Virtual | 17.09.2024

SYNERGIE PROJECT – LEARNINGS FROM THE GERMAN ENERGY MARKET

SynErgie | Synchronisierte und energieadaptive Produktionstechnik zur flexiblen Ausrichtung auf eine fluktuierende Energieversorgung

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Die Zukunft unserer Energie

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Bundesministerium für Bildung und Forschung

Universität Stuttgart
Institut für Energieeffizienz in der Produktion EEP

Fraunhofer-Institutszentrum Stuttgart

Strong partner for different industries

At a glance

- Second largest research center of the Fraunhofer-Gesellschaft in Germany
- 65,000 m² space devoted to applied research
- 5 institutes with over 1,800 employees
- Different research focuses:

  - Technology management
  - Bioengineering and environmental technology
  - Organizational and automation tasks
  - Urban and regional planning
  - Innovation and IP management

- Close cooperation with S-TEC Stuttgart Technology and Innovation Campus

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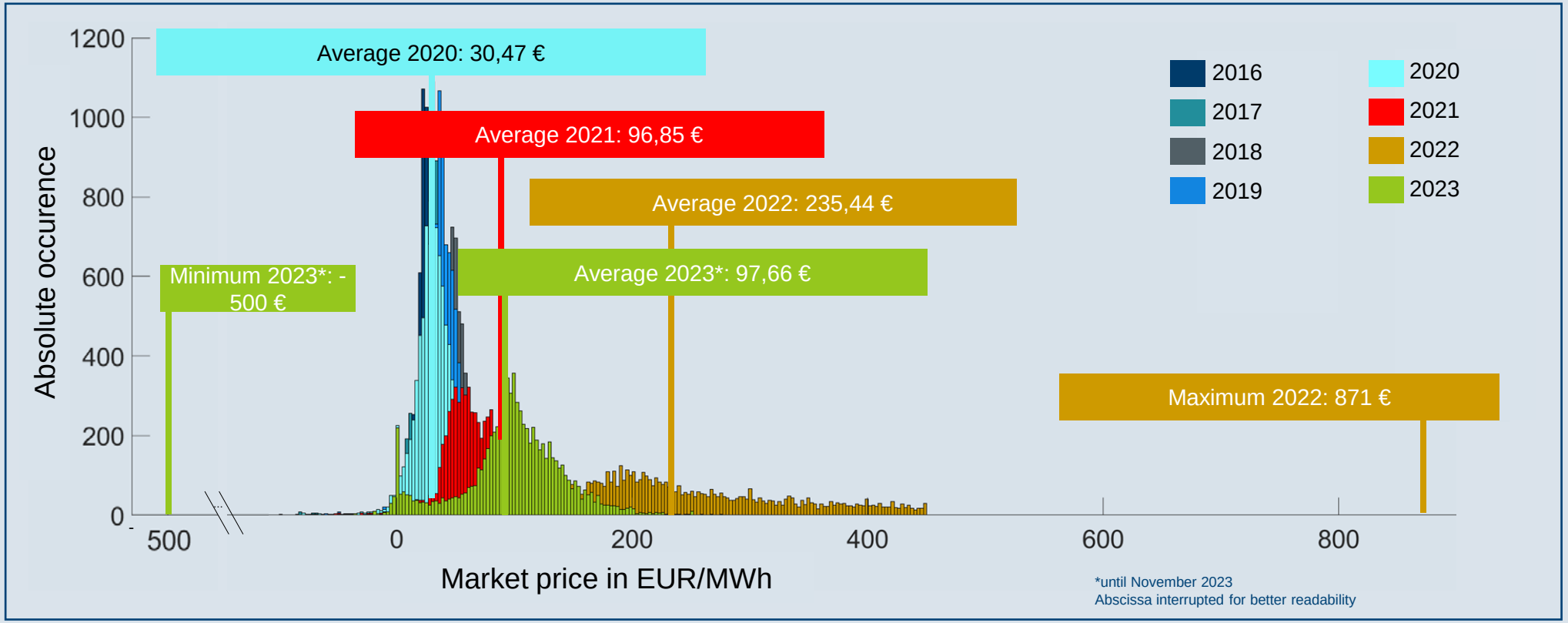
2022/23 – The Energy Crisis requires different measures

The unstoppable price increases for gas and electricity are affecting the German economy



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The Kopernikus Projects

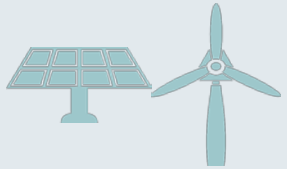
A German initiative for mastering the energy transition

Ariadne
Prof. Edenhofer

In a joint learning process between science and society, **Ariadne** analyzes how political measures work - from individual sectors to the big picture.

