Project Proposal for Large Scale Pilot "FEASIBLE" in H2020 - the National Pilot

Dr. Georgia Ayfantopoulou

Principal Researcher
Deputy Director - Hellenic Institute of transport
Center for Research and Technology Hellas
gea@certh.gr

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FEASIBLE at a glance

- Innovation project proposal
- Submitted at:
  - H2020
  - Work Program: Secure, Clean and Efficient Energy
  - Call: Competitive Low-Carbon Energy
  - Topic: Demonstration of smart grid, storage and system integration technologies with increasing share of renewables: distribution system

FEASIBLE – Who is involved

Nr.	BENEFICIARY	Country	Stakeholder Typology								
			DSO	Utility	Telecom	Research	Techn. Manuf.	Authority	Education	SME	Standard. Body
1	TIM	IT			■						
2	RSE	IT				■					
3	CNIT	IT							■		
4	BKK	NO	■	■	■						
5	DT	DE			■						
6	ELTEK	NO					■				
7	SINTEF	NO				■					
8	ACEA	IT	■								
9	INACCESS	GR					■			■	
10	OTE	GR			■						
11	INFOCOM	IT					■			■	
12	SIEMENS	IT					■				
13	CEA	FR				■					
14	YME	GR						■			
15	CERTH	GR				■					
16	THYTRONIC	IT					■			■	
17	VITO	BE				■					
18	UCY	CY							■		
19	KPN	NL			■						
20	ESC	GR		■							
21	NQIS	GR									■

FEASIBLE – Aims and Approach

- Aims:
  - designing, proving and demonstrating integrated technological solutions for Smart Electricity Distribution Grids in large Pilot Plants
  - identifying and assessing novel business models that such solutions enable.

- Approach:
  - exploiting existing power assets deployed in large Information and Communication Technology (ICT) sites (Telecom sites and Data Centers) to be integrated with the Electricity Grid in order to implement and prove innovative solutions in support of the Electricity Distribution Grid operation. The use of available power assets, enables earlier availability of the needed solutions at a marginal cost.

FEASIBLE – Focus and Solutions

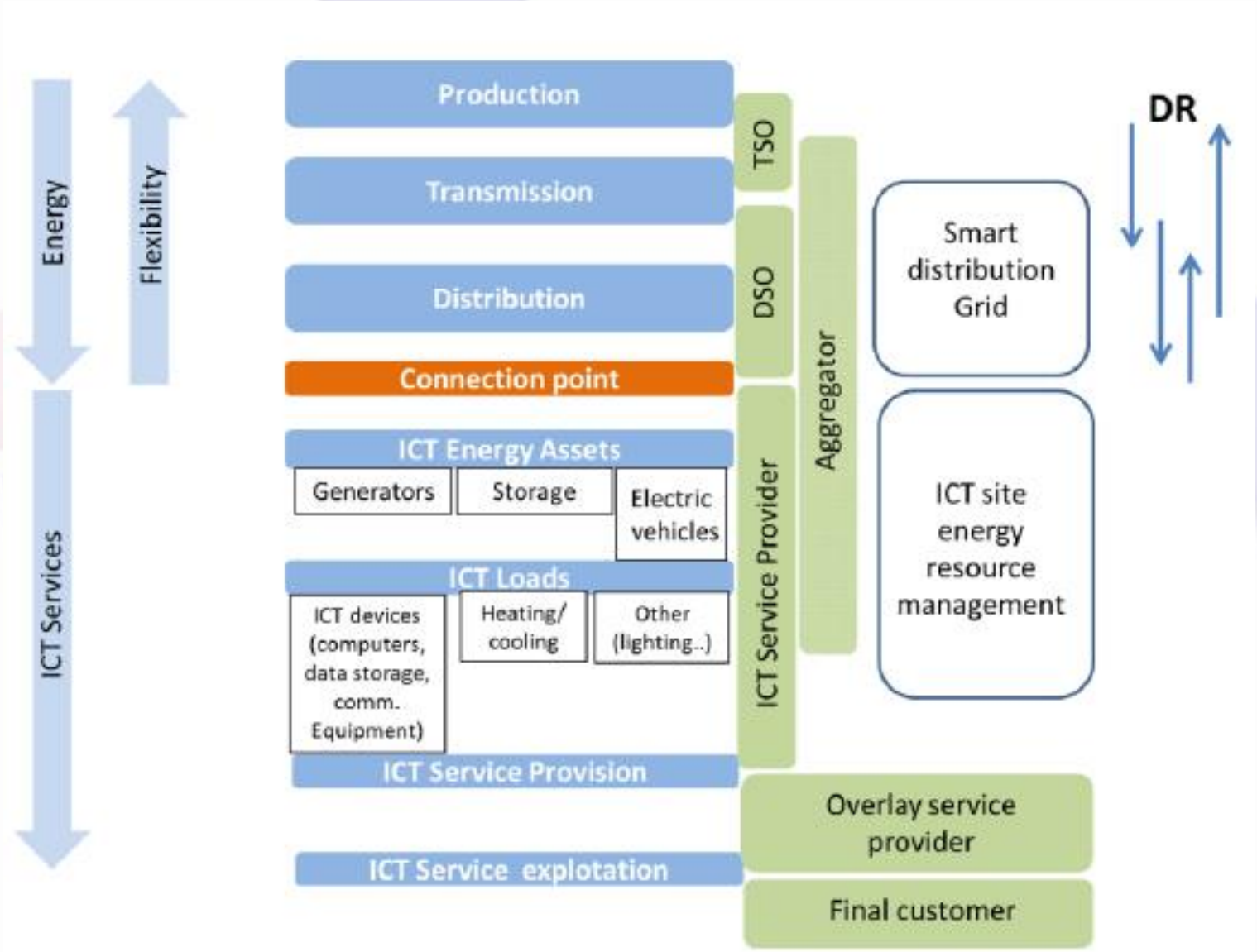
- Focus:
  - on the seamless integration of distributed power assets into the Medium and Low voltage (MV/LV) electricity Distribution Network (DN) with specific emphasis on the key role played by Distributed Generators (DG) and Energy Storage Systems (ESS), with the inclusion of Electrical Vehicle (EV).

