

Smart Building Smart Grid Smart City

3Smart: Vision for Smart Energy
Distribution Systems in the
Danube region

THE MAIN GOAL OF 3SMART

To provide a technological and legislative setup for cross-spanning energy management of buildings, energy grids and major city infrastructures in the Danube region.

This includes the development of a modular platform for coordinated building and distribution grid energy management. The developed platform will be installed on 5 pilot locations in 5 countries (Croatia, Slovenia, Austria, Hungary and Bosnia and Herzegovina) and comprehensive cost-benefit analysis will be performed to verify the platform's performance.

3SMART VISION

In this way 3Smart will enable economically optimal interoperation of energy efficiency measures and renewable energy sources in buildings, and will motivate installation of distributed storages to improve energy security in the Danube region.

INNOVATION BROUGHT WITH 3SMART

Major innovative moment is in vertical two-way synchronization through all the platform modules via simple interfaces to attain optimal operation of the buildings and the grid, and easy modules add-on to the existing systems.

PROJECT PARTNERS

	University of Zagreb Faculty of Electrical Engineering and Computing	Lead partner
	Hrvatska elektroprivreda d.d.	ERDF partner
	E 3, ENERGETIKA, EKOLOGIJA, EKONOMIJA, d.o.o.	ERDF partner
	Municipality Idrija	ERDF partner
	Elektro Primorska d.d.	ERDF partner
	European Centre for Renewable Energy Güssing Ltd.	ERDF partner
	Municipality of Strem	ERDF partner
	Energy Güssing Ltd.	ERDF partner
	University of Debrecen	ERDF partner
	E.ON Tiszántúli Áramhálózati Zrt.	ERDF partner
	University of Belgrade Faculty of Mechanical Engineering	IPA partner
	JP Elektroprivreda Hrvatske Zajednice Herceg Bosne	IPA partner
	University of Mostar Faculty of Mechanical Engineering and Computing	IPA partner
	Croatian Energy Regulatory Agency	Associated strategic partner
	Jožef Stefan Institute	Associated strategic partner
	Goriška Local Energy Agency	Associated strategic partner
	Regulatory Commission for Energy in Federation of Bosnia and Herzegovina	Associated strategic partner
	Hungarian Energy and Public Utility Regulatory Authority	Associated strategic partner

WHY IS THE CURRENT DISTRIBUTION SYSTEM “NOT SMART”?

Technology current state analysis in the Danube region Challenges/obstacles identified

- Renewable Energy Sources (RES)/Distributed Energy Resources (DER) still considered a problem, not a market participant
- Inadequate information exchange in operation between the Distribution System Operators (DSOs) and Transmission System Operators (TSOs)
- Prosumers need to be integrated/promoted in active distribution system management
- 'Smart management' of distribution network only in pilot projects
- No national Smart Grid strategies
- Smart meters - absence of standardized communication technology
- Smart meters Cost-Benefit Analysis (CBAs) - very different results due to different and incomplete benefit assessment methodologies
- Building Energy Management Systems (BEMs) not used for DSO grid issues
- Technical specifications for smart meters do not cover the possibility of communication with BEMs

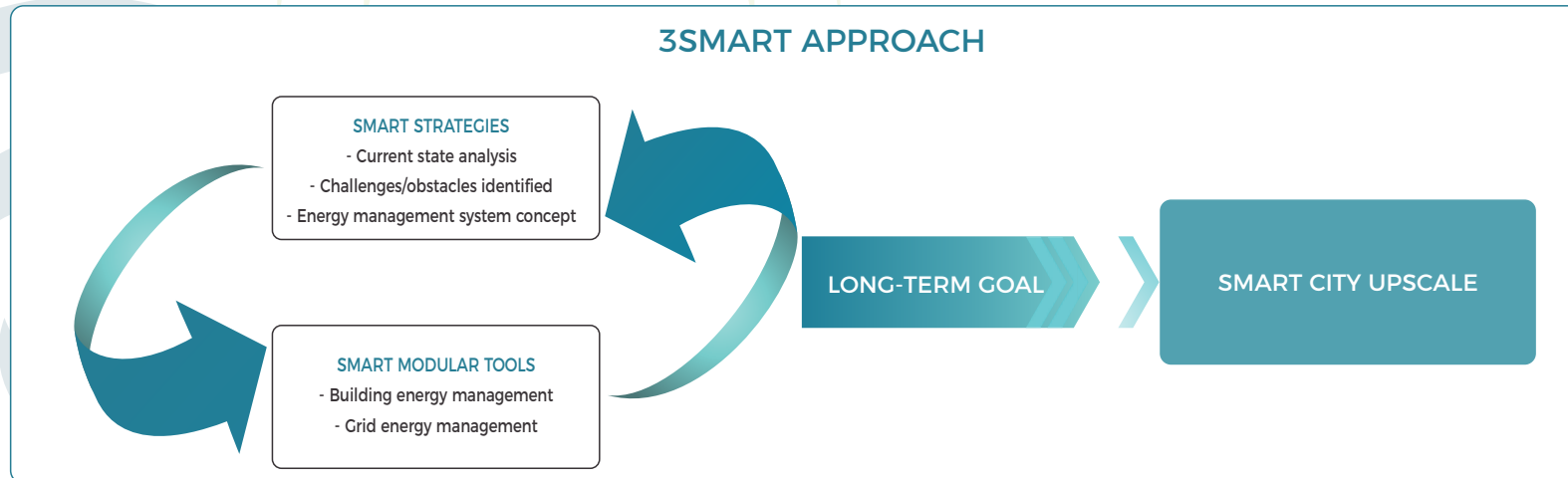
Regulatory current state analysis in the Danube region Challenges/obstacles identified

