



OPEN & AGILE SMART CITIES

Energy: **INTEROPERABLE** Smart Homes and Grids.

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CONNECTED SMART CITIES CONFERENCE 2018

*Energy Union is
“Deepest Transformation Energy Systems Since
Industrial Revolution”*

EU Vice-President Maros Šefčovič

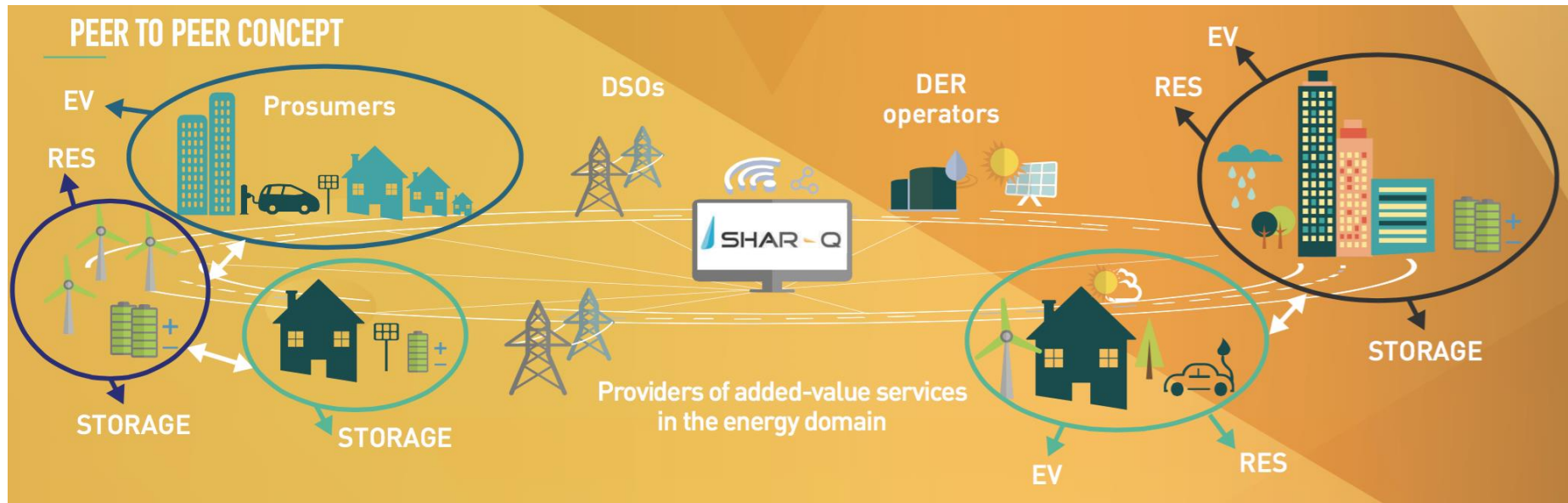
*“Renewables, decentralized energy,
digitalization and smart grids will be the
backbone of the new modern economy in
Europe.”*

ENERGY is TRANSVERSAL

- ① Energy sector trends affecting and driving changes
- ② New nodes or clusters approach
- ③ Clean Mobility – a new catalyst for a wider sector change?
- ④ Domain relevant solutions
- ⑤ Levels of Interoperability
- ⑥ Business models and the related challenges

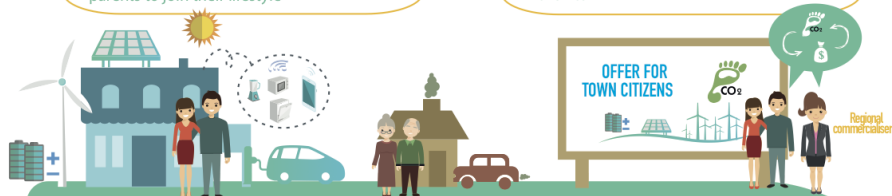
ENERGY SYSTEM in TRANSITION

- ① Decentralised and smarter system
- ② Low carbon energy generation
- ③ New modes and levels of interaction and management
- ④ New transmission, generation and balancing technologies and services

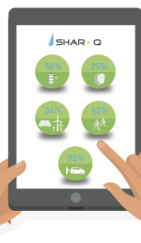


Max and Alice is a young couple committed to sustainability, trying to convince their parents to join their lifestyle

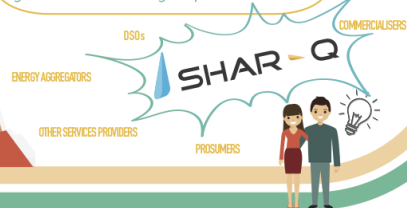
They want to make the most of their generation and storage facilities, thanks to a pilot rollout in their town



