Research and Innovation

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NOWOCERT's Services

Software Development

Designs and delivers customized optimization tools and AI-driven software solutions to meet the specific technological requirements of our customers and partners:

- Dynamic operational planning for energy stakeholders
- Risk-aware decision-making tools for future expansion and profitability
- Advanced analytics to support participation in various energy markets
- Integration of renewable energy sources, storage systems, and sector coupling

Consulting and Strategic Planning

Provides expert consulting services to help energy suppliers, communities, and investors:

- Develop strategies for optimal participation in energy and flexibility markets
- Identify and manage risks associated with emerging energy technologies and integrated systems
- Plan investments in greener energy systems, including renewables, P2H2, hybrid energy storage, electric vehicles, and demand response mechanisms

NOWOCERT's Services

Pilot Projects

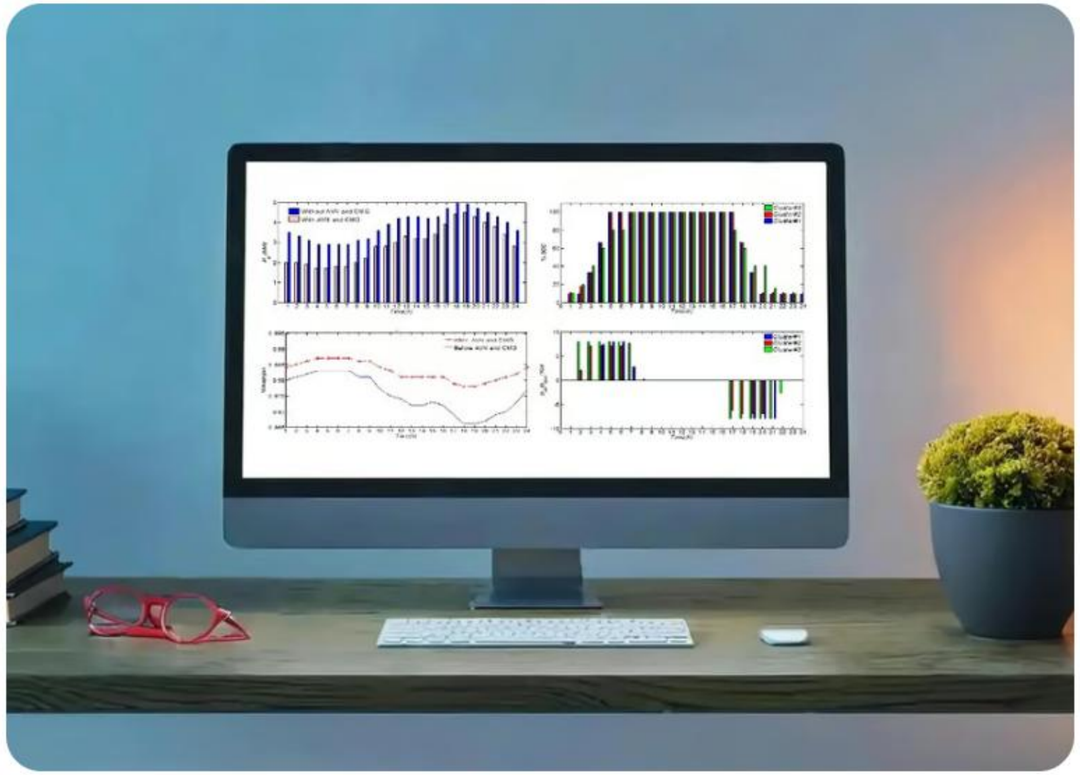
Designs and implements pilot settings to test and validate innovative technologies, through our extensive European networks. These pilots are tailored to meet the unique requirements and specifications of energy stakeholders, ensuring practical and scalable solutions.

