

Figure 40 - First poll question of BS1 on D1.3 (15 responses)

1. Which of the considered scenarios is most likely to occur toward 2030-2050?

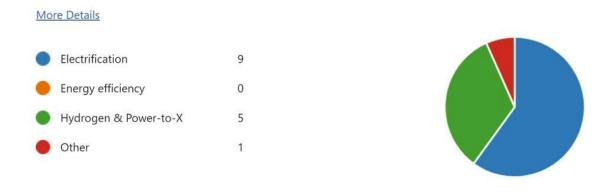




Figure 41 - Second poll question of BS1 on D1.3 (15 responses)

Q2



2. What will be the impact of each scenario on the distribution grid (more flexibility and/or investment needs)?

More Details

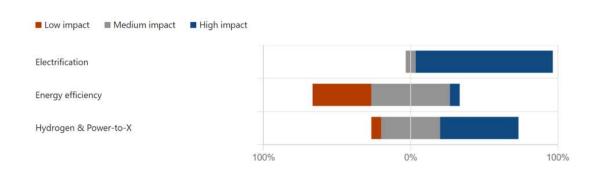


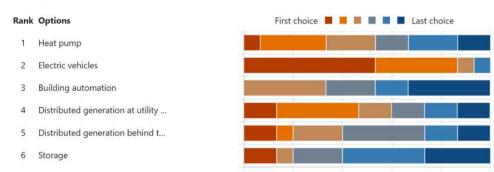
Figure 42 - Third poll question of BS1 on D1.3 (15 responses)

Q3



3. Please sort the following technologies from 1 - most expected impact to 6 - least expected impact on the distribution grid.

More Details





D3.3: System-level assessment framework for the quantification of available flexibility for eneabling new grid services.

With this deliverable, we aimed to have a more closer look at local flexibility markets and characterize the main flexibility needs and solutions based on two test networks. The deliverable consists of the following highlights:

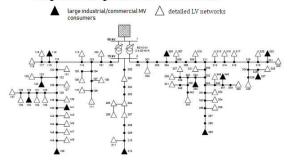
- A study of existing initiatives to identify here flexibility is currently procured to solve distirubtion network issues, to develop a benchmark of products characteristics and parameters and to examine the underlying flexibility framerworks of existing market platforms.
- Perform optimal power flow simulations on two representative test networks (Figure 43) to quantify and characterize the flexibility needs in these distribution networks.
- Insights and recommendations for product definition to provide grid services (Figure 44).

Figure 43 - Network toppology of the two representative test networks of D3.3 (BS1 workshop slide 26)

The test network – 1MV network (15kV) and several LV networks(0.4kV) connected to the MV level

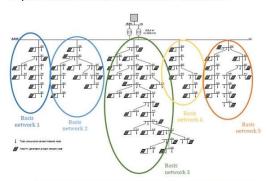


Single line diagram of the MV network



semi-urban area in the southwest of Portugal operated in a radial configuration having two 20 MVA transformers connecting the HV level (60 kV) with the MV level

Representation of the five basis LV networks



Typical LV networks were assigned to each white triangle based on the rated power of the transformer connecting the MV and the LV levels



Figure 44 - Insights and recommendations based on the analysis of EUniversal D3.3 (BS1 workshop slide 27)

Insights and recommendations for product definition to provide grid services



Results are specific to the situations modelled. One has to be cautious when generalizing.

- Voltage issues are more likely to appear earlier than congestions issues. This is also confirmed by field observations of DSOs. Capacity does not seem to be the most constraining element.
- Issues are different in wind- and PV-dominated systems (duration of issues)
 - PV-intensive systems = daily cycles (issues last for 5h on average)
 - Wind-dominated systems = several days of high/low wind (issues last for 10h on average)
 → Flexibility is to be activated differently (coordination through time, limited availability of energy-limited technologies if issues are lasting longer, some assets are closer to the problem than others, etc.)
- MV-LV relationship: Issues appear typically in LV rather than in MV due to increasing share of EVs and PV.
 Furthermore, assets in MV do not necessarily help solving issues in LV.
 - → This raises the question about the "relevant market" to be considered in LFM. How can we obtain liquid markets at LV level? or do we need to rely on "command & control"?
- Flexible loads and storage clearly favour integration of intermittent renewables
 EV shifting → 3 % decrease of PV curtailment, Load shifting → 18 % decrease of PV curtailment
 → Importance of technology-neutral procurement mechanism
- · EVs are both source of issues (under-voltage) and a solution (typically close to the problem)

The findings and main assumptions of the deliverable were tested with the participants of the workshop using two poll questions. The questions and responses can be found in Figure 45 and Figure 46.

