



ECS4DRES

“Electronic Components and Systems for flexible, coordinated and resilient Distributed Renewable Energy Systems”

Project co-funded by the Chips Joint Undertaking under the

Topic 4 – Electronic Control Systems (ECS) for management &
control of decentralized energy supply & storage

Chips JU Grant Agreement no. 101139790

D5.1– Factsheet and project presentation

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Duration: 36 months

Organisation name of lead contractor for this deliverable: TUD

Author(s): Holger Schmidt (IFAG), Zian Qin (TUD)

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Work Pack. / Task WP5 / T5.1

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Description: This deliverable contains the factsheet and the overview presentation of the project.
(max 5 lines)

Type:	R = report		
Dissemination Level:	PU	Public - fully open	x
	SEN	Sensitive, limited under the conditions of the Grant Agreement	

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History of Changes		
Version	Publication Date	Change
00-01	21.08.2024	Initial version- Start deliverable creation process
00-20	21.08.2024	First Draft for review available
00-30	09.09.2024	Integration of modifications after 1 st review
00-50	09.09.2024	Final Draft approved version
00-60	17.09.2024	QM Check, submission preparation
01-00	23.09.2024	Submitted Version – End deliverable creation process

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1. Executive Summary

This deliverable contains the factsheet and the overview presentation of the project.

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2. Factsheet

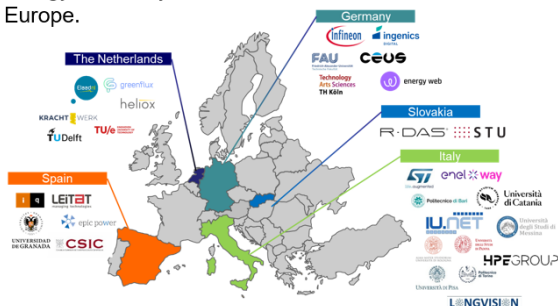
Figure 1 shows the project's factsheet. It describes the main objective of the project and identifies the partners involved.



Electronic Components and Systems for flexible, coordinated and resilient Distributed Renewable Energy Systems

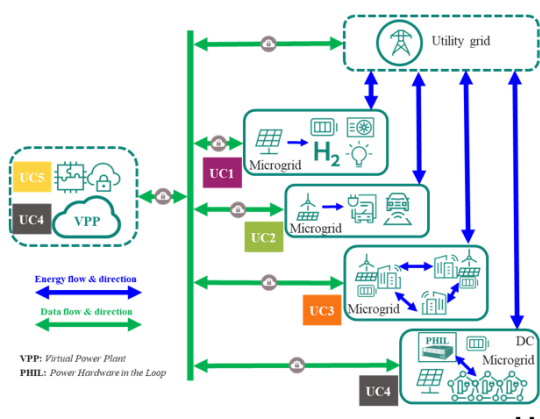
Objective

ECS4DRES will strengthen the long-term reliability, safety, and resilience of DRES by developing advanced monitoring and control technologies including integrated sensors capable of different types of detection for safety purposes, and for monitoring of energy transfers. Finally, ECS4DRES will achieve interoperable and low-latency communication systems, enabling the widespread interconnection of a large number of DRES, subsystems, and components to realize optimal energy management between sources, loads, and storages within the microgrid, to improve power quality and to enable resilient system operation. Minimum power consumption and maximum interoperability are further goals for the researched monitoring & control and communication solutions. The overall target is to align with the EU policy on energy efficiency and contribute towards reduction of CO₂ emissions of 55% by 2030 and to become climate neutral by 2050, and development for enhancing component technologies that guarantee security, trust and energy-efficiency for critical infrastructures and sectors in Europe.



