

6G vertical applications for sustainability

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6G SNS

6G, energy and sustainability



6G provides a data-driven, hyper-connected world enabled by near-instant and unlimited wireless connectivity



Technology enablers such as higher frequency bands, IoT, AI-powered network management and edge computing



6G enables verticals productivity, security, sustainability and new business models



6G energy efficiency and 6G for energy solutions



6G introduction to market and the UN SDG both targeted for 2030

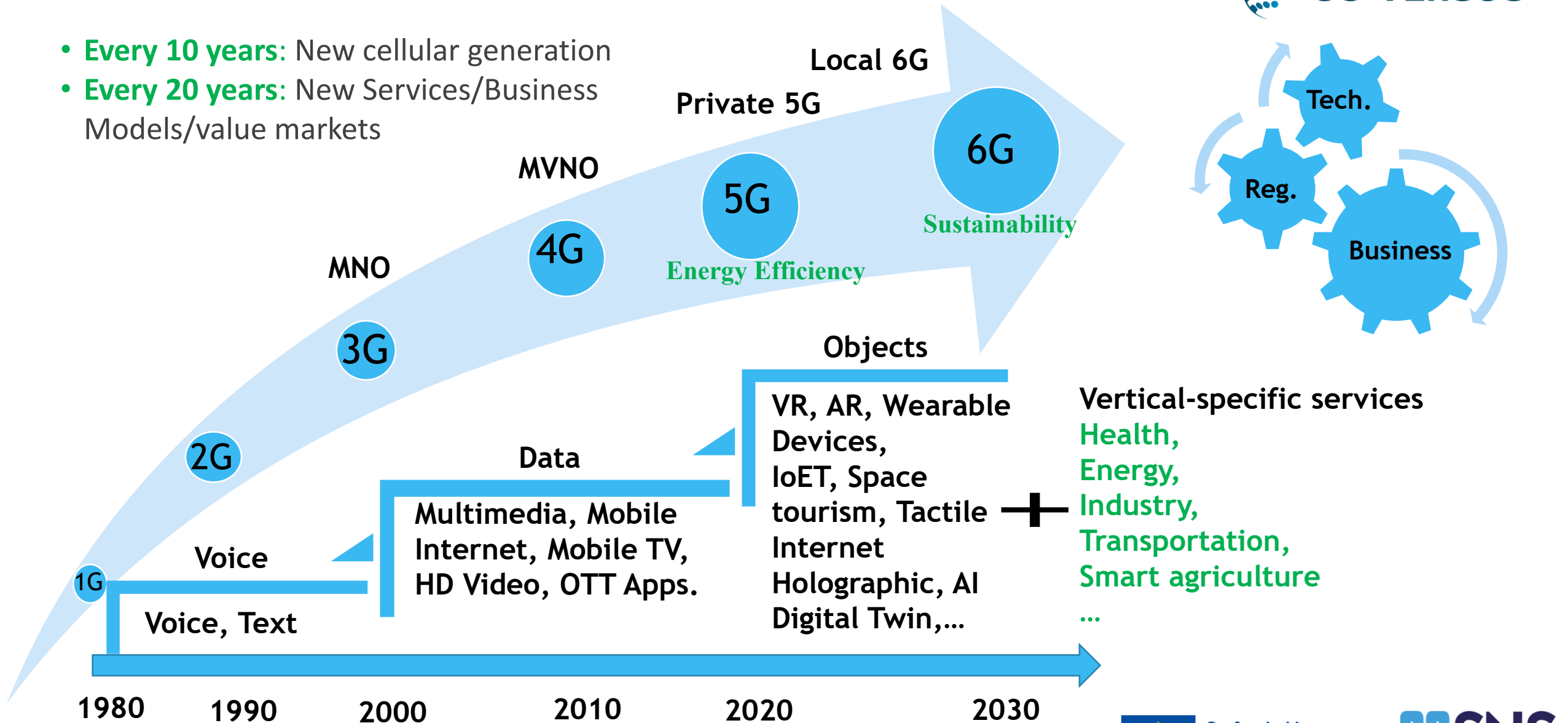


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Evolution of Mobile Communications

