Advanced operation and maintenance of wind turbine

AIDTWIND - AI-Driven Digital Twin Platform for Operation, Maintenance, and Wind Energy Optimisation

CONSORTIUM

KocDigital Cozumler A.S. (TR) (main partner) (https://www.kocdigital.com/)

The Scientific and Technological Research Council of Türkiye (TR) (https://tubitak.gov.tr/en)

Entek Elektrik Uretimi A.S. (TR) (https://www.entekelektrik.com.tr/en)

Wiz Development & Services Srl (RO) (https://wizresearch.com/)

Analisis - Dynamic & Security Computations Sl (ES) (https://analisis-dsc.com/)

Seacon Europe Kft. (HU) (https://www.seacon.hu/en/)

Ubimet GmbH (AT) (https://www.ubimet.com/)

AIDT4WIND consortium consists of 7 partners from 5 countries (TR, ES, RO, HU, AT). The consortium has been carefully formed to ensure complete coverage of the project's scientific, technological, and industrial ambitions. Partners were selected based on their complementarity, multidisciplinary excellence, regional balance, and proven capacity for innovation. The consortium reflects a balanced collaboration between industrial partners, SMEs, and research organizations, maximizing both technological innovation and exploitation potential. AIDT4WIND combines end-user involvement (ENTEK) with strong SME participation (SEA, WIZ, ADSC, UBI), ensuring high relevance, rapid validation, and direct exploitation of results. Roles and responsibilities have been distributed based on each partner's core competencies, with clearly defined leadership in work packages and tasks.Each partner has a unique contribution to the project:

AIDT4WIND aims to advance wind turbine operations and maintenance (O&M) by developing a comprehensive, AI-driven digital twin platform, specifically designed to optimize performance, increase efficiency, and extend the operational lifespan of wind energy systems.

AIDT4WIND seeks to reduce the operational costs of wind energy through predictive maintenance and real-time monitoring, aligning with Europe's climate neutrality goals and contributing to energy sustainability. Commercially, the project positions itself to meet growing industry demand for more efficient and resilient wind energy solutions, thus enhancing the competitiveness of Europe's renewable energy sector. The project integrates cutting-edge AI and machine learning to predict turbine maintenance needs, prevent unplanned outages, and maximize energy output.

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Key technological advancements include digital twin technology for real-time monitoring, predictive analytics to anticipate component wear, and robust cybersecurity measures to protect against threats in digital and physical domains. This innovative approach will deliver highly accurate decision-making and enhancing overall system reliability.

AIDT4WIND addresses critical challenges in renewable energy, including energy efficiency, cost reduction, and resilience against cybersecurity threats. By advancing predictive maintenance and digital twin applications, the project supports Europe's goals for a secure, sustainable, and competitive energy landscape.

OBJECTIVES

- *Twinning of wind energy operations & maintenance to reduce costs and improve efficiency*
- *Development of cybersecurity solutions for protection of digitized wind energy systems*
- *Enhanced wind energy forecasting for financial viability and operational efficiency*
- *Public engagement and social acceptance of wind energy*

EXPECTED OUTCOMES

- *Enhanced turbine reliability, reduction in unplanned maintenance, increased operational lifespan*
- *Secured wind farm operations, online threat detection capabilities, Resilient infrastructure*
- *Higher forecasting accuracy, Increased energy production,Financial risk reduction*
- *Increased understanding of renewable benefits, Collaborative decision-making*

THE CLEAN ENERGY TRANSITION PARTNERSHIP

The CETPartnership is a multilateral and strategic partnership of national and regional research, development and innovation (RDI) programmes in European Member States and Associated Countries, aiming to boost and accelerate the energy transition and to support the implementation of the European Strategic Energy Technology Plan (SET Plan).

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