Workshops and Training

Conducts workshops, seminars and training programs to educate about:

- Market trends and regulatory changes
- Emerging competitors and technological advancements
- Strategies for reducing CAPEX and OPEX while improving profitability

Products and Solutions



Dynamic Energy Management Software

Our flagship software is a powerful platform that helps energy suppliers and communities optimize their operations and bidding strategies. Key features include:

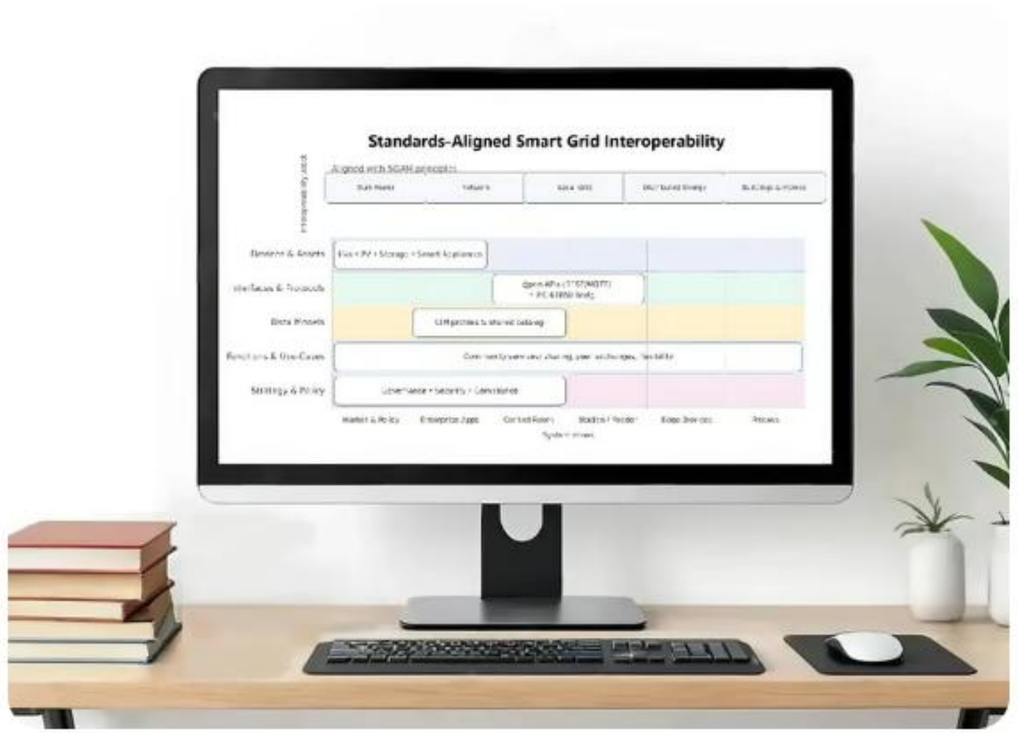
- Integration with ancillary and flexibility markets such as regulation services, spinning reserves, and frequency restoration reserves.
- Tools for managing uncertainties using methods like Value at Risk and Conditional Value at Risk.
- Customizable modules for different regions, allowing adaptation to specific market rules and environmental policies.

Products and Solutions

SGAM Architecture & Interoperable Data Modeling

Nowocert helps utilities, operators, OEMs, and platform providers design standards-based smart grid architectures and interoperable data models. Our Smart Grid Interoperability Framework applies SGAM across business, function, information, communication, and component layers to give all parties a shared blueprint for system design and integration. We implement IEC CIM as the canonical information model, profiling, governing, and validating data so heterogeneous applications can exchange information with clear, consistent semantics. The result is vendor-neutral, plug-and-play integration for grid operations, DER and storage management, substation automation, building and campus systems, EV infrastructure, and market platforms.

Our services cover semantic data integration and API engineering: model catalogs and dictionaries, CIM profiles and mappings, interface specifications (e.g., REST/MQTT), and bridges to field protocols such as IEC 61850. We build in security by design (identity and access control, encryption, auditing) and deliver practical assets, including SGAM maps, data models, reusable API definitions, conformance tests, and reference adapters, hence teams can scale faster while avoiding lock-in.