- **Every 10 years:** New cellular generation
- **Every 20 years:** New Services/Business Models/value markets



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6G energy in connectivity and beyond connectivity



Sustainable connectivity

5/6G E2E energy efficiency

Cybersecurity

RE & storage to power 5/6G connectivity

Environmental impact

Flexible loads in mobile network

Societal impact & UX

Distributed intelligence

Energy data processing and transfer

Distributed energy resources mgmt

Digital flexibility platform

Multi-energy optimization

Resilience of the smart grid

Connectivity for smart grid protection and control

Balancing - local, national and cross-border

Multi-service gateways

Mesh energy networks

Virtual energy systems

Digital twins, simulations of energy domains

Energyverse

Multi-modal energy experience

Remote & mobile energy technology integration

V2X, off-shore wind power, SMR, hydrogen, water management

6G-VERSUS: 6G VERTical trials for SUStainability

Duration: 36 months 1.1.2025 - 31.12.2027

Call: HORIZON-JU-SNS-2024-STREAM-D-01-01 - SNS Large Scale Trials and Pilots with Verticals

Type of action: HORIZON JU Innovation Actions

Funding: 12,1 M€, total budget 14,5 M€

Coordinator: UOULU / Sanna Tuomela

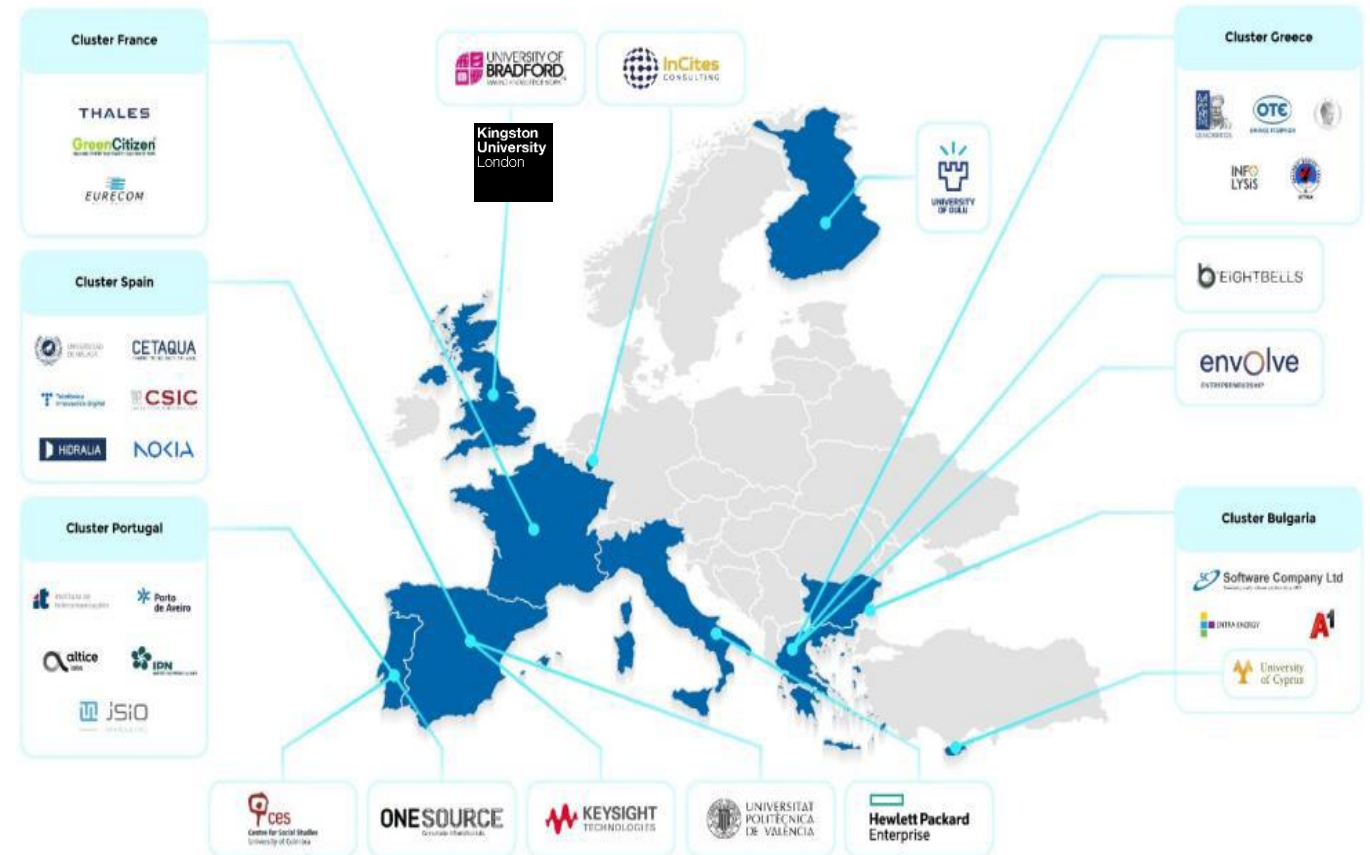
Technical manager: ICCS / Xenofon Vasilakos