Figure 45 - Fourth poll question of BS1 on D3.3 (12 responses)

1. Do you have similar experiences as the findings in the deliverable? Please pick one

More Details

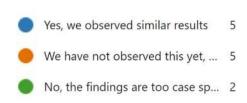


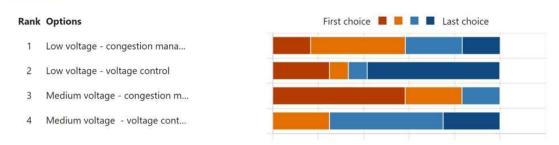




Figure 46 - Fifth poll question of BS1 on D3.3 (12 responses)

2. For which type of flexibility needs are markets most suitable? Please sort the options from 1 - the most suitable to 4 - the least suitable.

More Details



D10.3: Regulatory recommendations for flexibility options and markets

With this deliverable, we aimed to look beyond flexibility markets and examine regulatory sandboxes that can be used to test flexibility markets in practice. Although D10.3 also provides a general overview of combining flexibility tools and performs a quantitative analysis of strategic behavior in flexibility markets, the main focus of the workshop was on regulatory sandboxes that consists of the following highlights:

- A survey-based analysis of regulation on regulatory sandboxes in Austria, Belgium (Brussel, Flanders and Wallonia), France, Germany, Lithuania, Norway and Spain.
- Characterization of nine design choices when implementing regulatory sandboxes (Figure 47), and the consideration of the impact of these design choices on the outcome of the sandbox.
- Conclusions on the risks and opportunities of regulatory sandboxes (Figure 48).



Figure 47 - Characterization of nine design choices when implementing regulatory sandboxes based on the survery-based analysis of 9 regulatory sandboxes (BS1 workshop slide 34)

Main findings		EUnivers UMEI
Dimension	Yes	No
Regulation in place?	Austria, Brussels, Flanders, France, Germany, Lithuania, Norway, Wallonia	Poland, Spain
Projects already granted under sandbox?	Brussels, Flanders, France, Norway, Wallonia	Austria, Lithuania, Poland, Spain
Dedicated call?	Austria, France, Germany, Poland	Brussels, Flanders, Norway, Wallonia
Everyone can apply?	Brussels, Flanders, Germany, Lithuania, Norway, Spain, Wallonia	Austria, France, Poland
Possible derogations specified?	Austria, Flanders, France, Poland	Brussels, Germany, Lithuania, Norway, Spain, Wallonia
Initial exemption longer than 5 years (with extensions)?	Flanders (France, Poland)	Austria, Brussels, France, Lithuania, Norway, Poland, Wallonia
Regulator administers (together with Ministry)?	Brussels, France, Lithuania, Norway, Poland, Wallonia (Austria, France, Germany, Spain)	Flanders
Funding included?	Austria, Germany, Lithuania, Norway	Flanders, France, Poland, Spain
Public report at the end of the project?	Brussels, Flanders, Germany, Lithuania, Norway, Poland, Wallonia	

Figure 48 - Conclusions on the risks and opportunities of regulatory sandboxes based on the analysis of EUniversal D10.3 (BS1 workshop slide 36)