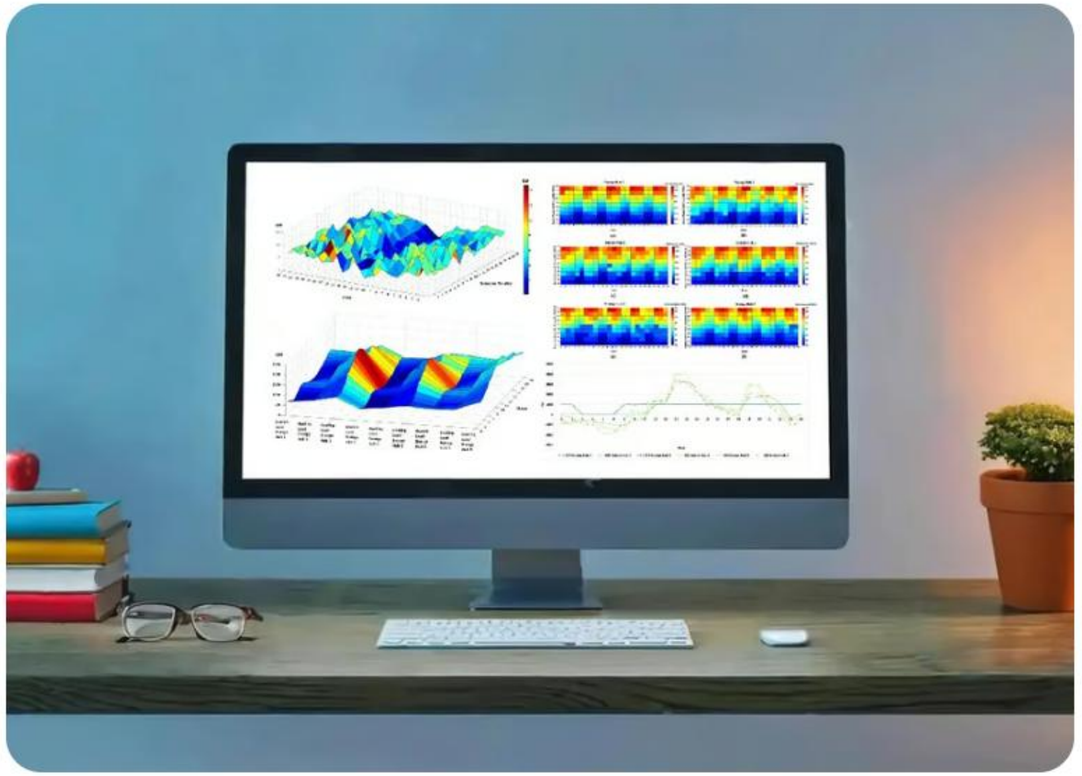


Products and Solutions

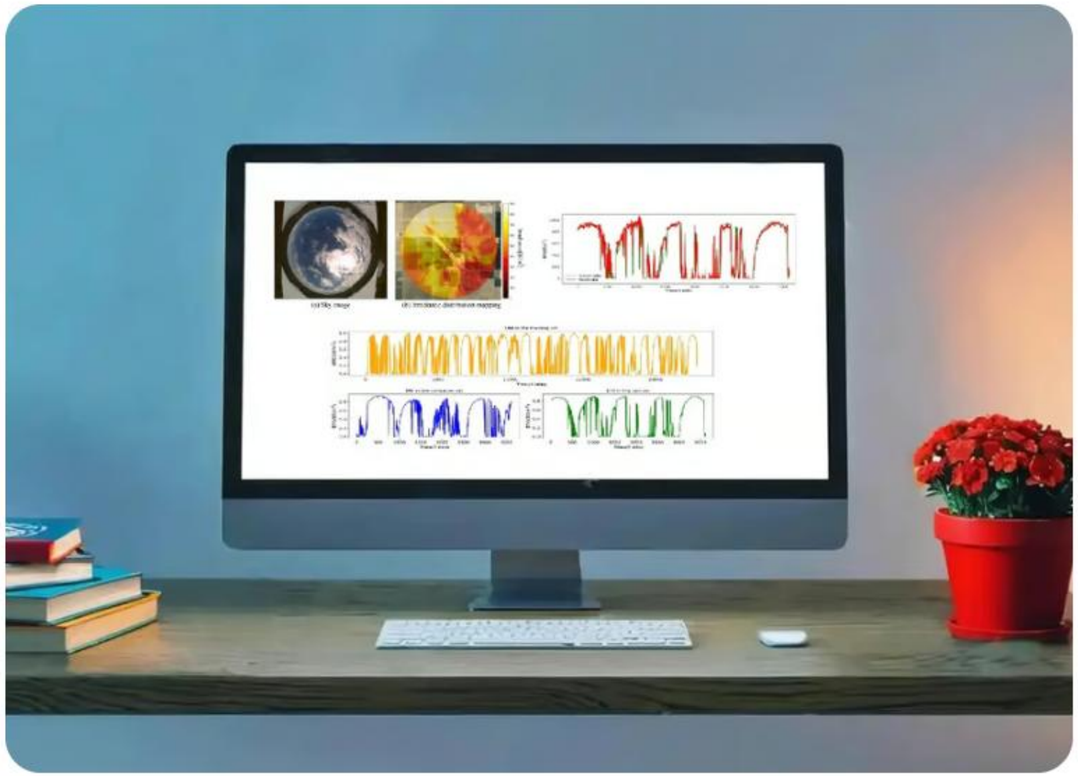
Seasonal Energy Storage Scheduler

This innovative tool enables energy suppliers to plan the optimal operation of seasonal storage systems. Features include:

- Accurate weather forecasting for wind speed, solar radiation, and energy prices.
- Scheduling tools to store energy during surplus months and utilize it during periods of high demand.
- Integration with microgrids, virtual power plants, and hybrid energy systems.



Products and Solutions



Solar Irradiance Forecasting Tool

This advanced tool utilizes sky image processing and real-time mapping models to deliver highly accurate minutely solar irradiance forecasts. Key features include:

- Sky Image Processing: Background elimination and distortion rectification techniques extract RGB values and pixel position information from sky images.
- Real-Time Mapping Model: A trained and continually updated mapping model links sky images to real-time solar irradiance measurements.
- Minutely Forecasting: Provides short-term solar irradiance forecasts with high precision to enhance solar power generation planning.

This tool empowers renewable energy operators to make data-driven decisions for solar energy management, reducing uncertainty and increasing system efficiency.

Products and Solutions

Wind Speed Prediction Tool

Our hybrid wind speed forecasting tool combines deep learning and evolutionary optimization to deliver real-time predictions with unmatched accuracy. Key features include:

- Hybrid Model: An AI-based technique combined with improved optimization algorithms ensures faster processing and enhanced prediction capability.
- Real-Time Forecasting: Provides minutely wind speed predictions to optimize wind power generation.
- Improved Algorithm Efficiency: The enhanced optimization algorithms reduce computation time and escapes local optima for better accuracy in dynamic conditions.

This tool supports wind farm operators in maximizing energy output and adapting to rapidly changing wind conditions, ensuring optimal renewable energy utilization.

Products and Solutions

Blockchain-Powered Market Solutions

Our blockchain-enabled platform facilitates secure and efficient energy trading. Features include:

- Peer-to-peer (P2P) energy trading capabilities.
- Local energy market customization for flexibility trading.
- Secure integration of customer behavior and policy compliance data.

Products and Solutions

Smart Energy Solutions

We also offer a suite of smart energy products, including:

- Intelligent EV parking systems and smart charging solutions.
- Demand response aggregation tools.
- Smart building energy management systems.

