



Integrated energy solutions  
and new market mechanisms  
for an eXtended **FLEX**ibility  
of the European grid

X-FLEX project

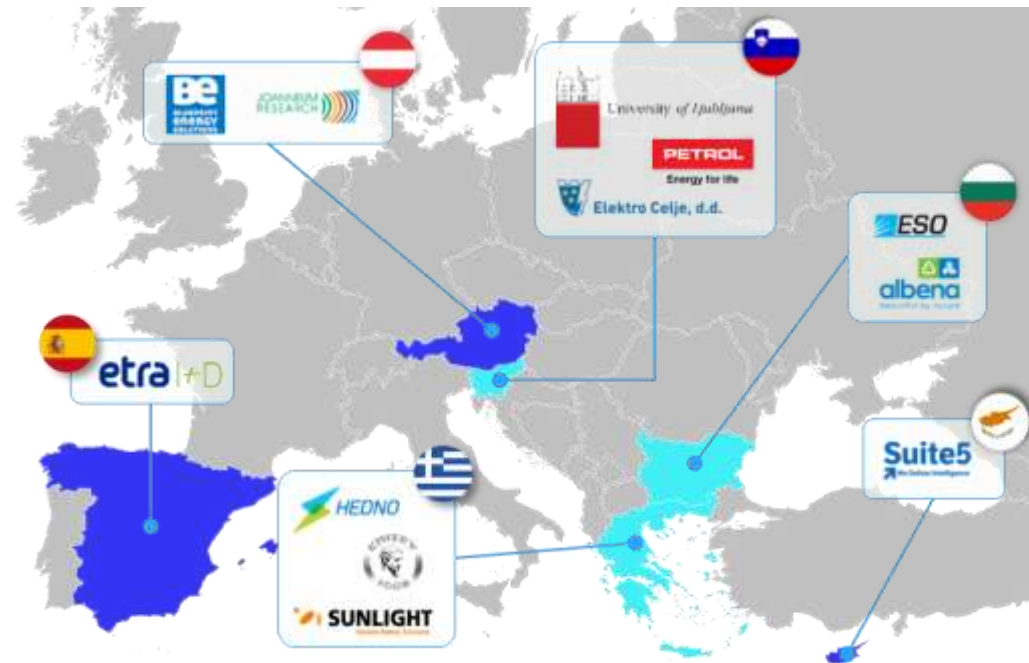
Flexibility services  
promoting cooperation  
among all the energy  
stakeholders

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# X-FLEX at a glance



- Coordinator: ETRA I+D
- Consortium: 12 partners from 6 EU countries (3 DSO, 1 microgrid manager, 1 TSO, 1 battery provider, 3 IT provider, 3 academy)
- Demonstration: 4 pilot sites in 3 EU Member states
- Total budget: 9,5 M€
- Total funding: 7,3 M€
- Start date: 01/10/2019
- End date: 30/09/2023



# X-FLEX Project objectives





1. Development of tools that would enable and facilitate the **use of flexibility in the power system** with the aim of **increasing the stability and security of supply** in normal working conditions and **extreme weather conditions**.
2. Demonstrate **technological, economic and social benefits** that are created with the participation of various stakeholders in the electricity system of existing energy connections.

# How to reach X-FLEX objectives



# How to reach X-FLEX objectives



## INTEGRATE VARIOUS EXISTING FLEXIBILITY UNITS

(batteries, electricity into heat / cold, EV into the grid and other energy storage technologies)

TEHNOLOGY



VARIETY OF SIZES, TECHNOLOGIES AND SERVICES

SIZE

1-20 kV

100-200 kV

1-2 MW

6 MW

12 MW

82 MW

Low voltage network

Distribution network (DSO)

Transmission network

SERVICES

Local optimization

Adjustable consumption

DSO system services

Grid congestion management

Development of local markets

Risk assessment due to extreme weather conditions

TSO system services

Balancing market and intraday market

Wholesale market

# How to reach X-FLEX objectives



X-FLEX will develop 3 complementary products that will offer services to all the energy stakeholders:

1. **SERVIFLEX tool:** Integrated flexibility management tool
2. **GRIDFLEX tool:** Advanced tools for automatic control and observability
3. **MARKETFLEX tool:** Market platform and new market mechanisms





## Serviflex tool



The **tool for flexibility managers** to take advantage of the value of **energy storage along with other demand flexibility resources** towards the establishment of a holistic framework for flexibility extraction, profiling, forecasting, classification, clustering and management to serve different market and grid needs.





## Gridflex tool



The tool for **grid and microgrid operators that prevents congestion (voltage and current issues) and power quality problems** with the increasing share of intermittent RES, giving special attention to the potential grid problems due to the impact of extreme climate events.

The tool will use **flexibility as an alternative to network reinforcement** when it is more cost-efficient than traditional reinforcement of the network.



## Market flex tool



This tool enables **final consumers and prosumers to access and participate**, individually or through an intermediate party, **on different energy markets**, such as wholesale market, local energy market or ancillary services market for TSO or DSO.

# X-FLEX Project pilot sites





## 4 PILOT LOCATIONS

- RAVNE NA KOROŠKEM, Slovenia
- LUČE, Slovenia
- ALBENA, Bulgaria
- XHANTI, Greece





## **Demo site: Ravne na Koroškem (Slovenia)** **Flexibility of the Power to heat on an industrial site**

- Ravne na Koroškem is a **small remote town** (population 7,268) with poor transport connection in the north-east part of Slovenia, known for its steel industry.
- XFLEX project will **create synergies with the heat production (RES Power2Heat) and heat network operation** to:
  - Provide flexibility on the electricity grid.
  - To lower the imbalances in the network.
  - To improve the reliability of electricity.



# X-FLEX Project pilot sites

## Demo site: Luče (Slovenia)

### Flexibility of local energy community



- Luče is a remote alpine village with 400 inhabitants in Slovenia. It has a low **local network capacity** with weak middle voltage overhead line connection that results in two major problems:
  - Limited local RES production.
  - Frequent power outages usually due to weather events.
- X-FLEX project will provide **flexibility to the local energy community through the use of DER** (batteries, PV, wind systems and EV-charging units), to **improve the network operation costs and operational reliability**.

# X-FLEX Project pilot sites

## Demo site: Xanthi (Greece)

### Green flexibility for network resilience



- The city of Xanthi, that has a population of more than 60,000, experiences **harsh winters and extreme weather events**, mainly including snowfall and strong rain storms.
- The goals are to facilitate the **optimal operation of Power2Gas** and **storage devices** at the microgrid, to contribute to the increased **resilience of the system under extreme weather events**, to achieve power losses reduction and to increase voltage stability.

# X-FLEX Project pilot sites



## Demo site: Albena (Bulgaria)

### Flexibility on a commercial site and micro grid/TSO cooperation

- Area on the Black Sea coast, which consists entirely of **hotel resorts**. Its most **active season is during the summer** when it can accommodate up to 20,000 people.
- Being a predominantly summer resort, Albena is subject to a **fluctuating energy demand throughout the year**. X-FLEX solutions will utilise this seasonal difference and improve energy consumption and efficiency by means flexibility market mechanisms with the provision of a model for financial incentives.





# Thank you!

## QUESTIONS?



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For more information visit:

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