Conclusions



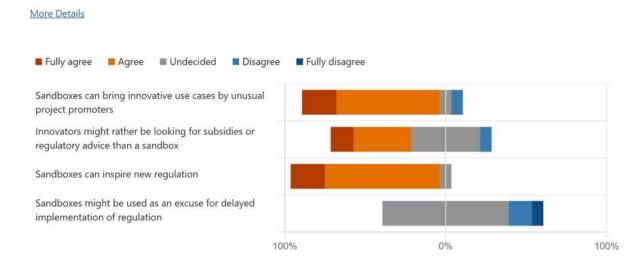
	Opportunity	Risk
Do sandboxes speed up innovation?	Sandboxes can bring innovative use cases by unusual project promoters	Innovators might rather be looking for subsidies or regulatory advice
Do sandboxes speed up regulatory change?	Sandboxes can inspire new regulation	Sandboxes might be used as an excuse for delayed implementation of regulation



The findings and main assumptions of the deliverable were tested with the participants of the workshop using one poll question. The question and responses can be found in Figure 49.

Figure 49 - Sixth poll question of BS1 on D10.3 (14 responses)

1. Do you agree with the following statements?



3.8.2 BS2. The UMEI and its compatibility with the market platforms - Main conclusions

BS2 was prepared with the purpose of presenting the work developed within the last task of WP2, T2.4, and its impact on the implementation of the demonstrations. The UMEI is a core component of the project, and essentially the bonding element between the several interacting parties which participate in the flexibility mechanisms put forward by the project.



Figure 50 - UMEI Overall Structure

Modular and Adaptable - 6 process groups

(REST APIs containing CRUD operations)



The session was divided into 2 major parts, firstly a presentation of the developed UMEI, and secondly a detailed explanation focusing on the UMEI adoption by the two distinct market platforms which participate in the project and demonstrations, NODES and N-SIDE.

The FMOs briefly showcased their core commonalities and differences in approaching flexibility markets, while underlining the capabilities which the UMEI brings in interfacing with them. A core conclusion of the session was that it allows for a seamlessely and easy-to-setup mechanism of communication to start interfacing with flexibility markets in a common manner, independently of the market characteristics.



Figure 51 - FMOs platform characteristics

	N-SIDE	NODES
Market Design	Tailored Market Design (based on specific customer needs)	Integrated Market design
Registration & Prequalification	Via the market platform/API (though not used in EUniversal)	Via the market platform/API
Product type (Long/Short)	Full compatibility with reserve/activation, long-term/short-term schemes	ShortFlex/LongFlex according to market and stakeholder requirements, Active/reactive power, Capacity (DLR),Energy
Service type	Network-aware market clearing & algorithms	Market clearing, validation & settlement (not in EUniversal)
Trading& Market clearing	Closed gate auction, pay-as-bid or pay-as- cleared; different TSO/DSO coordination schemes supported	Continuous market, Pay-as-bid Gate closure time defined in market rules
Data requirements	Can operate with limited network information, and improve optimality in case of extensive topology shared	Minimum data requirements
Tool usage/interface	API	GUI/API

Lastly, Centrica and E-REDES also explained their perspective to the usage of the UMEI in their role as FSP and DSO, often the seller and buyer of flexibility products, respectively.

Centrica as FSP in EUniversal

FMOs

UMEI: submit bids and offers together with baselines, receive the accepted bids after market clearing

UMEI: Meter reading data (hosted by FSP)

Figure 52 - FSP perspective towards the usage of the UMEI

- The bids are submitted in the form of portfolios. One portfolio can be the aggregation of multiple flexible assets.
- Without UMEI, FSP needs to create a tailor-made communication protocols (channel), which requires different parameters, to submit
 the bids and offers to each FMO.



During the session, the presenters also fostered the participation of the audience through the slido.com tool, by performing 3 surveys in order to understand:

- The audience's perception and knowledge of what is the UMEI
- Challenges to the adoption of the UMEI that must be evaluated
- Future development opportunies to the work which was done so far

Figure 53 - What is the UMEI

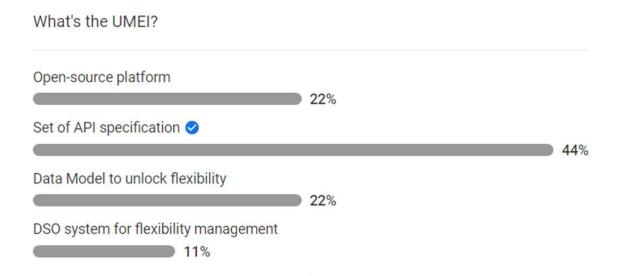




Figure 54 - Challenges for the UMEI to become an European standard

What do you think are the main challenges for the UMEI to become an European standard?