All our products are designed with flexibility in mind. They can be tailored to meet the specific needs of energy stakeholders, including:

- Decision support systems for techno-economic optimization.
- Interoperable solutions for integrated energy networks.
- Tools for addressing challenges in sector coupling and emissions reduction.

Products and Solutions

Home Energy Management Tools

Our advanced Home Energy Management (HEM) tools empower residential consumers to actively participate in demand response programs while maintaining comfort and satisfaction.

Key Features:

- Stochastic Optimization: Considers uncertainties in renewable energy generation and electric vehicle availability to optimize energy use.
- Cost Reduction: Minimizes consumer energy costs through intelligent scheduling of appliances and participation in DRPs.
- Inhabitants' Satisfaction: Ensures high levels of comfort by addressing technical appliance limits and introducing a response fatigue index.
- Long-Term Engagement: Mitigates response fatigue to sustain consumer participation in DRPs over time.

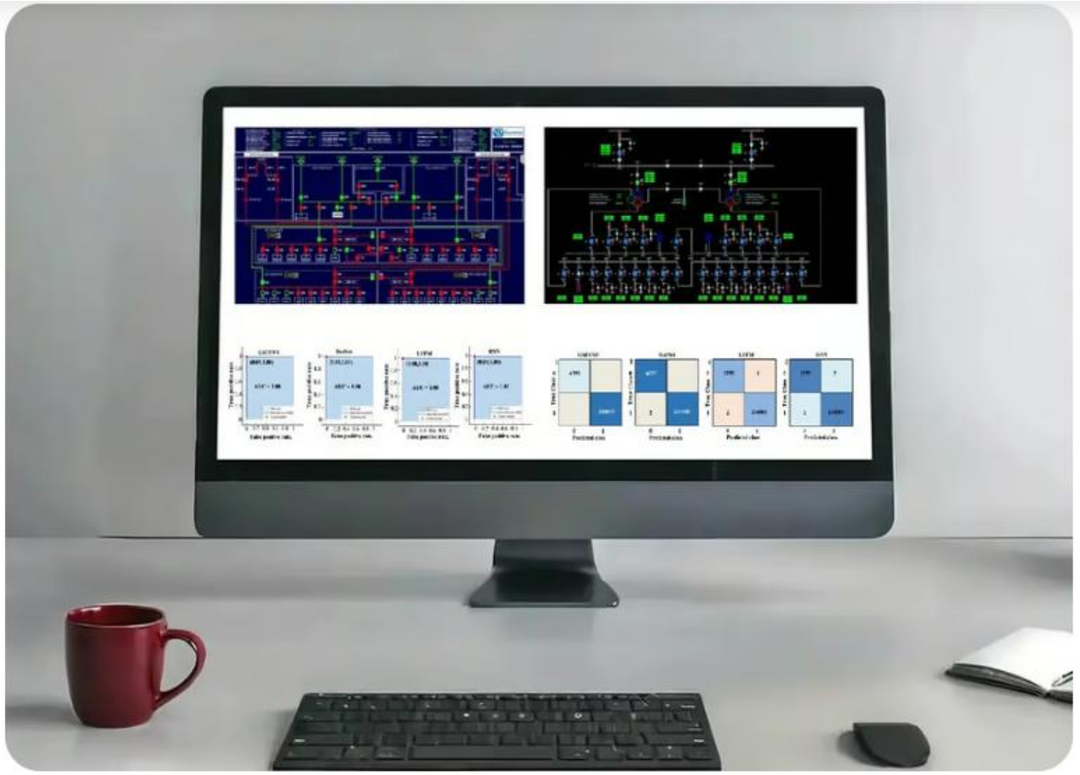
Products and Solutions

Cybersecure SCADA Solution

Our Cybersecure SCADA solution enhances the safety and performance of smart grids by detecting and mitigating cyberattacks with cutting-edge deep learning algorithms.

