



# Smart-Campus Siemens Portugal Sustainability and Decarbonization Living Lab

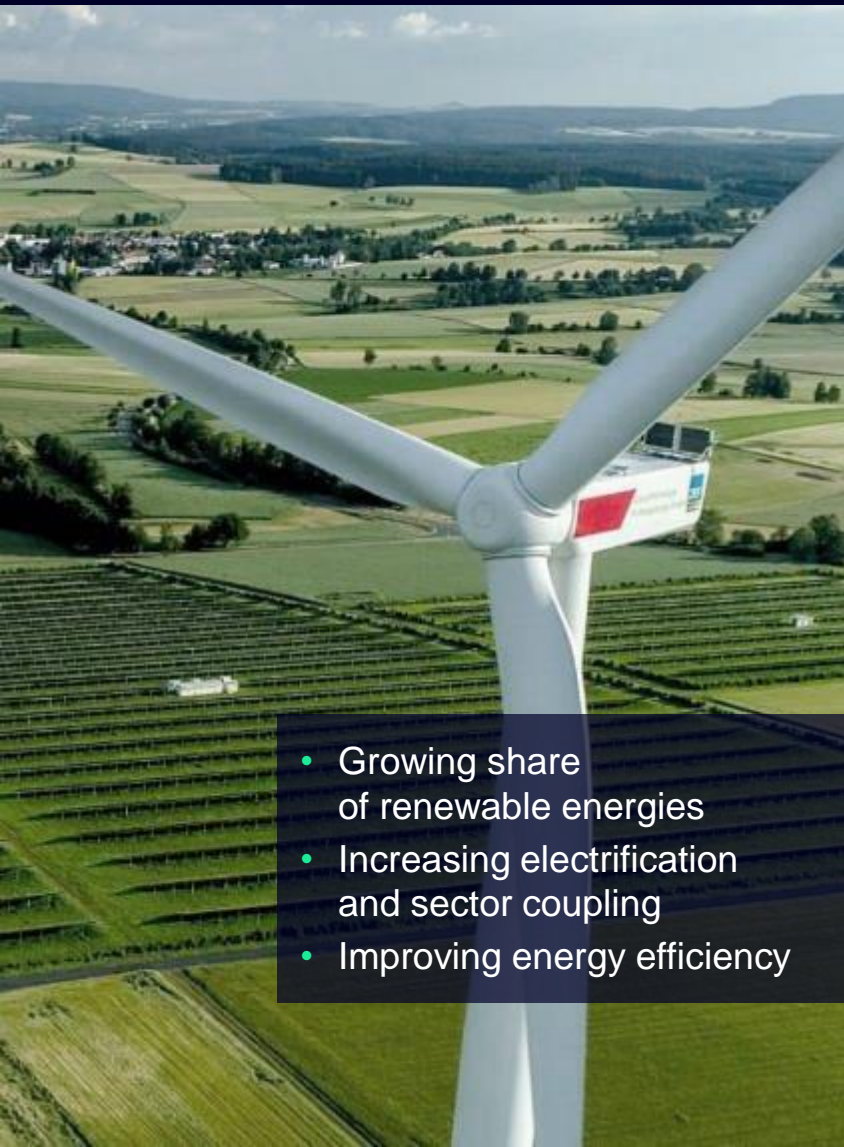
Technology with purpose

**SIEMENS**

# Smart-Infrastructure



# The world is changing Decarbonization. Decentralization. Digitalization.



- Growing share of renewable energies
- Increasing electrification and sector coupling
- Improving energy efficiency



- Flexibilization of the energy market
- From consumer to prosumer
- New market players