ENSURE
Prof. Niessen

ENSURE develops the power grid of the future



P2X
Prof. Leitner

P2X researches the conversion of renewably generated electricity, CO2 and water into gases, fuels, chemicals and plastics.

SynErgie
Prof. Sauer

SynErgie is investigating how energy-intensive industrial processes can be made more flexible and thus adapted to the availability of renewable energies..

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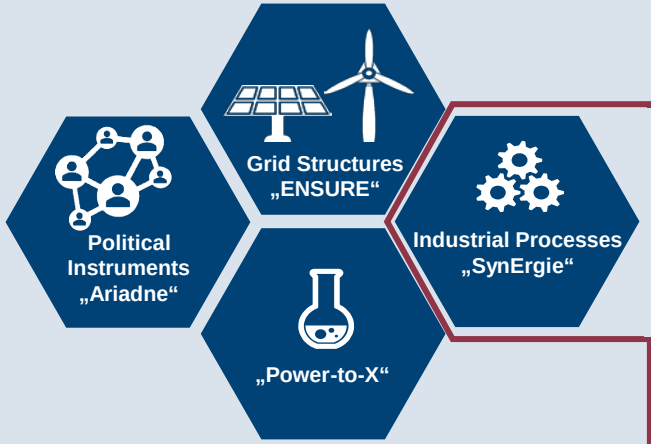
Kopernikus Projects for the German Energy Transition

400 Million Euro
over 10 years (2016-2026)

> 200 Partners
from all areas of society

4 Kopernikus-Projects
funded by BMBF



› **Flexibilization of Industry** in order to effectively synchronize the energy demand of German industry with the volatile energy supply.

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Our Goal

Goal of the Project

The Kopernikus project SynErgie aims to create all the **technical** and **market conditions** in harmony with **legal** and **social** aspects within ten years in order to effectively **synchronize the energy demand** of **German industry** with the **volatile energy supply**.