Partners: 34 from 10 countries, 13 academic and/or research organizations, 10 industrial partners, 9 SMEs and 2 NGOs

Effort: 1800 PMs



Partners





6G-VERSUS



Bridges technological innovation with strategic experimentation to achieve tangible sustainability outcomes.



Presents a novel technology methodology and architecture that transforms existing use cases into 6G applications, optimises the data and control planes of 6G systems and facilitates seamless information flow and decision-making processes.



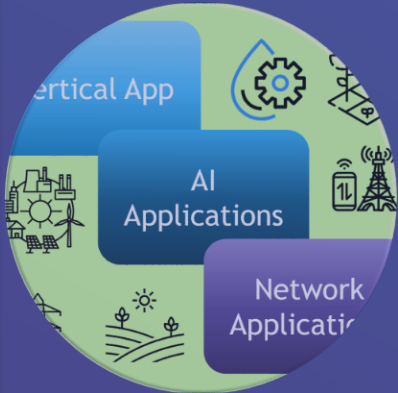
Leverages advanced 6G research platforms across Europe, conducts large-scale trials and pilots to explore sustainable solutions in five environmentally conscious vertical industries.

Transforming the currently existing vertical use cases and services into 6G applications

Testing and Validating the 6G applications of each use-case/pilot at the six Experimentation Platforms that are enhanced with energy efficiency tools and components

Assessing sustainable impact of each 6G Application per use-case/pilot on the environment, the society, the economy, the industry and the European market

6G-VERSUS Objectives



Design and Development of a 6G-Enabled Application Framework for the triplet of V-app, AI-app and N-app



Conduct 6G Trials to Assess AI, Network and Application Performance, concentrating on the principles of "sustainable 6G"