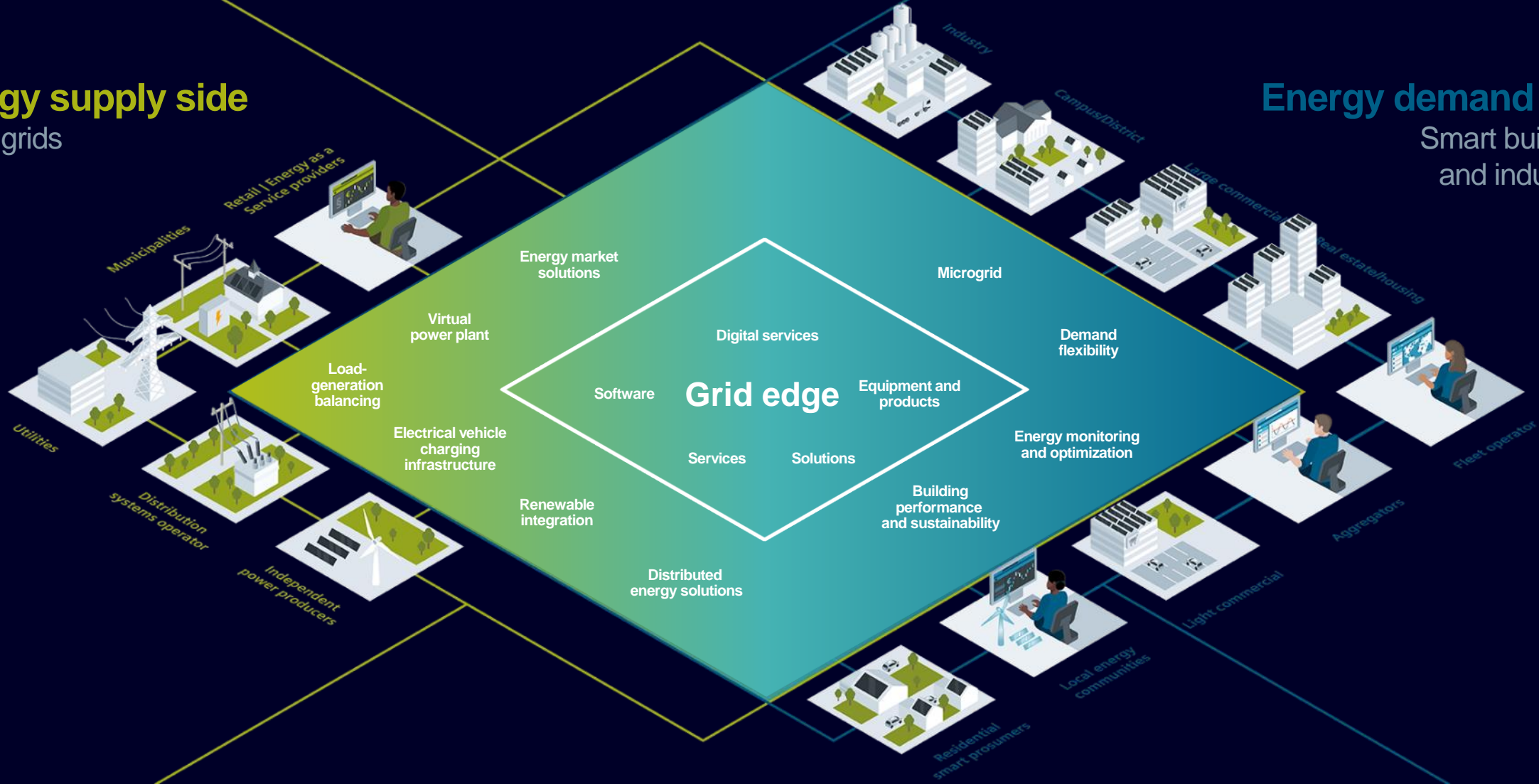
- Connected systems and automated processes
- Smart data as a basis for decision-making
- New business models

# Energy supply side

Smart grids

# Energy demand side

Smart buildings and industries



Buildings are becoming an active part of the energy system



# Why

act now



Bringing all this together

## "Using Energy Smarter"



# SIEMENS

Campus Microgrid Alfragide

# Infrastructures ... Opportunities & challenges

## Buildings and campuses are becoming an active part of the energy system...

### Energy Independence

Increase of supply (mostly renewable)