- Solutions:
  - will enable the integration of Distributed Energy Resources will improve the controllability and automation of the electric infrastructure
  - will allow the smart support of users from transport (such as electrical vehicles and ships)
  - will enable consumers to actively participate in the energy market and in Demand Response schemes.

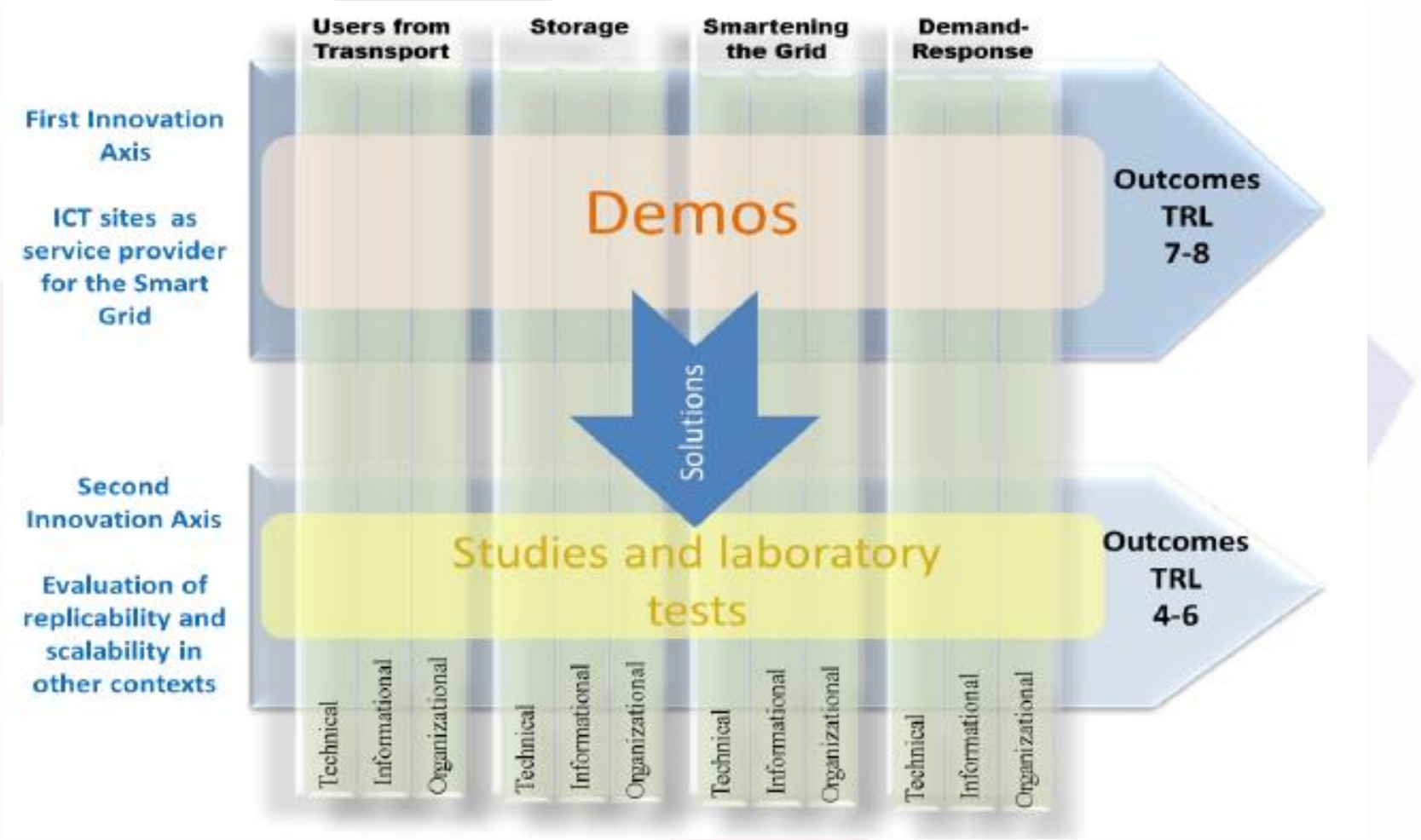
FEASIBLE - Goals

- Goals of the project is defining and assessing:
  - integrated monitoring, control and communication solutions that enable the smooth interoperability of MV/LV distribution networks and energy sources and storage systems to guarantee electricity service high availability and quality,
  - demand/response protocols to dynamically condition the supply of loads from the Distribution Grid, while guaranteeing Grid stability and consumer satisfaction, by leveraging available alternative energy sources and storage systems
  - novel business models to maximize and fairly share the economic gain derived from the optimization of relevant resource usage and reduced operational costs among all the stakeholders involved in the system