Integrate Advanced 6G Applications across 6 6G-SNS and non-SNS Testbeds



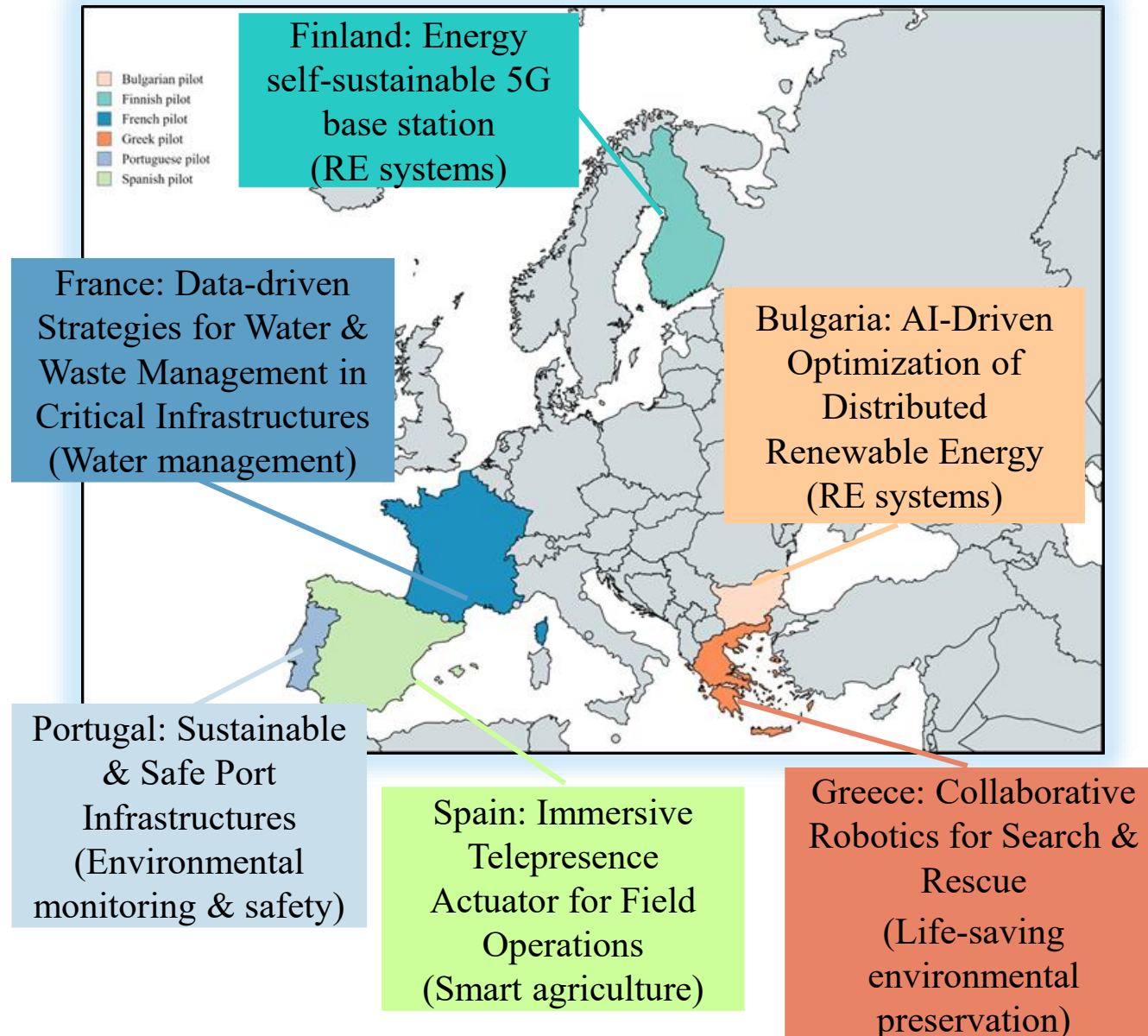
Evaluate the societal and environmental impact of 6G trials to ensure alignment with sustainability goals and societal needs and create new business models



Maximize the impact and adoption of 6G-VERSUS results through dissemination, communication, capacity building, standardization efforts, and exploitation measures.