Our main Partners throughout the Project

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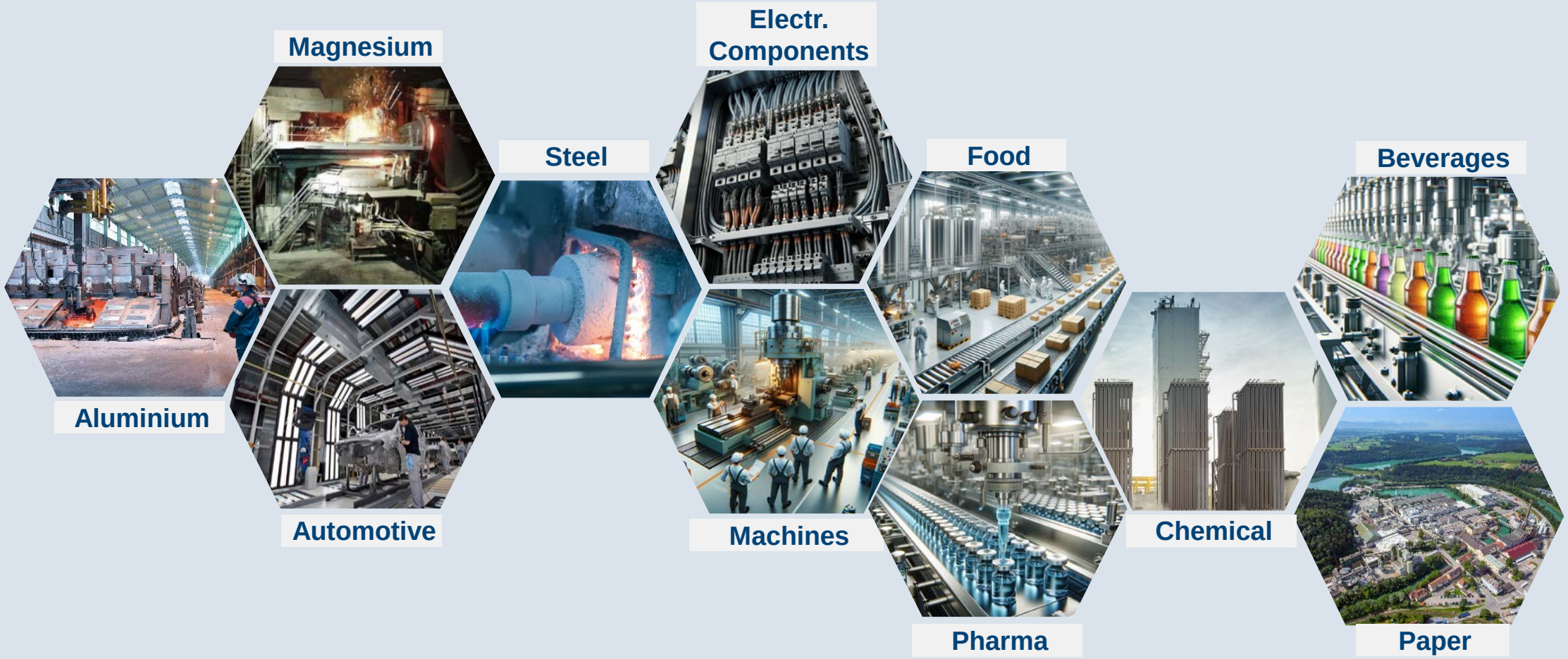
Innovative Solutions for Manufacturing Processes



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Bivalent Heat Supply in Metal Industry

Flexibility Potential of **143 MW** for **80 h** and **220 times** a year

Bivalent Furnaces for Automotive Supplier

Procedure and Results

—

Key Facts

- Change of energy source
- Peak Shaving, Exploiting volatile energy prices
- Scenario development to assess economic benefits; Numerical simulation to ensure functionality and efficiency; development of a bivalent crucible furnace

Results

- Annual energy cost reduction of up to 10% compared to monovalent crucible furnaces
- Bivalent furnace with forced-air burner and air preheating for fuel operation and electric resistance heating elements for electric operation

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Material-Based Energy Flexibility in Paper Industry

Flexibility Potential of **90 MW** for **10 h** and **20 times** a year

Flexible Pulp Production

Procedures and Results

—

Key Facts

- Shut down semi-finished product production systems
- Load reduction or shifting Procedure for enabling: Enabling of semi-finished material plants (TMP plant, grinding plants), expansion of semi-finished material storage capacity

Results

- Upgrade to more efficient grinding technology
- Connection of production lines to increase storage capacity
- Implementation of an optimization service for intelligent control of the production facilities at all three sites

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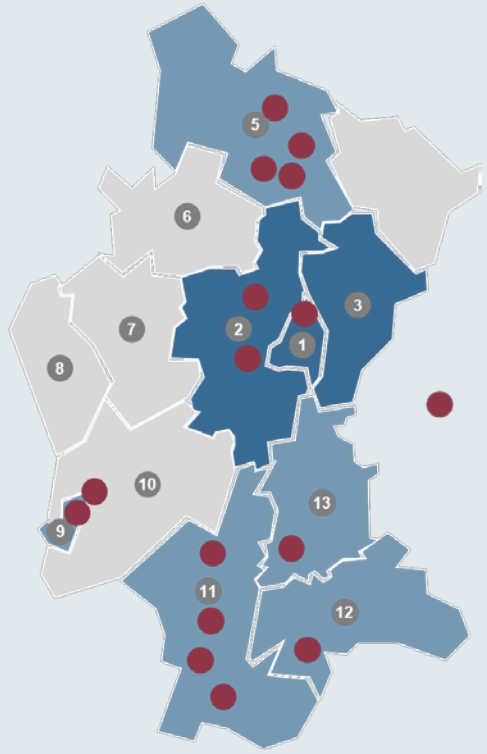
Energy-Flexible Model Region Augsburg

Knowledge transfer for realization and implementation

- Implementation of **16 demonstration projects** in the Energy-Flexible Model Region Augsburg
- Integration of **all relevant stakeholders** such as politics, network operators, industry, and society
- Further development of the model region into **an innovation region** to enable regulatory learning

In the Energy-Flexible Model Region Augsburg, the implementation of demonstration projects, the integration of all relevant stakeholders, and the systemic analysis are closely interlinked.