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### Increased Load

Imposes challenges to grid infrastructure and Point-Of-Interconnection – How to avoid solving power needs through grid reinforcement

### Power demand

Increased demand, namely due to e-mobility

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**Flexible power devices** (Ex. Storage, Flexible Loads)

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**Security of supply and system stability**



# Why act now for Smart-Campuses

New Market Players

New Flexibilities

>Peak Power Prices

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Demand for balancing Energy

E-mobility challenges

We have the same challenges as our customers

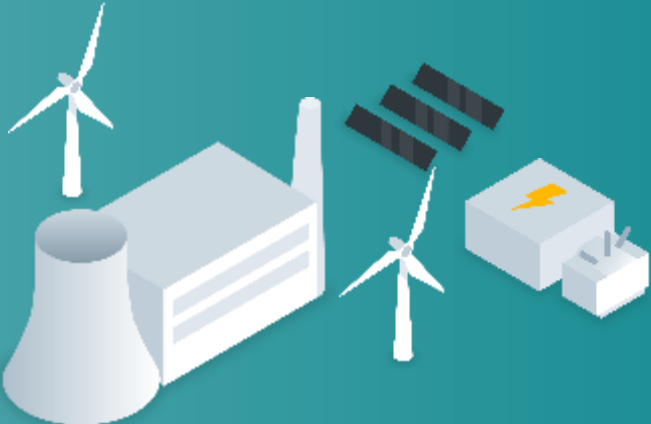




# Smart-Campus

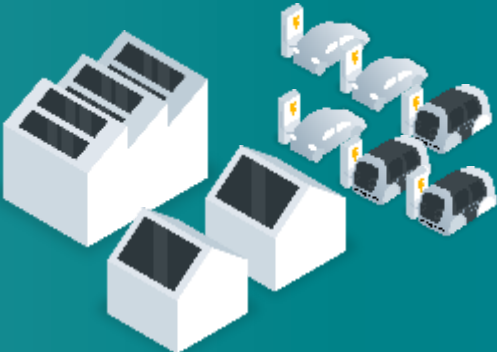
Limited grid connection capacity

Expensive grid extension



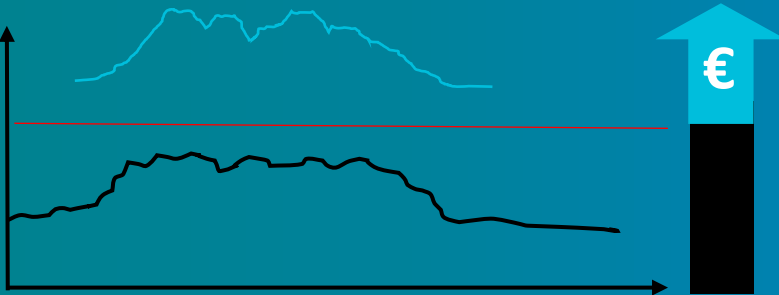
Uncontrolled charging infrastructure and fast chargers

