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This project has received funding from the European Union's **Horizon 2020 Research and Innovation programme** under Grant Agreement No **824388**.

Business Model Innovation in Energy – The confluence of locality, digitalization and sector coupling

2th April 2020, Online webinar



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Integrated multi-vector management system for Energy isLANDs

Technical tools in support of carbon neutral public energy islands

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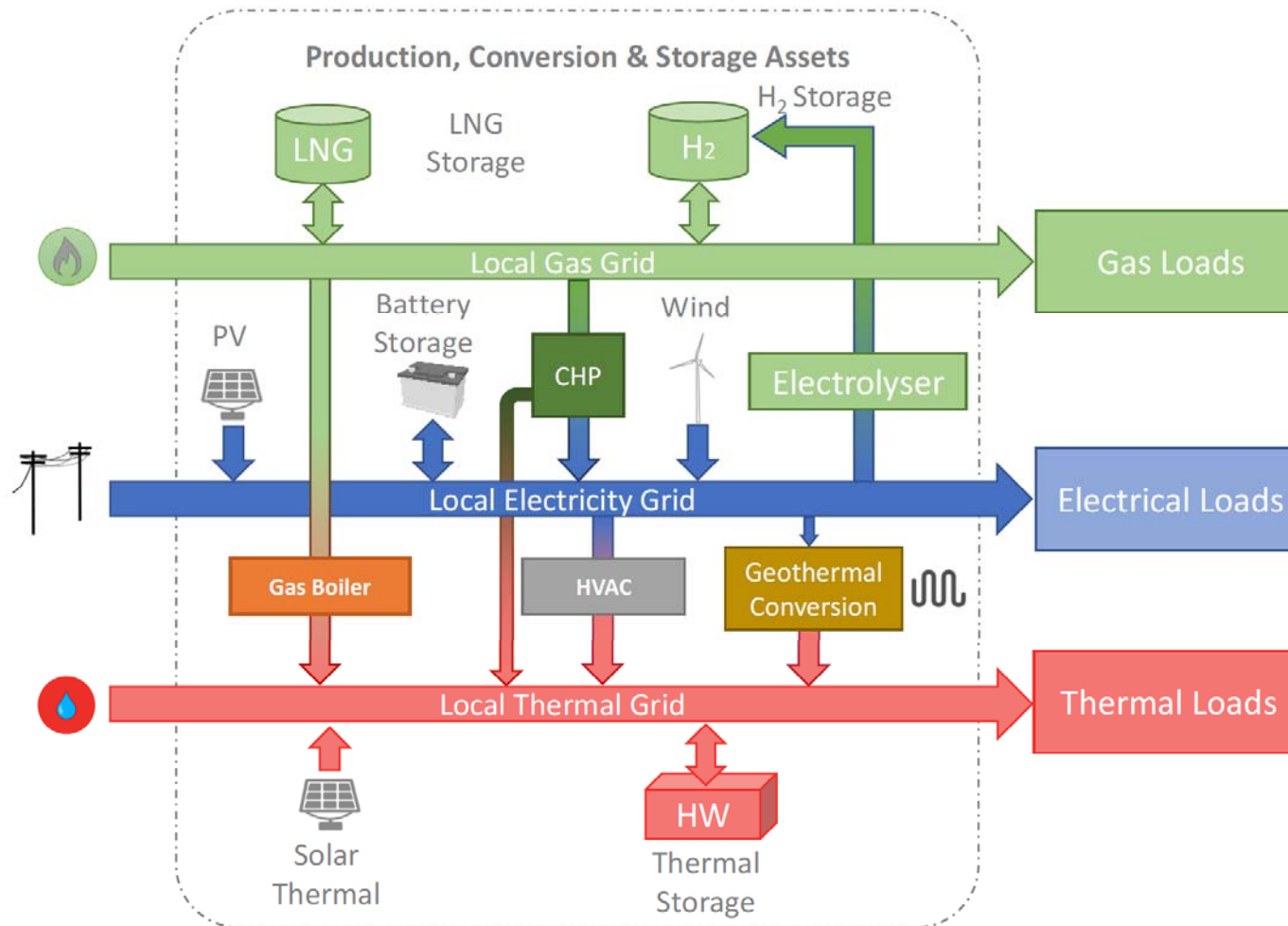
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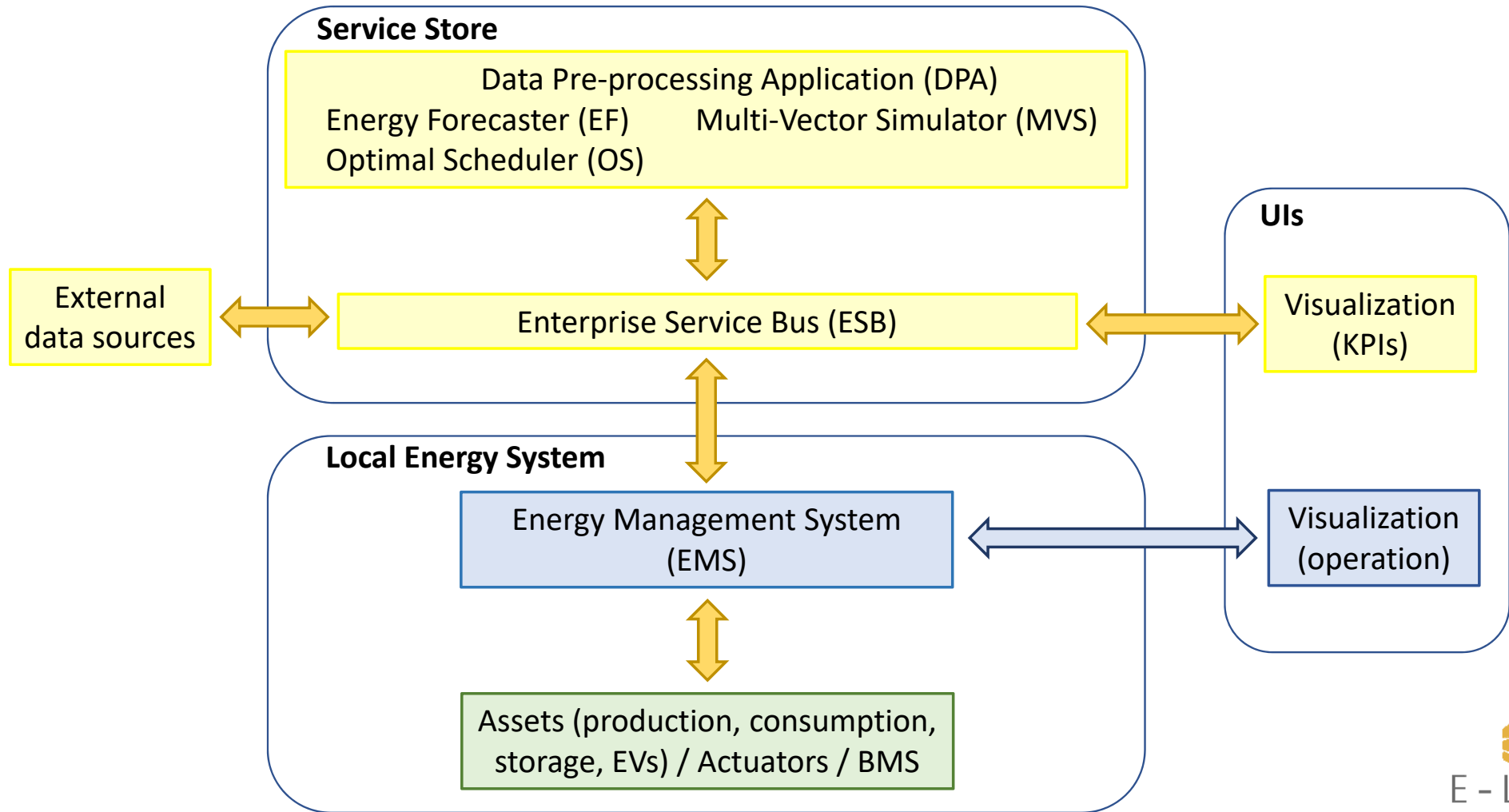
Introduction

