

Virtual Worlds Connect

Brokerage event

Atilla Arda Beşen

atilla.arda.besen@volarevers.com
volarevers.com



VolareVers Technologies

Limited Liability Company

- ✓ Founder & Product Strategist
- ✓ AI-Powered XR Simulations and Industrial Worlds Creators



TWINCLEAN

Hybrid Digital Twin-Enabled Wet Gas Cleaning for BAT-AEL
Compliance and Resource-Efficient Emission Control



Project idea

TWINCLEAN will develop a validated hybrid living digital twin of a three-stage wet scrubber, combining fixed process knowledge with AI-based predictive models calibrated on real operational data and supported through an immersive operator decision-support interface.

The project aims to establish a new benchmark for industrial gas cleaning by enabling BAT-AEL compliant operation, resource-efficient optimisation, and safer human-in-the-loop control within explicitly validated operating conditions.

TWINCLEAN will deliver an advanced hybrid living digital twin that

- ✓ forecasts emissions and supports continuous BAT-AEL compliance assurance,
- ✓ identifies technically feasible operating ranges to optimize reagent, water, and energy use,
- ✓ detects anomalies, drift, and out-of-distribution conditions to enable predictive maintenance,
- ✓ provides an explainable decision-support and immersive training interface for operators.

The twin will combine a fixed process structure with AI-based predictive models calibrated on real scrubber data, ensuring that operation beyond validated conditions is explicitly constrained and blocked.

Consortium Roles

- Łukasiewicz – IMN: physical scrubber, process expertise, data, validation.
- Technical University of Denmark: predictive modelling, optimization, surrogate models.
- AI partner: TBD - predictive modelling, optimization, surrogate models.
- VolareVers: Digital Twin and VR Training Creator
- Classified Industrial partner: requirements, validation, exploitation scenarios.

Potential Call: HORIZON-CL4-2026-04-HUMAN-01 Developing and demonstrating core technologies for Virtual Worlds and Web 4.0