High peak power costs

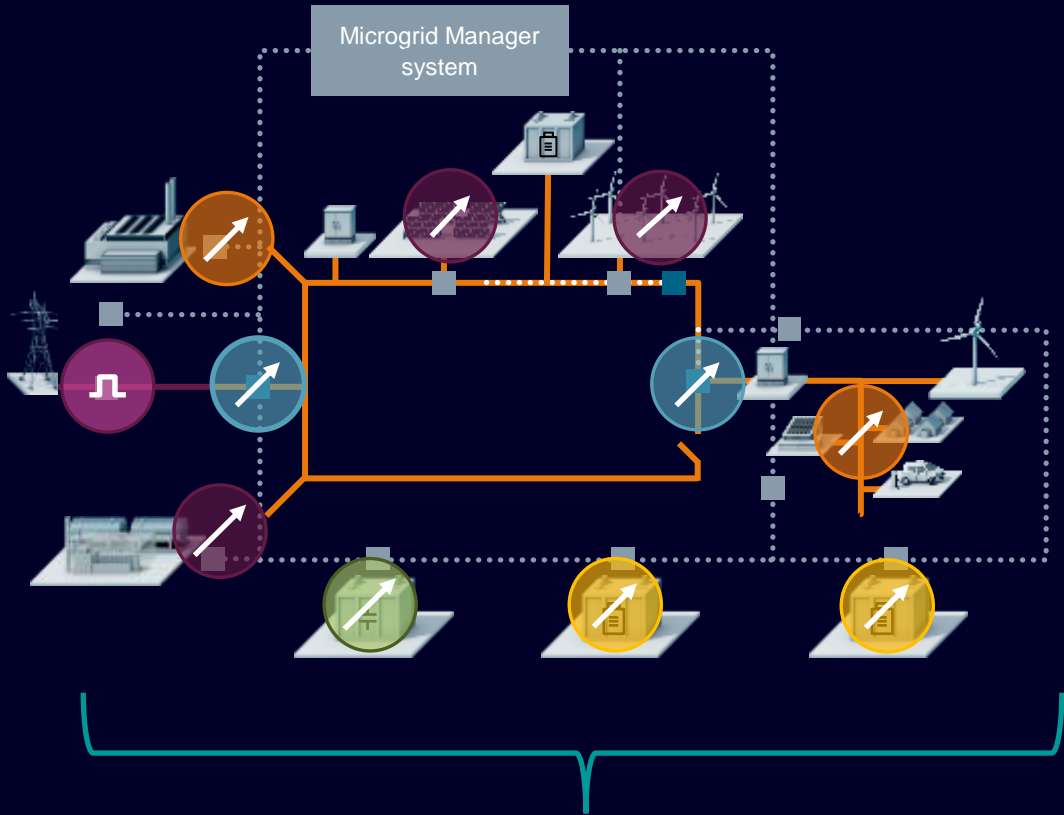
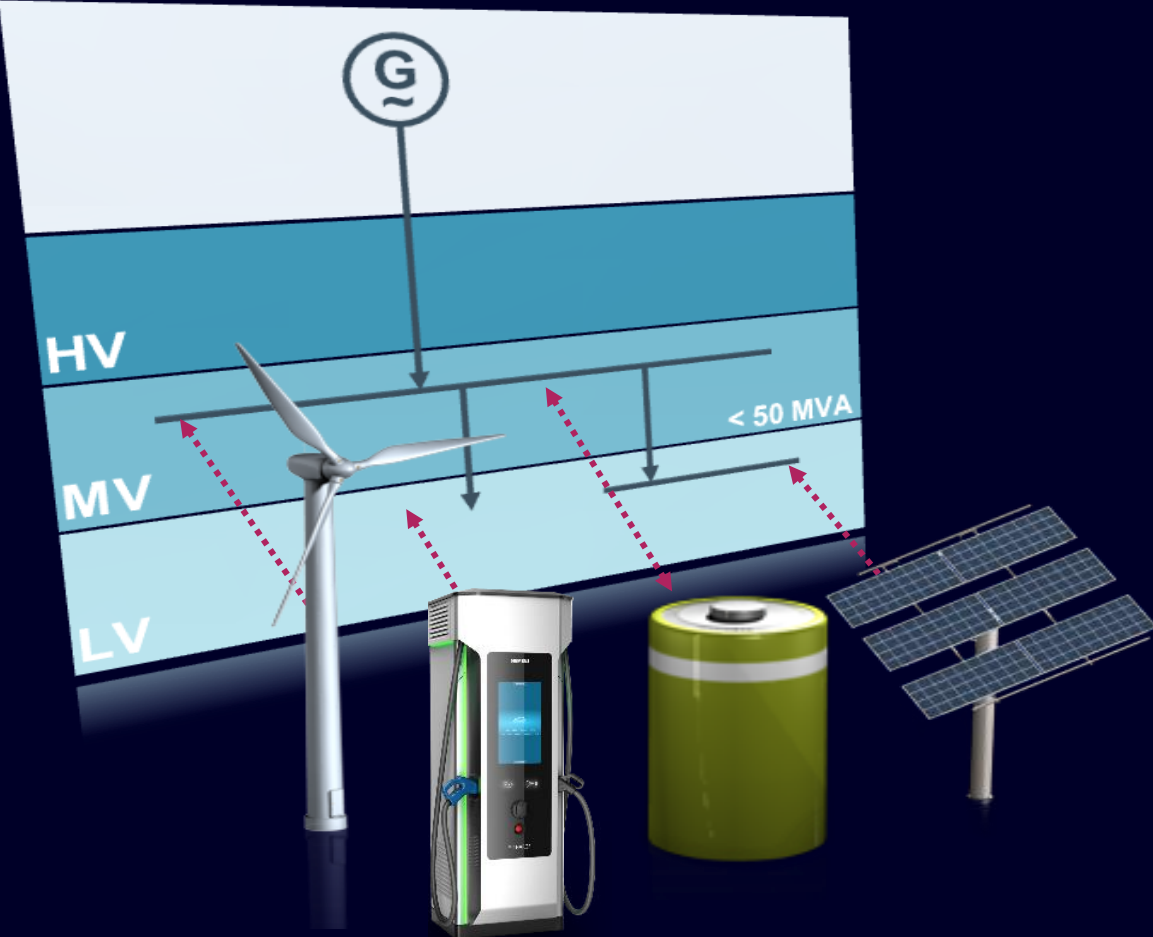