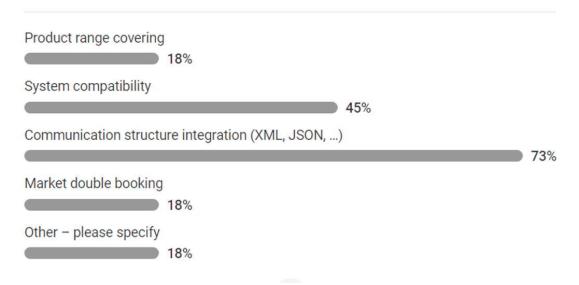


Figure 55 - Future development opportunities for the UMEI

Priority development opportunities for the UMEI?

Compatibility with the TSO

Flexibility register synchronization

20%

Alignment with standards

10%

Inclusion of other steps of the process (e.g. settlement)

Other (please detail)

0%



At the end of the session, the floor was opened for active participation of the audience to answer questions, but also to take on suggestions to the future work of the project.

The main conclusion topics of BS2 can be summarized as follows:

- It became clear for the participants what the UMEI is, being its modularity and ease-of-use a strong point. The entire implementation isn't centered in one participant, but divided between them according to the identified needs
- One of the main benefits which was identified is the capability of allowing the multiple FSPs
 to communicate with the flexibility market platforms without needing to deeply explore and
 understand complex standard data models, which ultimately saves time by reducing the
 complexity and allows for a greater participation of distributed resources in such mechanisms
- It's clear from the answers to the surveys that
 - The integration of more data structure technologies in the UMEI should be a priority in order to maximize the compatibility and adaptation to legacy systems already working
 - Another priority for future developments would be the extension of the UMEI to the TSO, in order to improve the degree of coordination between the system operators, but also the inclusion of additional steps from the flexibility process in the UMEI, such as the settlement

3.8.3 BS3. Technical session focused on DSO tools - Main conclusions

The main objective of BS3 was to present EUniversal vision and tools for the active and coordinated management of distribution networks considering market based flexibility. The session was organized considering of the following agenda:

- 1. EUniversal vision for Smart and Flexible Distribution Network, introducing the topics of the session and presenting the DSO multi-level preventive management framework developed in WP4 (see Figure 39), consisting of HV, MV and LV tools that implement a predictive and multi-level approach for the assessment and mobilization of market based flexibility.
- 2. Solutions for enabling the use of LV network flexibility, considering the limited data availability and poor characterization of network topology and feeder electric characteristics. Three different tools for the LV network considering different scenarios of data availability were presented, namely: LV flexibility need assessment tool developed by KUL, the LV congestion forecasting developed by VITO and the Data-driven State Estimation and Voltage control based on smart metering data, developed by INESC TEC.
- 3. Discussion & Closing, based on online pool and live questions from the audience.



Figure 56 - BS3 slido info



The presentations prepared for topics 1 and 2 are available at the project SharePoint. The DSO tools developed within the project are coordinated according the multi-level approach represented in Figure 39. The main objectives of these tools are:

- Capability of forecasting technical problems in HV, MV and LV networks
- Quantification of flexibility needs in MV and LV networks, considering a coordinated operation between MV and LV networks.
- Optimal bid selection coordinated with DSO assets and a coordinated operation between MV and LV networks.
- Compatibility with different flexibility market platforms and models.

In order to understand the tools the audience considers more relevant, a online survey was made available to understand which set of tools the audience consider more relevant or their projects focus on. As shown in Figure 40, the audience consider more relevant tools to enable TSO-DSO coordination followed by distribution network planning and MV-LV coordination and LV network. The survey shows that the audience consider less relevant the development of tools for the operation of distribution network.