Project Information

Start date:	1 st July 2024
Duration:	36 Months
Number of partners:	27
Number of countries:	5
Overall Budget:	€ 27.930.499,07
EU Contribution:	€ 8.577.941,75
Project Coordinator:	Infineon Technologies AG Germany



ECS4DRES strives to deliver a set of interoperable mature solutions centered around energy conversion and management for DRES, by designing, developing, and implementing the necessary electronic hardware and software components and systems. This includes the development of:

- hardware including highly efficient (e.g., > 97% efficiency) and high-power density (e.g., > 50 W/inch³ power density) power converters and their control systems, grid-interfacing components, sensor (e.g., hydrogen sensor with sensitivity better than RH₂/R_O ≈ 50) and monitoring systems (e.g., 50% reduction of memory footprint and energy consumption of the applied neural networks) and their integration.
- algorithms and software tools including control techniques for DRES and at grid level, local balance between energy production and consumption in microgrids (e.g., > 50% peak power reduction), by taking advantage from AI (e.g., > 25% improved accuracy for energy management measures; > 95% probability to detect anomalies)
- communication techniques including applications of 5G (e.g., > 70% reduction of latency) and wireless extensions of power line communications

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This project is supported by the Chips Joint Undertaking under grant agreement number 101139790 and its members, including the top-up funding by Germany, Italy, Slovakia, Spain and The Netherlands.

Figure 1: ECS4DRES factsheet

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3. Project presentation

The following presentation describes an overview of the project, highlighting the main R&D&I objectives and challenges, the work package structure and the consortium.



Electronic Components and Systems for flexible, coordinated and resilient Distributed Renewable Energy Systems

ECS4DRES PROJECT OVERVIEW

Holger Schmidt, Infineon Technologies AG
August 21 2024



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Figure 2: ECS4DRES project presentation

 Project Overview 	
Focus Call Information	Call 2023-1-IA Topic 4: Focus topic on Electronic Control Systems (ECS) for management & control of decentralized energy supply & storage Outcome: novel solutions reaching up to TRLs 6 to 7 in the form of electronic control systems, sensor technology and smart systems integration for the deployment and efficient and resilient operation of (Distributed Energy Systems) DRES. Priorities: – Study of use cases on building energy systems, HVAC, battery storage and hydrogen generation and storage. – Evaluation of customer needs and requirements for these use cases – Definition of solution concepts for the use cases. R&D on the following technologies: • Sensors and measurement devices for monitoring energy equipment. • Interoperability, reconfigurability and retrofit ability of the sensing systems onto existing assets and infrastructure with long term performance. • Lifetime estimation based on models and sensor data to optimize predictive maintenance. Autonomous condition base monitoring systems to detect anomalies. Collaboration for Hydrogen applications.

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Project Overview



Vision and Mission

Vision

Creating an **energy system** that is **sustainable, secure, and cost-effective, powered by distributed renewable energy sources.**

Mission

deliver a set of **interoperable mature solutions centred around energy conversion and management for DRES**



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Project Overview



Challenges

Challenge 1: highly efficient (> 97%) and high power density (> 50 W/inch³) power converters

Challenge 2: compensating local unbalances between energy consumption and generation

Challenge 3: ECS4DRES will strengthen the long-term reliability, safety, and resilience of DRES

Challenge 4: develop efficient and low-latency communication systems, capable of connecting multiple DRES

Challenge 5: validation of the above-mentioned developments in a series of relevant industrial use cases