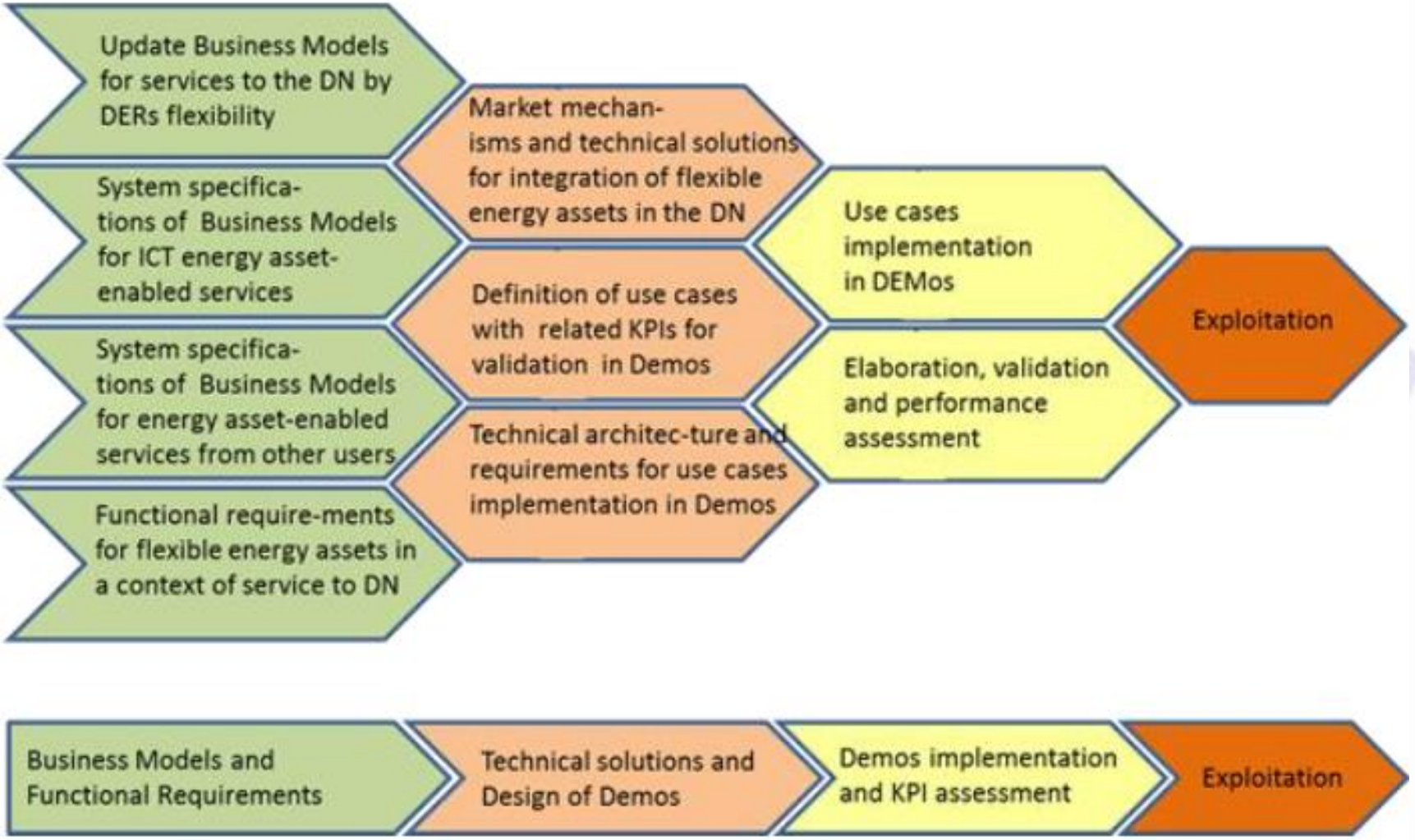
FEASIBLE at a glance



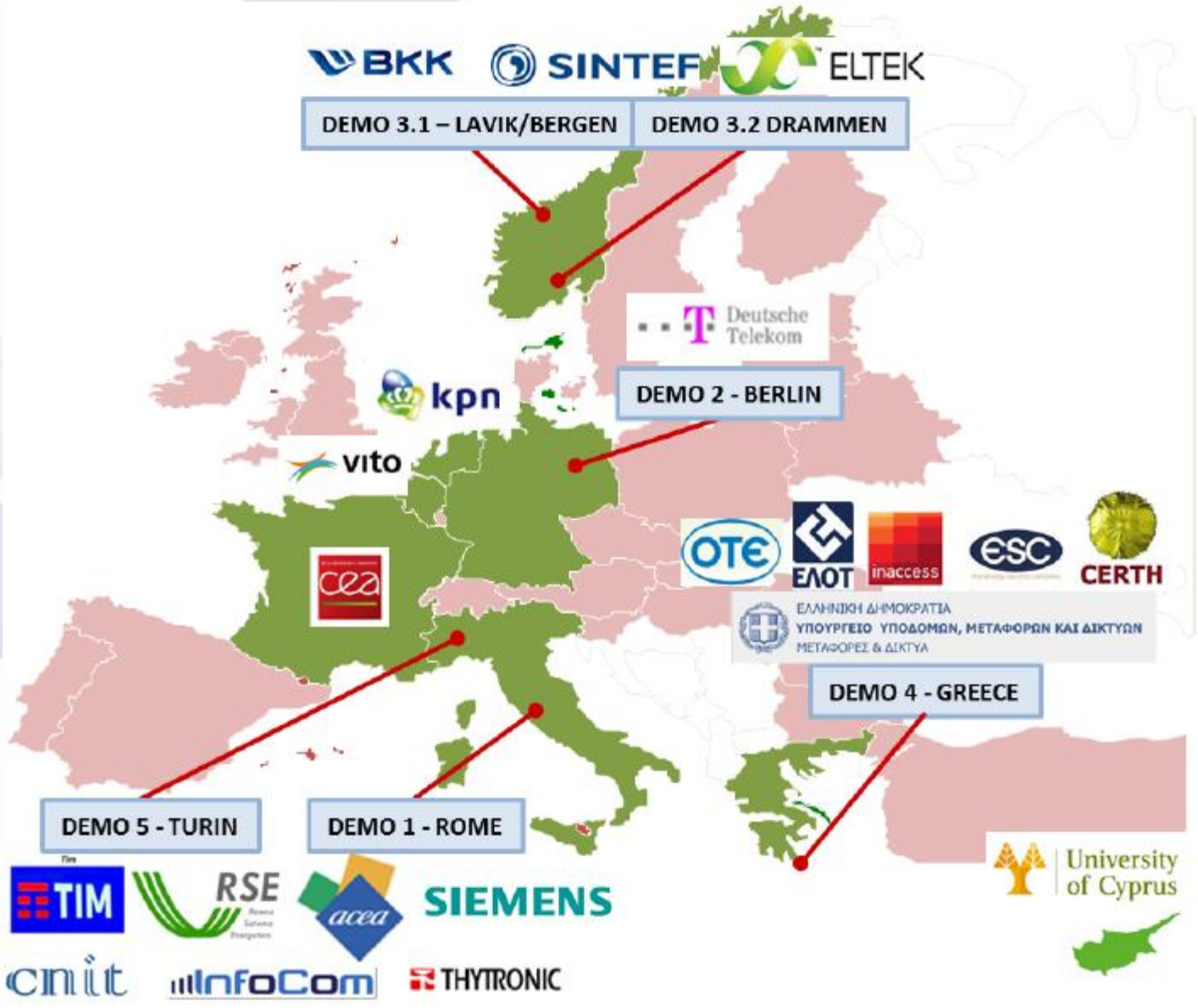
FEASIBLE - Methodology



FEASIBLE – Activities flow



FEASIBLE – Demonstrators

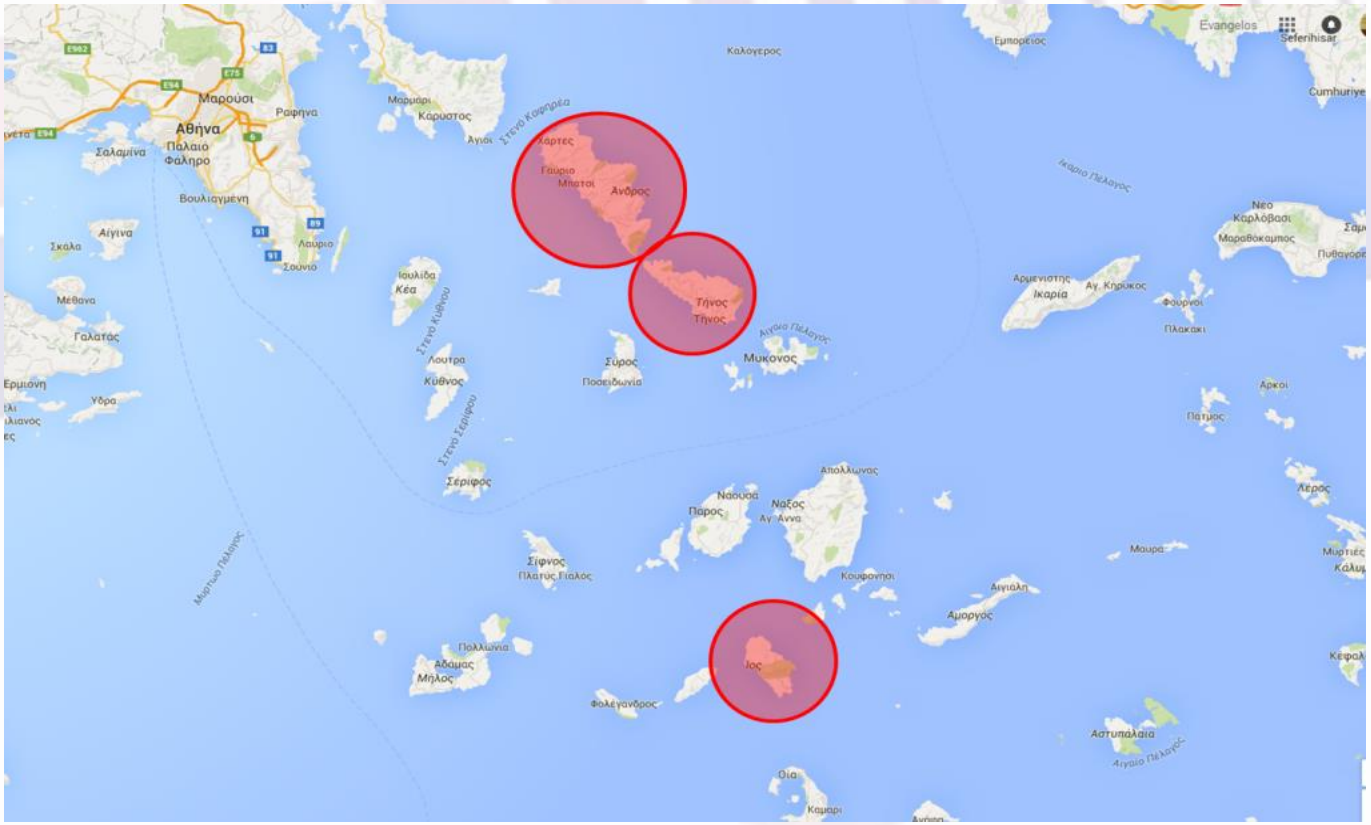


FEASIBLE – Demonstrators

1. Italy, Rome:
   - Improvement of the efficiency, availability and reliability of the distribution network by optimally managing energy resources and testing the innovative, bi-directional energy systems in a medium/large TIM site.
2. Germany, Berlin:
   - Development of appropriate hierarchical ICT control architecture enabling the flexible reaction of the microgrid (loads, generation and storage equipment) to external signals
3. Norway, Lavik/Bergen:
   - Focus on how distributed and diverse resources can be orchestrated in a holistic manner. Demonstration of smartening of the distribution grid, including smart integration of grid users from transport (electric ferry and electric vehicles
4. Italy, Turin:
   - Test and development playground to verify feasibility, efficiency and effectiveness of the novel use of the existing and innovative energy and backup assets to deliver flexibility services to the Grid.