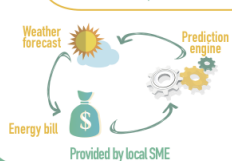
Now they can easily set up and manage their home energy system, minimising their CO2 footprint



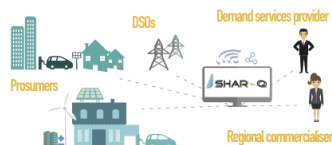
They learn about SHAR-Q, a smart collaborative platform connecting the capacities of the neighbourhood and wide regional electricity generation and storage capacities



3rd party added value services can be identified and developed



Demand response programs can be deployed to leverage local prosumers production, helping DSOs to balance the grid and cover the peaks



SHAR-Q IS A WIN-WIN FOR ALL MARKET PARTICIPANTS !!

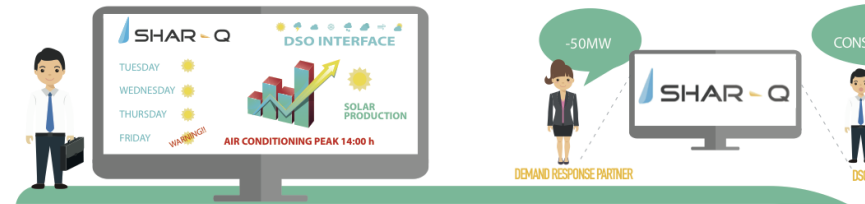
Home and office environments can interact through SHAR-Q platform, e.g., to enable the use of energy stored in the EV's battery



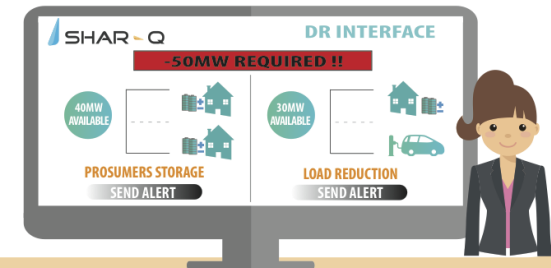
DILO PROSUMER perspective

A Regional DSO connected to SHAR-Q platform collects weather information anticipating future demand and production peaks

DSO and demand response (DR) parties interact to find the best solution



SHAR-Q provides the DR partners with the resources available to manage the peak consumption (storage from prosumers, demand reduction...)



DR sends requests for P2P power share through SHAR-Q platform. Prosumers can accept or decline according to their energy needs.



Thanks to SHAR-Q, peak load is under control, collaborating prosumers are rewarded and notified of the benefits gained and a significant reduction of CO2 emissions is achieved