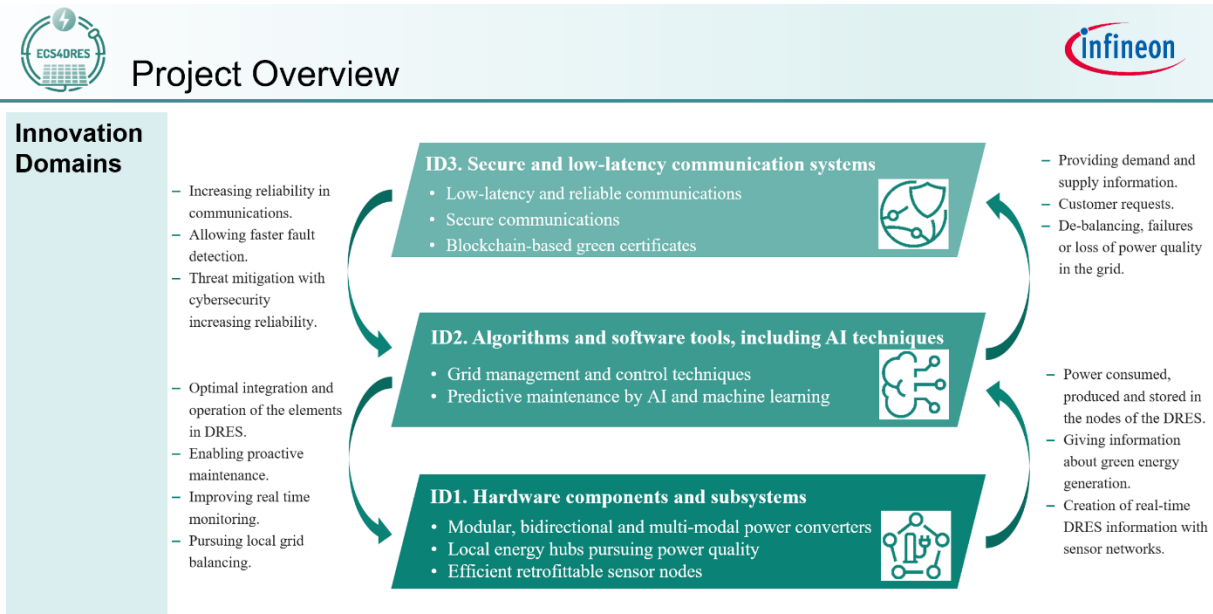


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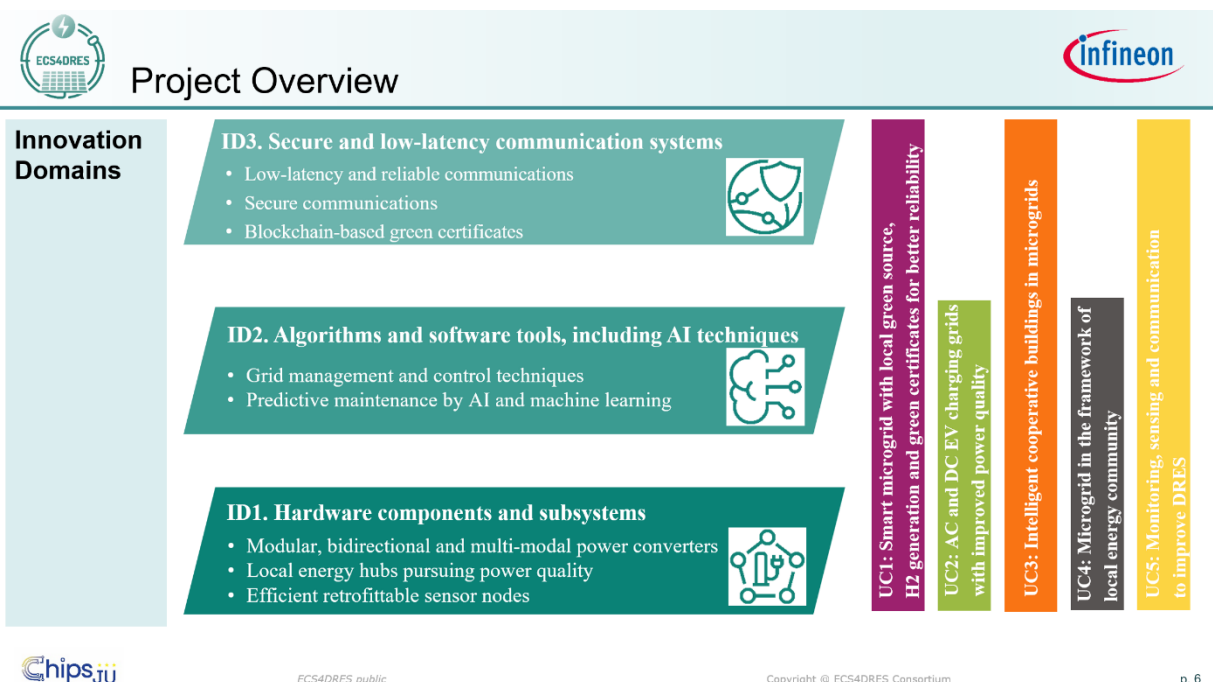
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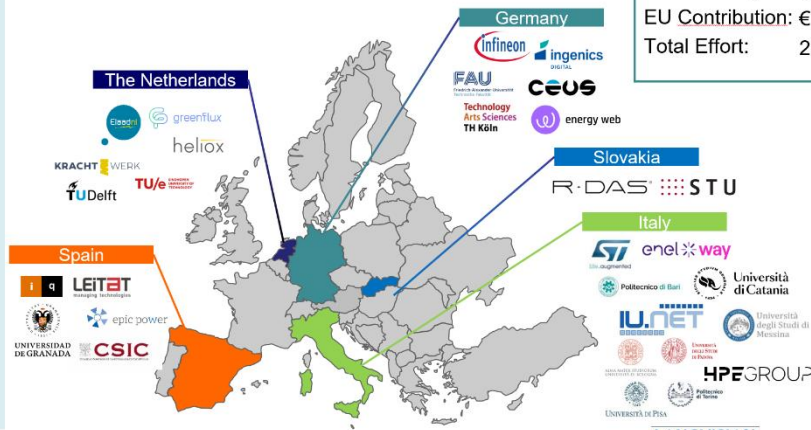
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Coordinator:	Infineon Technologies AG Germany
Overall Budget:	€ 27.930.499,07
EU Contribution:	€ 8.577.941,75 €
Total Effort:	2970,7 PM



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WP	ECS4DRES	Lead
WP1	Requirements, specification, architecture & system level design	ENWEB
WP2	Hardware	ST-I
WP3	Algorithms, software, artificial intelligence AI tools and methods	IDG
WP4	Integration & validation	CSIC
WP5	Impact & outreach	TUD
WP6	Project management	IFAG