Key Features:

- **Advanced Threat Detection:** Identifies and classifies cyberattacks using deep learning models optimized with a nature-inspired root foraging algorithm.
- **Robust Accuracy:** Achieves superior results with 97.8% accuracy in binary classification, 95.6% in three-class, and 94.3% in multi-class classification.
- **Real-Time Protection:** Prevents attackers from introducing false data or misleading operators, safeguarding critical infrastructure and operations.
- **Performance Benchmarking:** Outperforms traditional machine learning models like Artificial Neural Networks (ANNs), Convolutional Neural Networks (CNNs), and Support Vector Machines (SVMs) across multiple evaluation metrics.



Products and Solutions

Multi-Voltage Network Expansion Planning

This advanced tool optimizes long-term transmission network expansion with a focus on renewable energy integration and multi-voltage systems.

Key Features:

- Multi-Voltage Approach: Optimizes voltage upgrades for existing substations and new transmission and distribution lines.
- Renewable Integration: Incorporates renewable energy resources, ancillary services, and energy storage for grid stability.
- Dynamic Planning: Provides cost-effective, long-term strategies over multi-year periods.
- Advanced Algorithms: Utilizes GIS-based hybrid forward–backward–decrease algorithms and AI-based optimization for large-scale systems.
- Reliability Focus: Ensures compliance with operational and security constraints, including contingency analysis.

Products and Solutions

Customizable Energy Marketplace Platform

Our Customizable Energy Marketplace Platform is a blockchain-based solution designed to enable energy communities to actively participate in energy and flexibility trading. The platform provides a scalable, adaptable structure to accommodate diverse market requirements, regulations, and consumer behavior across regions.

Key Features:

Customizable Marketplace Structure:

- Supports various energy community operation modes, including centralized management by energy community managers and decentralized peer-to-peer (P2P) energy trading.
- Tailors marketplace functionality to local regulations, weather conditions, and consumer behavior.

List of Horizon Europe calls September-December 2026 – Cluster 5 (Tab-I)

Call	Contribution of Nowocert	Role
Innovative technologies and solutions to improve wind energy systems supporting the Strategic Energy Technology (SET) Plan on wind **HORIZON-CL5-2026-09-D3-03** Deadline: 15 September 2026	Nowocert can contribute an integrated **AI-driven optimisation framework** to support green transition objectives, including flexibility, resilience, reliability, emission reduction, and self-sufficiency. The contribution can combine task-specific forecasting agents with optimisation models, enabling emission-aware and flexibility-aware decision support. Where needed, explainable AI modules can generate operator-facing reports for DSOs, energy community managers, or other system operators. Multi-objective optimisation can be applied to manage trade-offs between conflicting objectives such as emissions, cost, flexibility, and local energy autonomy.	**WP leader**
Researching the technical, social & economic factors impacting the energy performance of Smart Buildings (Built4People Partnership) **HORIZON-CL5-2026-09-D4-01** Deadline: 15 September 2026	Nowocert can contribute AI methods for socially responsive smart building deployment. This includes **Bayesian optimisation for human-in-the-loop calibration** of smart building controls, using sparse occupant feedback to tailor setpoints and automation rules across different socio-economic groups. Nowocert can also apply **federated learning** to enable privacy-preserving cross-building pattern discovery across multiple countries and building types, allowing local data to remain on site while shared models identify common barriers, preferences, and energy-impact patterns.	**Coordinator/ Co-leader**
Validating policies and business models for affordable and sustainable housing (Built4People Partnership) **HORIZON-CL5-2026-09-D4-04** Deadline: 15 September 2026	Nowocert can contribute a **multi-objective optimisation framework** for deep renovation cost-benefit analysis in rental housing. The framework can assess trade-offs between renovation costs, energy savings, affordability, and decarbonisation targets across different building scales and ownership/governance models. By integrating local market data, climate conditions, and demographic vulnerability indicators, Nowocert can support evidence-based comparison of renovation affordability across local markets and quantify the impact of policy instruments on renovation costs.	**Coordinator/ Co-leader**
Enhanced resilience in multimodal passenger transport through digital technologies and generative and discriminative AI **HORIZON-CL5-2026-10-D6-10** Deadline: 08 October 2026	Nowocert can contribute a **multi-agent reinforcement learning framework** for distributed disruption management in multimodal transport corridors. The approach can model transport operators such as bus, metro, and rail authorities as autonomous agents that coordinate service frequency, resource allocation, and passenger information during disruptions. A shared resilience-oriented reward function can reduce selfish operational behaviour and improve corridor-level performance. The framework can be trained and tested in a digital twin environment using libraries of planned and unplanned disruption scenarios, supporting faster response planning and delay reduction across pilot sites.	**Co-leader/ WP leader**
Improved system design for innovative PV applications (EUPI-PV Partnership) **HORIZON-CL5-2026-11-D3-14** Deadline: 01 December 2026	For the **AgriPV area**, Nowocert can support spatial planning and dynamic allocation of AgriPV systems using GIS-based analysis, techno-economic modelling, and optimisation. The contribution can address CAPEX and OPEX reduction while respecting agricultural, energy, geographical, and policy constraints. Nowocert can also support data-driven assessment of regional food requirements to inform greenhouse and AgriPV planning. In addition, Nowocert can design a coordination platform integrating individual AgriPV energy management systems, enabling coordinated energy and food-production planning, including potential market participation. Experience from semi-transparent greenhouse work in Qatar can support concept development and validation.	**Co-leader/ WP leader**