- Energy optimization: **WHEN** and **HOW** ?
 - to produce
 - to consume
 - to store
- Maximize the use of local renewable energy resources
- Multi-vector energy scenario (challenge)

Introduction



Technical tools



Technical tools – Local Energy System

- Existing/updated infrastructure
 - Energy measurement devices (production, demand)
 - Actuators (controlled assets: storage, flexible demand)
 - Sensors
 - EV chargers
- EMS – Integration in one single device

Technical tools – Enterprise Service Bus

- System that enables the integration of the previous systems and the advanced software tools (service store)
- Integration of external data sources: weather forecasting and energy prices
- There is not direct communication between software tools themselves and between software tools and field assets

Technical tools – Service store

- Advanced tools for:
 - Data Pre-processing Application
 - Energy Forecaster
 - Optimal Scheduler
 - Multi-Vector Simulator

Technical tools – Service store

- Optimal Scheduler – short-term operation

Day-ahead and intra-day scheduling of controllable assets

Calculates the optimal schedules for the dispatchable assets considering the diverse type of assets of the LES and the various parameters (e.g. forecasts, energy prices, operational constraints, etc.)

Technical tools – Service store

- Multi-Vector Simulator – long term planning

Investment Planning

Simulation of the long term dispatch of assets and their connected energy flows within the LES with the goal to aid future investment planning into energy-related assets

Provides optimal sizing of individual assets

Technical tools – User Interfaces

- Day-to-day operation
- Short-term operation:
 - KPIs to assess the impact of short-term schedules (e.g. reduction in CO₂ emissions, reduction in electricity for the grid, demand covered by local renewable generation, etc.)
- Future planning
 - Definition of scenarios, results and KPIs

Benefits

- Modular set of methodologies and ICT tools to optimize and control multi energy islands
 - Customizable
 - Expandable
 - Interoperable
-
- Optimal scheduling of a multi-vector energy system assets (together)
 - Use of the end-user flexibility as a resource
 - Optimise storage together with end-user flexibility

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ENERGY ISLAND

Any question or comment?

Thank you!

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