Effort per work package

Work Package	Percentage
WP1	34%
WP2	27%
WP3	23%
WP4	11%
WP5	4%
WP6	1%

Response Option	Percentage
WP1	10%
WP2	34%
WP3	27%
WP4	10%
WP5	10%
WP6	10%

27%

WP1 WP2 WP3
WP4 WP5 WP6

■ WP1 ■ WP2 ■ WP3
■ WP4 ■ WP5 ■ WP6

■ WP4 ■ WP5 ■ WP6

July 1 2024

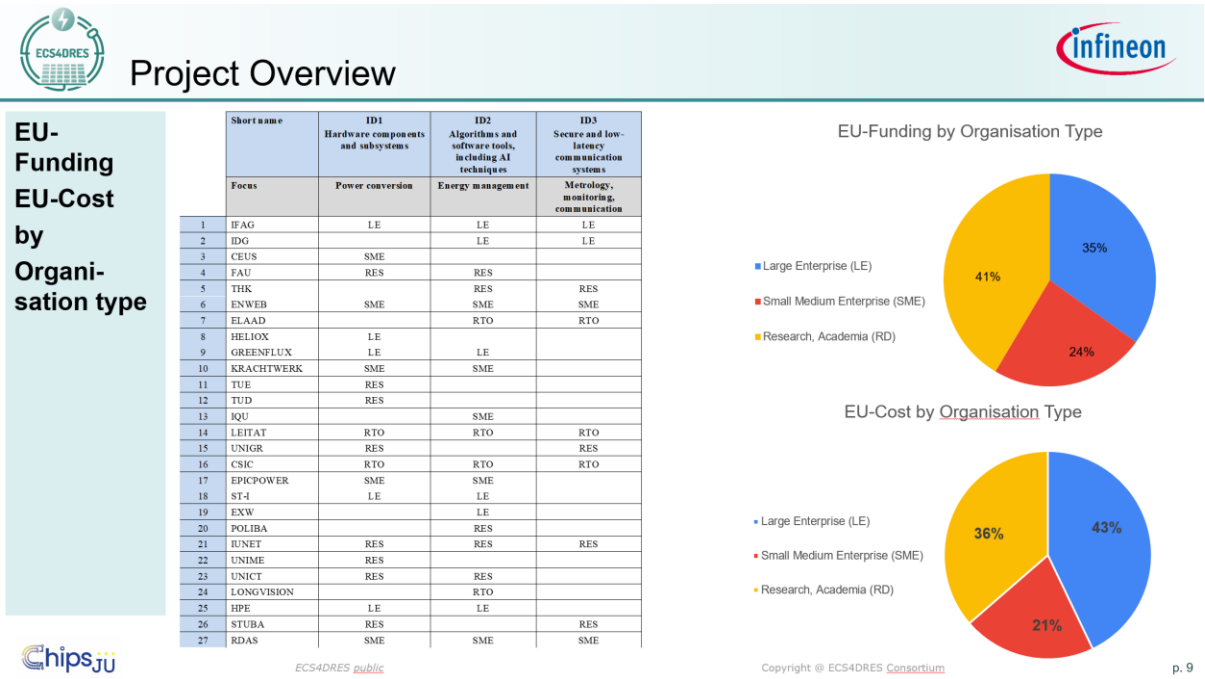
June 30 2027

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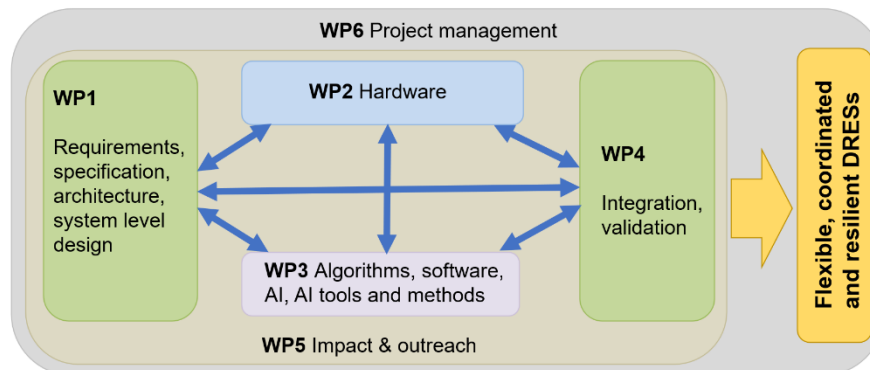




WP6 –Project Management



Dependencies



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Thank you for your attention

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4. Conclusions

The factsheet and the overview presentation of the project have been shown.

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Glossary

Abbreviation / acronym	Description
AC	Alternating Current
AI	Artificial Intelligence
CO ₂	Carbon Dioxide
DC	Direct Current
DRES	Distributed Renewable Energy Systems
ECS	Electronic Control Systems
EU	European Union
EV	Electric Vehicle
H ₂	Hydrogen
HVAC	Heating, ventilation, and air conditioning
ID	Innovation Domain
LE	Large Enterprise
JU	Joint Undertaking
LE	Large Enterprise
PHIL	Power Hardware in the Loop
R&D	Research and Development
RD	Research, Academia
SME	Small and Medium-sized Enterprise
TRL	Technology Readiness Level
UC	Use Case
VPP	Virtual Power Plant
WP	Work Package

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