List of Horizon Europe calls September-December 2026 – Cluster 5 (Tab-II)

Call	Contribution of Nowocert	Role
Data sharing to support the training and development of AI foundation models for the energy sector **HORIZON-CL5-2026-11-D3-23** Deadline: 01 December 2026	Nowocert can lead a **secure energy-data and AI foundation-model framework** combining interoperable data models, data-quality scoring, privacy-preserving pipelines, and governance rules for shared energy datasets. The work can include federated learning, synthetic-data generation, and benchmark tasks for forecasting, flexibility, anomaly detection, and cyber-resilience. This positions Nowocert as the technical integrator for trustworthy energy AI models trained on multi-actor data without exposing sensitive operational assets.	**Coordinator/ WP leader**
Generative AI for smarter CCAM: enhancing perception, decision-making, and validation **HORIZON-CL5-2026-10-D6-03** Deadline: 08 October 2026	Nowocert can contribute a **GenAI-enabled scenario generation and validation framework** for connected, cooperative and automated mobility. The framework can create rare edge-case traffic scenes, synthetic sensor/perception data, and stress-test libraries for decision-making systems. Nowocert can also define robustness, explainability, and safety KPIs, linking virtual testing outputs to risk-aware validation workflows for mobility labs, city pilots, and CCAM technology partners.	**Co-leader/ WP leader**
Increasing competitiveness and resilience of multimodal freight transport and logistics **HORIZON-CL5-2026-10-D6-06** Deadline: 08 October 2026	Nowocert can deliver a **risk-aware logistics digital twin with optimisation and disruption forecasting** for multimodal freight corridors. The contribution can combine demand prediction, port/rail/road capacity modelling, ETA uncertainty, and contingency planning to improve resilience and competitiveness. Multi-objective optimisation can balance cost, emissions, delivery reliability, and asset utilisation, while dashboards support operators in selecting robust rerouting and recovery strategies during disruptions.	**Co-leader/ WP leader**
Advanced data platforms to integrate whole life carbon in building information modelling **HORIZON-CL5-2026-09-D4-03** Deadline: 15 September 2026	Nowocert can support an **interoperable BIM-LCA data platform and carbon intelligence layer** that links building information models, material passports, operational energy data, and uncertainty-aware carbon accounting. The contribution can include data harmonisation, AI-assisted gap filling, sensitivity analysis, and decision-support modules to compare design, renovation, and procurement options. This helps partners quantify whole-life carbon trade-offs and create scalable workflows for pilots and certification stakeholders.	**Co-leader/ WP leader**
Geopolitical competition and socioeconomic resilience in CCAM: an innovation and policy roadmap **HORIZON-CL5-2026-10-D6-02** Deadline: 08 October 2026	Nowocert can provide an **AI-supported foresight and resilience roadmap methodology** for CCAM value chains, digital infrastructure, skills, data sovereignty, and dependency risks. The contribution can map technology bottlenecks, policy scenarios, and adoption pathways, supported by stakeholder workshops and evidence-based KPIs. Nowocert can translate technical risks into actionable roadmap recommendations for European CCAM leadership, resilience planning, and strategic investment decisions.	**Co-leader**