Local generation and storage

Additional revenue



# Need for a full integration of all assets



Dynamic Generation & Load Management



# Siemens Smart Campus – Alfragide General Overview

 PV Plant

 EV Charger (without communication)

 EV Charger (with communication)

 Storage

**MGC** MicroGrid Controller

 Cloud connection

 PCC (Point of Common Coupling)



# Siemens Smart-Campus Alfragide Grid & Building Management as one

## Microgrid Controller connected to Building Management System

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Loads controlled via Building management system to be used by Microgrid Controller for load and generation optimization



# Siemens Smart-Campus Alfragide Battery Storage Solution

## Battery Storage

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Microgrid controlled

- Peak load shedding
- Primary balancing services
- Comfort Charging



# Electricity Storage:

A Cornerstone for  
the New World of Energy

# Siemens Smart-Campus Alfragide Monitoring and Data Analytics

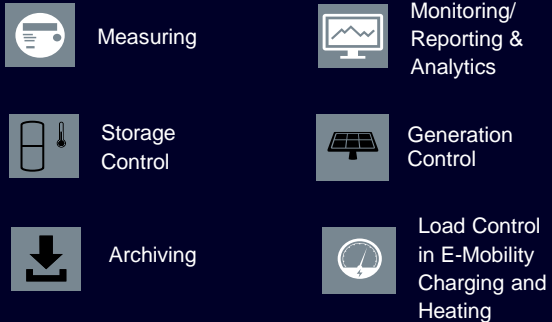
## IoT based Monitoring and Data Analytics

Cloud service to monitor and analyze continuously the actual state and optimize the operation of the Smart-Campus.