Sustainability

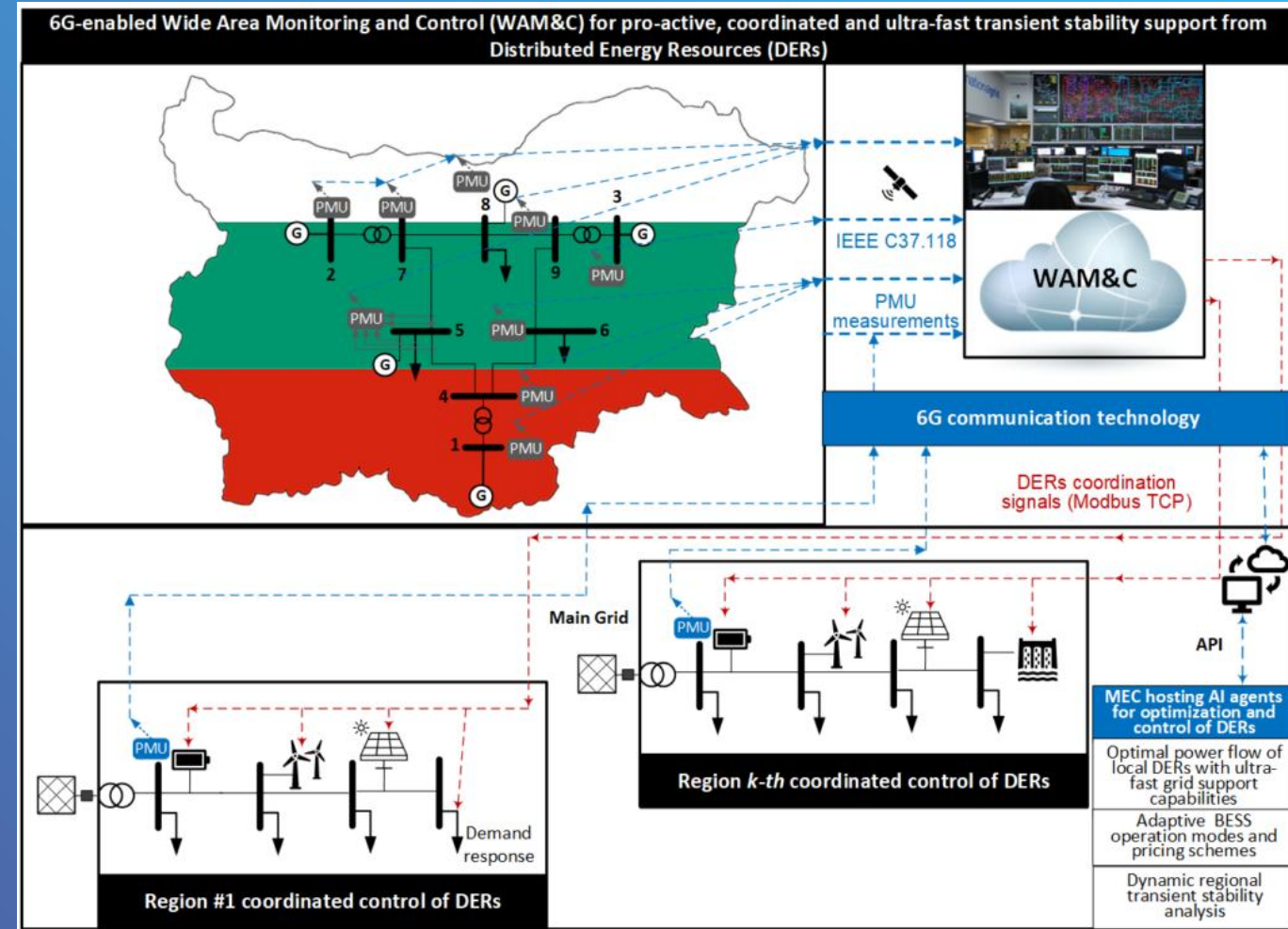
Pilot clusters



- 6 large-scale E2E pilots for 5 verticals
- Real-life sustainability use cases
- Integration with 5G/6G testbeds
- Novel technology architecture and methodology