List of Horizon Europe calls September-December 2026 – Cluster 5 (Tab-III)

Call	Contribution of Nowocert	Role
Supporting sustainable and smart urban mobility in Europe (CIVITAS) **HORIZON-CL5-2026-10-D6-07** Deadline: 08 October 2026	Nowocert can contribute a **data-driven replication, monitoring, and capacity-building package** for sustainable urban mobility. The work can define readiness indicators, digital maturity assessment, emissions and accessibility KPIs, and decision-support templates for cities. Nowocert can also support stakeholder engagement through training, toolkits, and evidence dashboards that help municipalities translate pilot results into scalable mobility strategies and investment cases.	**Co-leader/ Task leader**
Road Safety and resilience of rural areas **HORIZON-CL5-2026-10-D6-09** Deadline: 08 October 2026	Nowocert can build an **AI-based rural road-safety and resilience analytics framework** integrating crash history, traffic patterns, weather, infrastructure condition, and emergency-response constraints. The contribution can identify high-risk road segments, generate safety interventions, and assess resilience under disruptions such as extreme weather or service interruptions. Decision-support tools can help road authorities prioritise low-cost, high-impact measures for rural accessibility and safety.	**Co-leader/ WP leader**
Flagship-pilot: large-scale demonstrations of CCAM **HORIZON-CL5-2026-10-D6-01** Deadline: 08 October 2026	Nowocert should not lead the flagship pilot, but can offer a **specialised AI validation and data-intelligence work package** within a strong pre-formed consortium. The contribution can include scenario analytics, operational data pipelines, KPI monitoring, cyber-risk checks, and evidence dashboards for pilot performance. This creates a focused, credible role without taking responsibility for vehicle platforms, large pilot sites, or CCAM infrastructure ownership.	**Co-leader/ Task leader**
Full-scale demonstration of heat upgrade solutions in industrial processes **HORIZON-CL5-2026-09-D4-08** Deadline: 15 September 2026	Nowocert can contribute **energy-efficiency optimisation and techno-economic decision support** for industrial heat-upgrade demonstrations. The framework can model heat-recovery options, process flexibility, operational constraints, CAPEX/OPEX trade-offs, and emissions impact across candidate industrial sites. Nowocert can also develop monitoring analytics to compare baseline and post-intervention performance, helping industrial partners justify investment and quantify replicability across process sectors.	**Co-leader/ WP leader**
Coordinated topic with India on recycling of EV batteries **HORIZON-CL5-2026-09-D2-04** Deadline: 15 September 2026	Nowocert can support this only with the right EU-India recycling partners through a **circularity data, monitoring, and sustainability analytics package** for EV battery recycling chains. The work can track material flows, process performance, energy consumption, safety events, and environmental indicators. AI-based analytics can support traceability, anomaly detection, and decision-making for recycling efficiency, while respecting that technology demonstration must be owned by recycling and battery-sector partners.	**Task leader**

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