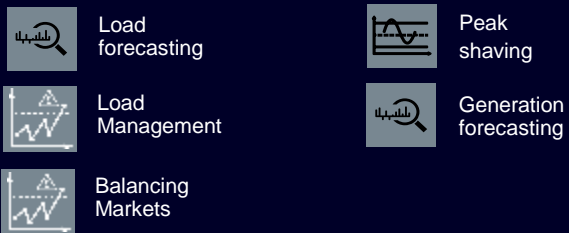


# Siemens Smart-Campus Alfragide Microgrid Control – Smart controls

## Basic Features



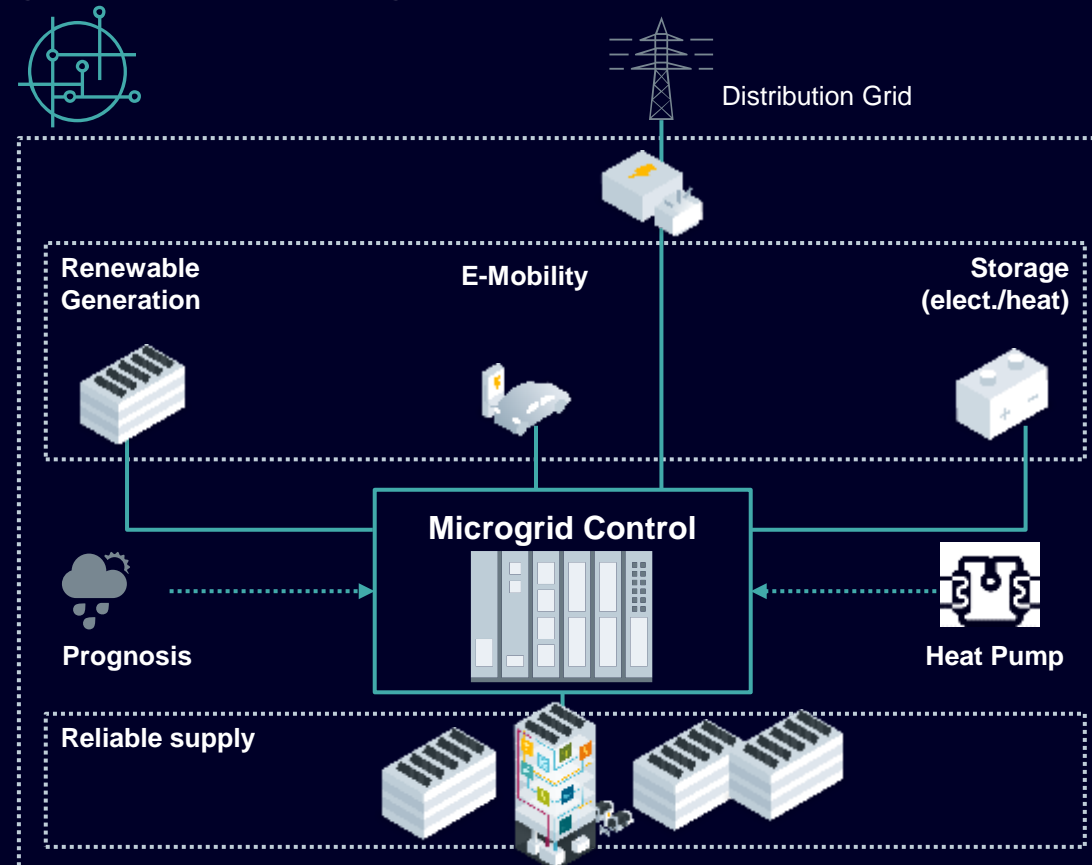
## Advanced Features



## Planned Features



## Microgrid – Distribution grid with renewable generation, grid infeed and storage



## Benefits of Smart-Campus Alfragide



### Energy mix/value streams

### Own Generation

### Decreasing CO<sub>2</sub> emissions

- Environmental optimization  
renewable vs. Public Energy Mix

### Managing e-mobility Infrastructure

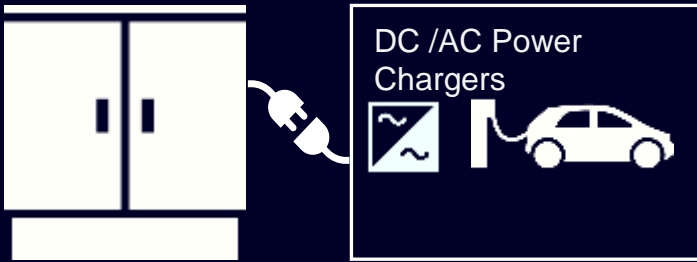
### Lower energy costs

- Economic optimization main  
grid supply vs. own generation  
Participation in Energy  
Community

