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Welcome to TWAIN!

Know more about the project in our introduction video



TWAIN is a 48-month Horizon Europe project led by 12 partners, dedicated to ensuring the reliable and cost-effective design and operation of wind power plants, with a specific emphasis on system stability, security, and environmental considerations. The project aligns with the European Union's decarbonisation goals, acknowledging the transformative influence of artificial intelligence and digitalisation as drivers of the energy transition and enabling the integration of wind farm control technology processes into the operation and design of future energy systems.

TWIN News and Events

TWIN exhibiting at the Lisbon Energy Summit 2024



The TWIN project was present at the [Lisbon Energy Summit](#) 2024 in Lisbon, Portugal, from May 27 to 29. TWIN was part of the [F6S Innovation](#) booth, the communication and dissemination partner of the project, together with other energy efficiency projects of the company. The event was a great opportunity to network and engage with stakeholders in the energy sector, to explain the methodology, objectives, and goals of TWIN, and to gather more interested parties for the development of the project, especially through the open calls phase of the project.

[Read more here](#)

TWIN presented at the WindEurope 2024

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TWAIN was presented at the WindEurope 2024 in Bilbao by the project coordinator and senior researcher of [DTU Wind and Energy Systems](#), Tuhfe Göçmen, within the Research and Innovation in Action session. The session included “project pitch” presentations, organised in collaboration with the European Academy of Wind Energy, aiming to serve as a bridge between academia and industry, offering insights and updates into research projects primed for collaboration.

[Read more here](#)

TWAIN Technical Advancements

From the Project Coordinator and Senior Researcher at DTU Wind and Energy Systems, [Tuhfe Göçmen](#):

The TWAIN project is steadily progressing towards revolutionising wind farm control through a multidisciplinary approach powered by AI. Central to the project are its five work packages, which guide the integration of data sources, modelling of wind farm processes, and conversion of these processes into actionable metrics and performance indicators to be used in optimum value-oriented decision-making. The primary focus of WP1 has been on integrating various capabilities into the TWAIN data environment, with key tools and frameworks being established, including MinIO for data uploads, Open Metadata for dataset browsing, and JupyterHub for data analysis. In WP2, we will soon start modelling wind farm control processes, where the team will be developing open-source tools for power and load prediction, as well as analysing noise emissions

Additionally, WP3 focuses on integrating performance metrics, where initial surveys of wind farm owners and operators gather insights on primary challenges and measurable impacts. Meanwhile, WP4 is gearing up to integrate controllers and scenarios for decision support, emphasising licensing and open-source business models to enhance trust, reduce duplication, and lower costs. The project's outreach efforts in WP5 are equally robust, with successful stakeholder engagement through promotional materials and upcoming events, including a significant open call for external end users to validate and demonstrate the TWIN framework.

Upcoming Energy Events in 2024



Some of the most important events for renewable energy in 2024:

[CIRED](#) - Vienna (AT), June 19-20 - CIRED is one of Europe's most important conference series for electricity distribution engineers.

[World Energy Transition Conference](#) - Online, September 5 - This virtual conference is dedicated to exploring innovative decarbonisation technology and solutions that are driving the transition to a low-carbon energy future.

[WindEnergy Hamburg](#) - Hamburg (DE), September 25-27 - One of the world's biggest and most important wind business platforms for exchanging news and views, building networks and closing major deals.

[Offshore Wind North East \(OWNE\)](#) - Sunderland (UK), November 6-7 - A leading event that explores themes and opportunities in the offshore wind sector.

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renewable energy sector. The exhibition provides participating companies with the opportunity to present their new technologies and present.

And more events mapped on our website!

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TWAIN Synergies

In this edition, we present four European Commission-funded projects teaming with TWAIN towards energy efficiency actions



[WILLOW](#) - "Wholistic and Integrated Digital Tools for Extended Lifetime and Profitability of Offshore Wind Farms", aims to achieve an integrated system that will provide a health aware curtailment strategy to the offshore wind farm operators. Physical models and data-driven models (AI/ML) will be used to assist decision-making and planning of wind turbine operation and maintenance (O&M) activities considering factors such as component degradation, the particular complexity of grid integration, or specific offshore issues like corrosion or the additional loads from waves, tides and currents.

[ICONIC](#)- Aims to develop innovative digital and physical tools to achieve fundamental breakthroughs for the integrated control of wind farms, considering the whole physical

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interactions among turbines. The proposed integrated control solutions have been demonstrated by an extensive validation study via high-fidelity simulation models, experiments at a national-level wind tunnel, historical operational data, and real-world wind farm field tests.

[AIRE](#) - An ambitious initiative aimed at enhancing wind energy efficiency by understanding the atmospheric impacts on wind turbines. It focuses on studying wind flows at different altitudes and under various weather conditions, including wind, precipitation, and haze. Our goal is to create a cost-effective, user-friendly, multi-fidelity prediction toolbox made of 4 complementary tools and 5 efficient numerical models for the wind farm sector to improve efficiency.

[DigiWIND](#) - The project will deliver interdisciplinary Specialised Education Programmes to future-proof the careers of Science, Technology, Engineering, and Math professionals in wind and energy systems through advanced digital skills in key capacity areas of High-Performance Computing, Artificial Intelligence, Cybersecurity, and other emerging technologies.

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Farm Control powered by Artificial Intelligence

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