However, considering EUniversal project vision, when considering flexibility from MV and LV consumers its necessary to endow the DSO with adequate tools to forecast grid status for the next day and hours and understand the flexibility needs at the distribution network and the impact its mobilization, particularly in LV network.

The project developed a set of tools that aim to improve LV network observability and controllability, considering different scenarios of data availability. For example, LV flexibility need assessment tool developed by KUL is based in conventional power flow results, requiring full characterization of LV network topology, feeders electrical characteristics and consumers phase connection. On the other hand, INESC TEC developed a fully data driven approach based on the availability of voltage and active power consumption historical data from the smart meters. An intermediate approach is proposed by VITO, which forecast LV congestion for the next hours, considering data from different sources, namely: typical load profiles, limited topology information, etc. Detailed information on the tools can be found in D4.1 and D4.2.

When discussing about the relevance of smart meter data for the DSO, the results of the online survey also shows the relevance of this data to the DSO network operation and planning with 75% of the answers.



External Data Meteorological Sources AMI Forecasts Data DSO Network state and Flexibility needs Flexibility bids constraint forecasting selection & validation Load and RES DLR based HV Forecast flexibility capacity MV flexibility scheduling HV and MV **SCADA** MV multi-period **Power Flow** Data-driven **OPF** Voltage Control (DdVC) LV congestion MV flexibility **AMI** forecasting scheduling Topology LV Data-driven Data-driven Voltage Database State Estimation Control (DdVC) (DdSE) LV flexibility needs assessment Flexibility Flexibility **ADMS** requests **Universal Market Enabling Interface - UMEI**

Figure 57 - DSO Multi-level preventive management framework



Figure 58 - Results of the online survey to question one of BS3

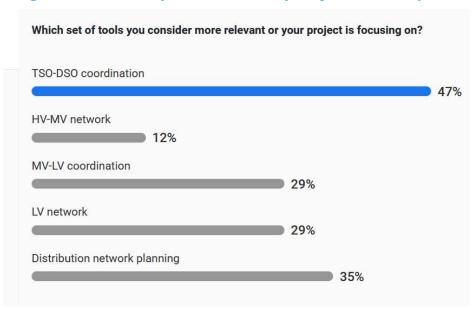


Figure 59 - Results of the online survey to question two of BS3

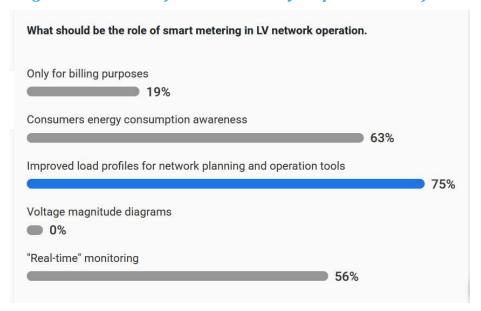
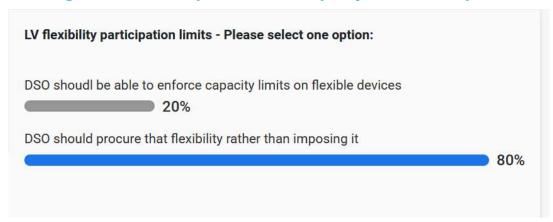




Figure 60 - Results of the online survey to question three of BS3



Summarizing, future DSO tools need to focus on the following challenges:

- Enabling coordinated management of distribution network and facilitating interaction with TSO
- Improving DSO capability of forecasting and detecting problems in LV networks is key for enabling the use of flexibility
- Effective design and flexibility market design considering the local nature of distribution network technical problems
- Development of tools specifically designed for the monitoring and control adapted to LV network characteristics

All created content relating to the workshop is available at the project SharePoint.



4 Annex 1 - EUniversal WS 2021 Questionnaire

To be consulted in the pdf file D11.3_Annex_I_EUniversalWS2021_Questionnaire_questions



5 Annex II - EUniversal WS 2021 Questionnaire responses

To be consulted in the pdf file D11.3_Annex_II_EUniversalWS2021_Questionnaire_responses