### Smart-Infrastructure Show-Case

# Applicable Portfolio

## Powerful and flexible



## e-BoP



### Sensing

Metering – L&G  
Power Metering  
Interconnection Protections (IEDs)



### Power

Intelligent Secondary Substations  
Energy Storage for e-mob  
Smart Switching-Gear (LV & MV)

## Active Systems



### e-Chargers

Versicharge & SIECHARGE  
From AC to Fast DC-Charging



### PV Power Inverters

WS Tech – Centralized Inverters  
KACO – String Inverters



### Control Platforms

Microgrid Mgmt. + e-charging Mgmt.  
- Based on proven platforms

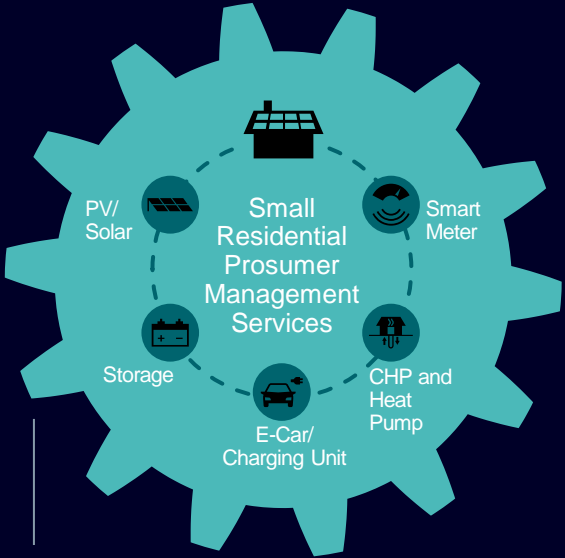


### Energy Storage

SIESTORAGE NEO - Smart Modular  
Energy Storage integrating PV, Storage  
and e-Charging



# Bridging the gap for the Energy Transition



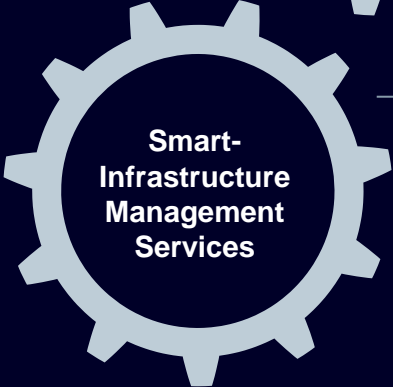
- Connectivity and Enablement
- Monitoring and Consumer Engagement
- (Local) Optimization incl. EV Charging Mgmt.
- Trading and Sharing



## Cross-Domain



- Building Lifecycle Mgmt.
- Energy Mgmt.
- HVAC Mgmt.
- Security Mgmt.



- Distribution Grid Mgmt.
- Microgrid Mgmt.
- Decentralized Energy Resource Mgmt.
- Asset Mgmt.
- Energy Storage

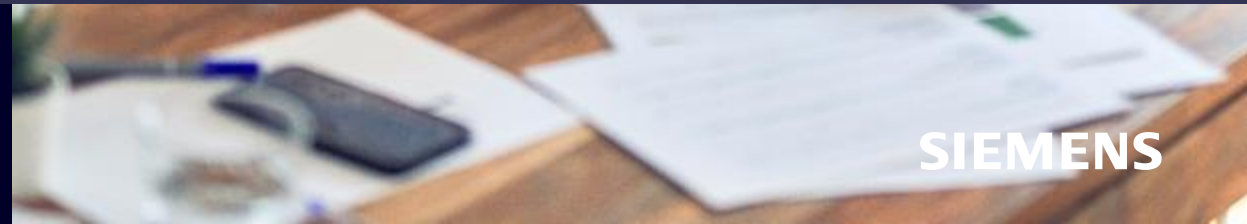


- Charging Infra-structure Mgmt.
- EV Fleet Mgmt.
- Vehicle-to-Grid Mgmt.

# Siemens

## Technology with purpose

... From business to society



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