DILO GRID OPERATOR perspective

INTEROPERABLE BUILDINGS AND NEIGHBOURHOODS

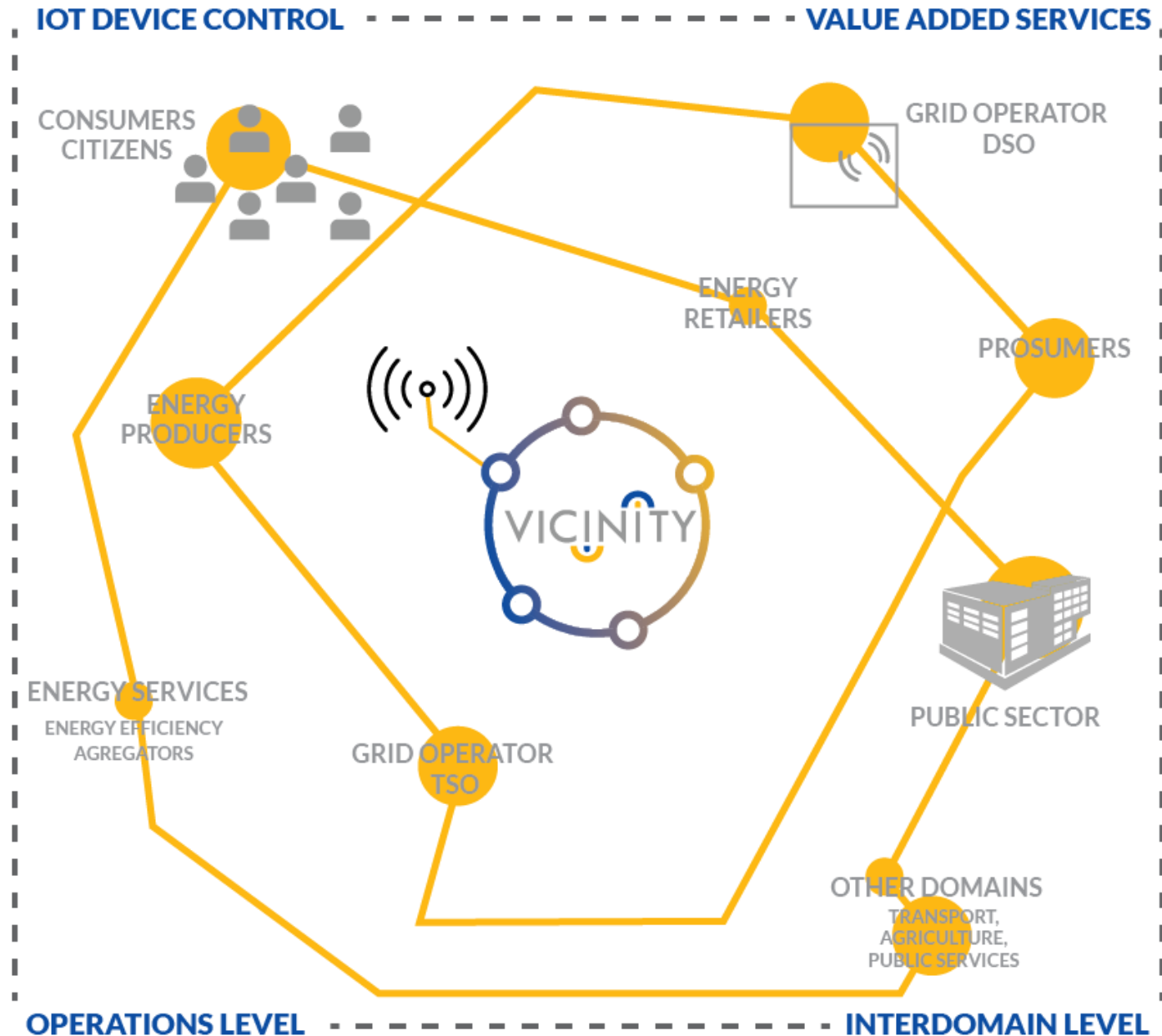


DISTRICT LEVEL



- Will EVs and alternative fuels Mobility projects enable Energy Efficiency along with Self Consumption and unlock community solar and dynamic markets?
- Horizontally integrated vertical solutions as an enabler?