FEASIBLE – The National Pilot

- Greece
- Title of DEMO: HELIOS
- Involvement of 3 islands: Tinos, Andros, and Ios



FEASIBLE – The National Pilot - Description

- Test of Demand Response schemes in both residential and public buildings, making use of ESC available monitoring infrastructure;
- Assessment of utilization of integrated storage systems for storing excess energy from RES to provide lighting service on night
- Public RES plants (mainly PV installations) will further provide power to nearby boat marines, taking advantage of produced energy during day-light and stored energy in the integrated storage system
- Focus on integration and sustainable management of energy in green ports operations.
- The ESCO participating in the project will further analyse and develop new business models and integrated energy services that can be provided upon the integrated infrastructure.

FEASIBLE – The National Pilot - Details

Typology and amount of the technology involved in the DEMO (generation, load, storage, automation, telecommunication…)

- Infrastructures (RES MW): The available RES capacity consist of (Andros: 46.0 MW Wind-energy and 2.4 MW PVs), (Tinos: 54.5 MW Wind-energy and 3.1 MW PVs)
- Generation: The available RES capacity consist of 141,4 GWh Wind-energy and 3,3 GWh PVs in Andros 153,6 GWh Wind-energy and 4,2 GWh PVs in Tinos and Ios.
- Building Loads: The loads comprise mainly of:
  - Typical residential buildings loads
  - Tertiary buildings loads of the OTE buildings (one in each island): All are powered by three-phase circuits with an average annual consumption of around 110 MWh each. They are equipped with equivalent backup power generators (for instance Tinos: 45KVA and Andros: 60 KVA), while battery arrays are also available (e.g. Tinos: 2X420 Ah/48V and Andros: 2X700 Ah/48V).
- Public lights: within the city and surrounding areas, with a total of around 15 MWatts comprising of more than 100 light infrastructures.
- Boats charging at islands main harbours, which can reach in high demands during peak season.
- Storage: The foreseen storage infrastructures to be installed and integrated with the available RES will be at least 80 KWh, to allow the implementation and demonstration of different business models of optimal utilization of the RES generation on the selected harbour areas.

FEASIBLE – The National Pilot - Details

Portion of the distribution grid involved in the DEMO

- At least 250 customers (mainly residential but also tertiary buildings) of the ESC company will be included in the foreseen demonstration. Moreover, OTE partner buildings will be part of the demonstration, hosting corporate business and data centres facilities.
- The core concept will be to the demonstrate and evaluate technologies for i) DR scenarios, ii) local energy grid flexibility analysis taking into account RES & storage, iii) Optimization of RES excess for intelligent and effective charging of port mixed loads (e.g. lights, vehicles/boats, etc.).
- Therefore, in terms of demo coverage, it is estimated that around 5-10% of the distribution grid will be covered within the aforementioned island harbours.

THANK YOU!

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