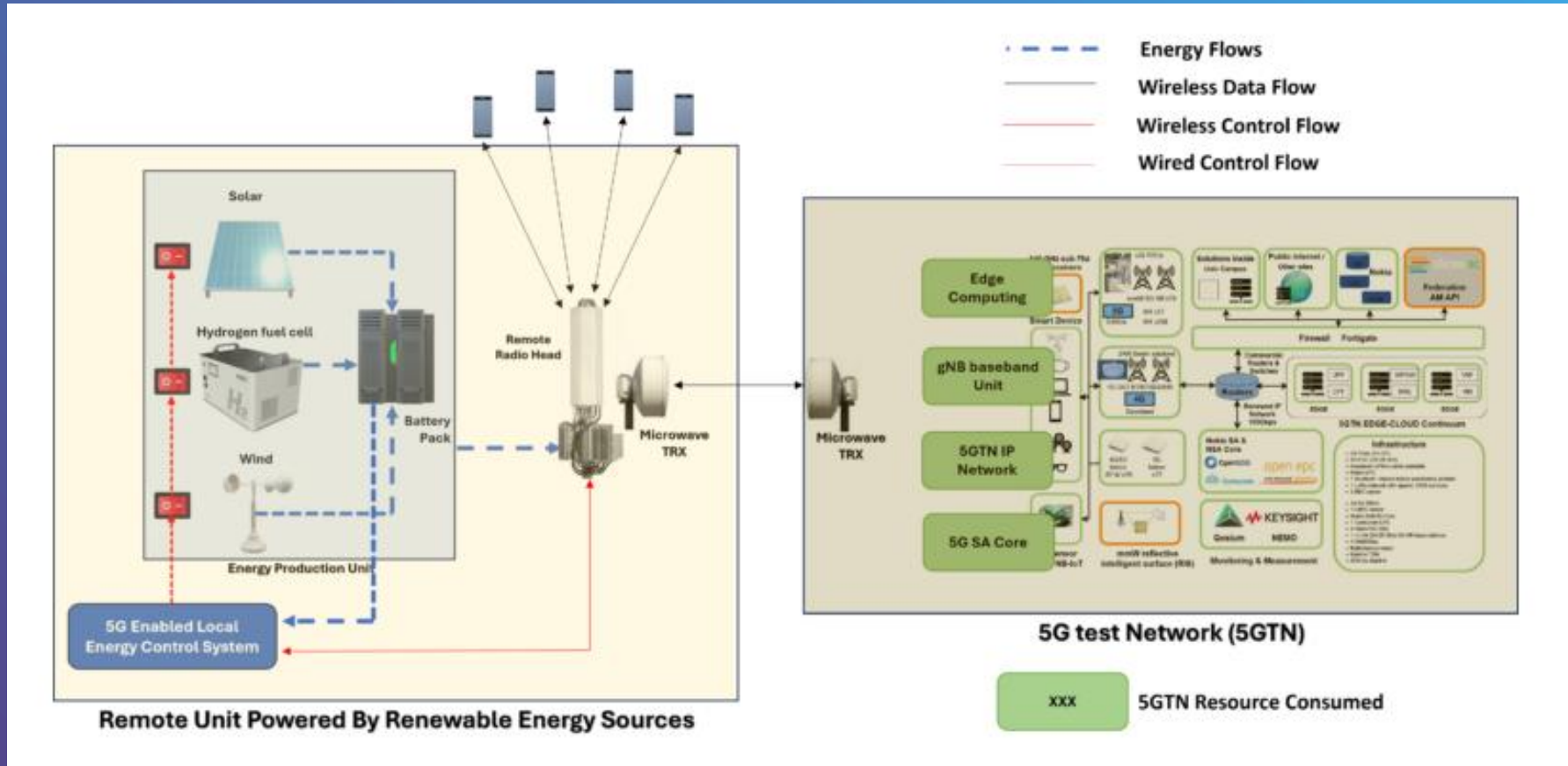
Energy grid management & predictive maintenance for wind farms

- Location Sofia, Bulgaria
- Aims to
 - (1) enhance reliability and resilience of smart grids using distributed control system (DCS) architectures and 6G communication
 - (2) improved voltage and frequency control by fine-tuning voltage and frequency levels across the grid (with a focus on high-RES penetration regions of distribution power grids the so-called grid edge)
 - (3) leverage on edge computing and localization advanced features of 6G networks to support identification of changes in the grid dynamics



Sustainable operations for a remote base station (off-grid) with RES power

- Location Oulu, Finland
- Aims to develop a remote base station site in arctic weather conditions, featuring a remote radio head, RES and a wireless fronthaul system like microwave link or NTN connectivity



Expected impact

Scientific

- generate new knowledge and insights of the capabilities of 6G technology for verticals and for advancing sustainability.

Technical

- demonstrate 6G vertical solutions that enhance the performance, reliability, and sustainability of communication networks.

Economic

- empower businesses and vertical industries to leverage 6G technologies for sustainable and profitable growth.

Societal

- raise awareness of the societal benefits of 6G technology and inspire broader adoption and investment in sustainable telecommunications infrastructure.

Policy

- influence the development of policies and regulations that support the deployment of sustainable 6G technologies.



6G Vertical Trials for Sustainability

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