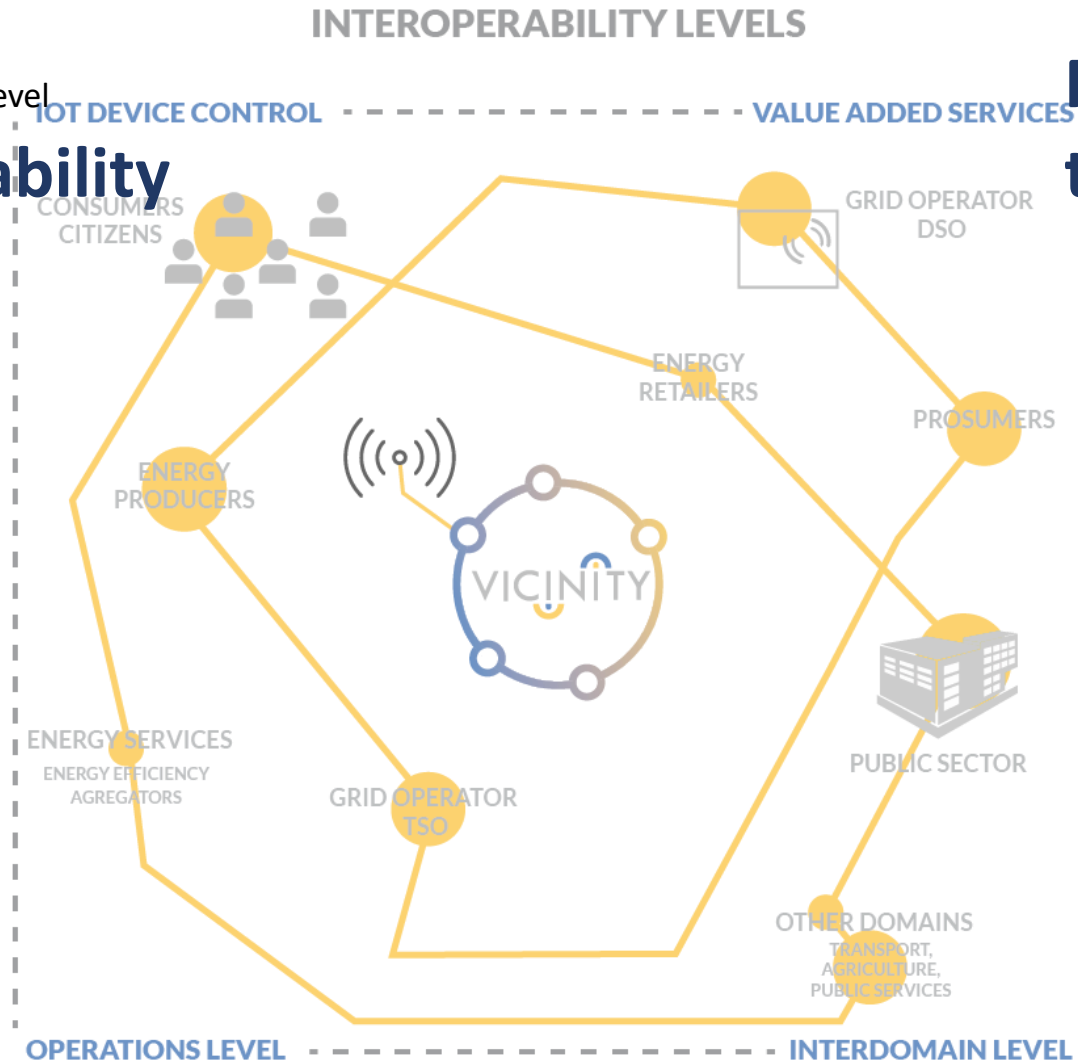
INTEROPERABILITY LEVELS



Technical interoperability

level

Platform to Platform



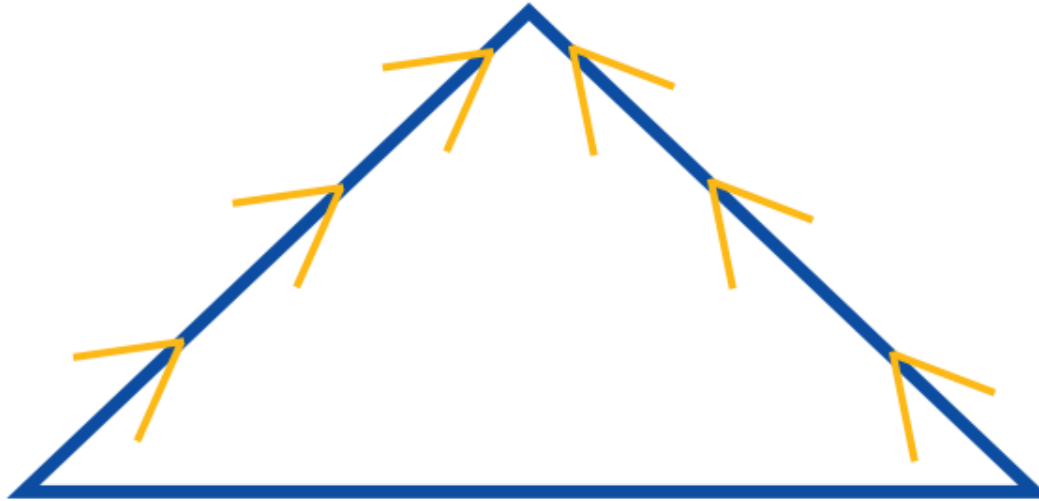
Business Processes

Business Models Level and Technical level

INTEROPERABLE BUILDINGS AND NEIGHBOURHOODS



Business Models



Business Drivers

Business Barriers



Energy Domain



*Smart
Buildings*



*Distributed Generation
and Microgrids*



*Smart homes
(Automation and E-health)*



E-mobility

THE INTERNET OF ENERGY

Internet of Things



Identification



Communications



Computation



Services



Big Data



Semantics

Energy Management

- ⊙ Monitoring and Supervisory real-time control
- ⊙ Distributed Energy Resources Monitoring (Energy supply and Storage)
- ⊙ Demand data collection:
 - User requirements for energy and power quality
- ⊙ Demand behaviour forecasting: optimization of demand/supply
- ⊙ Advanced metering infrastructure:
 - (smart metering for real time consumption and pricing)

The winter energy package 2016

Opportunities and Challenges

- ⊙ Retail energy markets: market participation of the consumers with specific issues related to data privacy and ownership so as to foster market efficiency;
- ⊙ Improved electricity market design so as to provide the right investment signals for investment decisions (need for flexibility, new players and new infrastructures in the power system);
- ⊙ The interactions and the roles of the different (and new) market players (access to and exchange of standardized data) and market makers.

Aiming at achieving even greater level of integration

- ⊙ mobility electrification and alternative fuels within smart grids
- ⊙ energy storage integration within smart grids
- ⊙ gas networks and smart grids coupling
- ⊙ heat networks and smart grids coupling
- ⊙ other fuel and chemical storage and smart grids
- ⊙ buildings, districts and smart grids within cities (microgrids, nanogrids, community solar)
- ⊙ flexibility of energy new models and DER RES management
- ⊙ energy markets growth