- Liquid electricity markets as necessity for power system flexibility
- RES not a market player/actor - supported by feed-in tariff or premiums
- Reserve market not developed, in most cases contracted bilaterally, not fully transparent
- DERs need to become participants on the ancillary services markets
- How to promote dynamic tariffs for final consumers?
- There is mainly no framework that encourages/requires DERs to provide any flexibility service
- BEMS - additional regulatory incentives needed for energy management systems in case of newly built properties

DSO current state analysis in the Danube region Challenges/obstacles identified

- Less than 5% of final consumption points in DSOs SCADA systems
- Deep connection scheme for DER integration might result in overbuilding and underutilizing the distribution network assets
- Optimal network layout/topology is based on experience and rarely changed
- Goals of reducing voltage deviations, power losses and increasing reliability and quality of supply (SAIDI, SAIFI) can be in conflict with current DER/RES integration practices
- Storage is mainly not recognized as a DSO asset
- Long-term network planning strategies, such as reducing the number of voltage levels, need to be integrated with smart distribution network planning concepts
- Conflicting challenges between standardizing procedures for planning future distribution networks and continuous integration of new technologies
- Only large consumers pay for power, instead of energy only

More information can be found at: link on D3.1.1 published on project web page; link on D3.2.1 published on the project web page



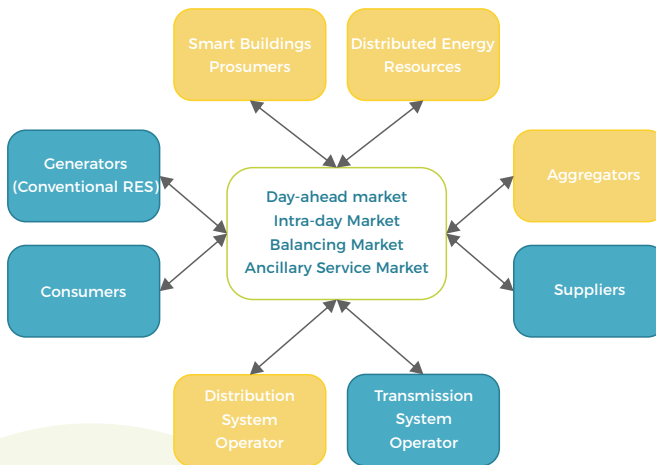
FROM IDENTIFYING PROBLEMS TO CREATING SOLUTIONS

MARKET CHALLENGES/OBSTACLES - PROPOSED SOLUTIONS

Currently the market design is based on balancing groups – the distribution level is still rather passive and procures services only from the upstream system. General concept on the right demonstrates changes needed (from current market to smart interactive, liquid market):

- DSO needs to be included in the market process: check network security, schedule services of DERs for the grid
- No retail/distribution level market – define and recognize the role of aggregators

3Smart market concept



PROSUMERS CHALLENGES/OBSTACLES - PROPOSED SOLUTIONS

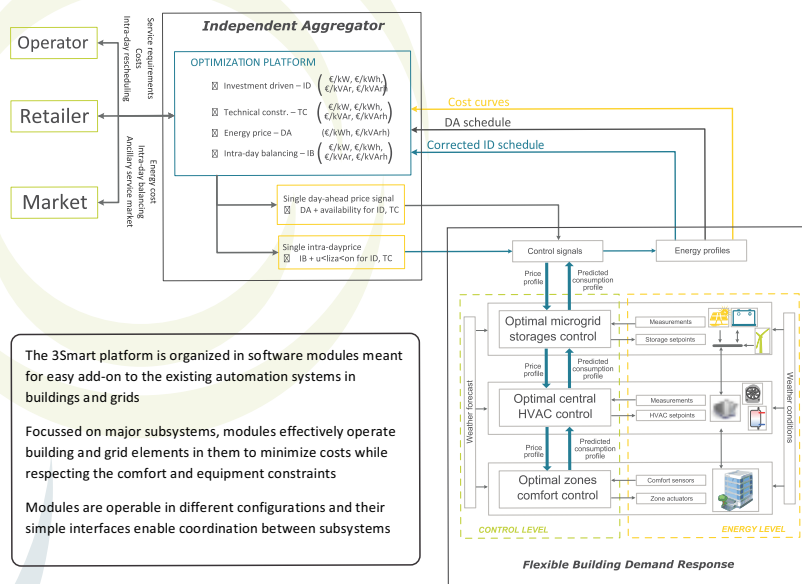
Prosumers need to be recognized as flexibility providers – opportunities for integrated building-grid energy management system.

Flexibility services to be provided to both TSO and DSO – stronger collaboration and communication between system operators.

Coordinated grid-building operation (or grid-Prosumers) can help the DSO to achieve the goals of mitigating voltage issues and reducing power losses.

Improving reliability and quality of supply (SAIDI and SAIFI).

The planned modular energy management system outlook within 3Smart



We sincerely ask to send us any feedback you might have on this brochure or on the linked documents. We hope to commonly pave the optimal route for smart energy systems development in the Danube region. Thank you in advance!

More on the 3Smart concept you may find at: [link on D4.1.1 published on project web page](#); [link on D5.1.1 published on the project web page](#)

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