Demonstration and Implementation Projects in the Energy-Flexible Model Region Augsburg



Umsetzungsvorhaben

Nr.	County
1	Augsburg (City)
2	Augsburg
3	Aichach-Friedberg
4	Neuburg-Schrobenhausen
5	Donau-Ries
6	Dillingen an der Donau
7	Günzburg
8	Neu-Ulm
9	Memmingen (Stadt)
10	Unterallgäu
11	Ostallgäu
12	Weilheim-Schongau
13	Landsberg am Lech

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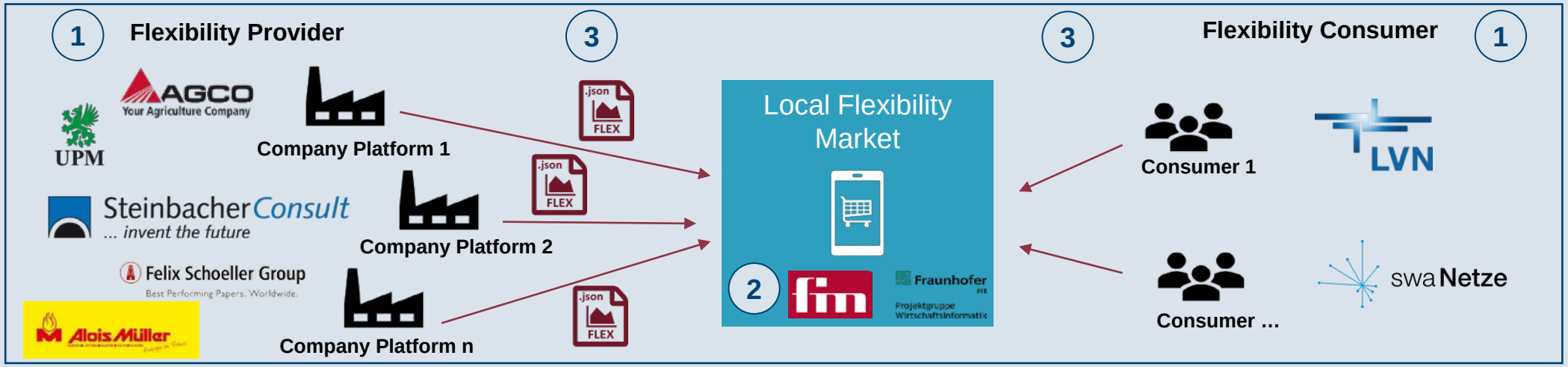
Local flexibility trading in Augsburg

Synchronization of local energy generation and consumption



1 **Recording the requirements of the various stakeholders on the local flexibility market**

2 **Design of the local flexibility market**

3 **Enabling access to the local flexibility market**

Test operation of the local flexibility market

How does communication work in the model region?

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Quelle: iwb/TU München, FfE, FIM/FIT, Fraunhofer IGCV, Forschungswende

Key messages and recommendations for action

Linking Science, Manufacturing and Implementation

- Partnership between science and industrial companies leads to reduction of emissions
- Implementation of energy flexibility measures reduces the need for fossil energy imports
- Implementation is the key

The Model Region Augsburg as a Lab

- Research Project results a real implementations and funded by the state and industrial companies
- Regulatory Learning has to be possible to find new energy market solutions
- Transfer possibilities for Germany and Europe

Addressing the need for regulatory change

- Current regulatory framework inhibits the use of existing flexibility potential
- Further development of the Strom-NEV to enable energy-flexible demand
- Incentives to market flexibility for energy-intensive companies and SMEs must be created

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THANK YOU FOR YOUR ATTENTION!

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