

Digital Twins to support CC(U)S development

Hamburg CCUS October 2025

2025



Gradyent's Digital Twin is the benchmark product in digital optimization of critical energy infrastructure

Rotterdam-based scale-up with 60% engineer background on 150 staff



District heating companies across Europe

WIEN ENERGIE

VATTENFALL

gasunie

uni per

VEOLIA

Eneco

HELEN

Industry Frontrunners



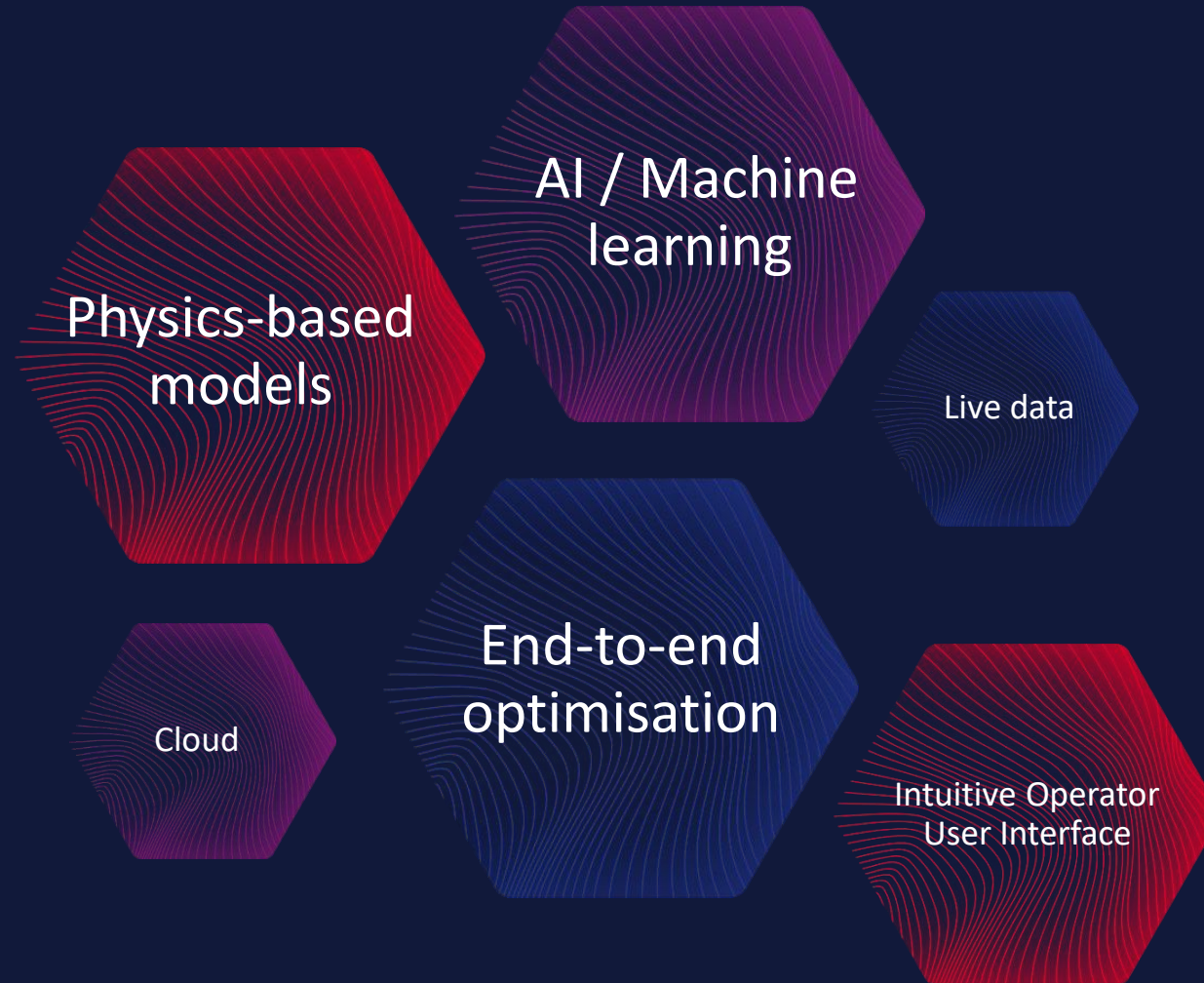
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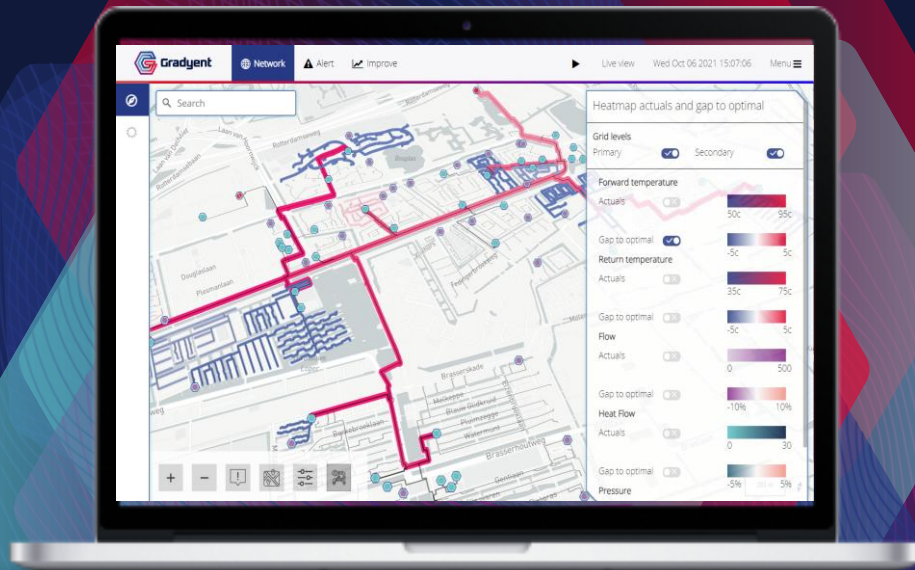
Sime Darby

NOBIAN

The Gradyent Digital Twin is built on 6 linked blocks, and is the best digital copy available of your full system



Gradyent's Digital Twin Technology enables both real-time optimization & future simulation of networks



Real time operational optimisation

By optimising pressures, nominations, flows across the networks, energy use & costs can be optimized

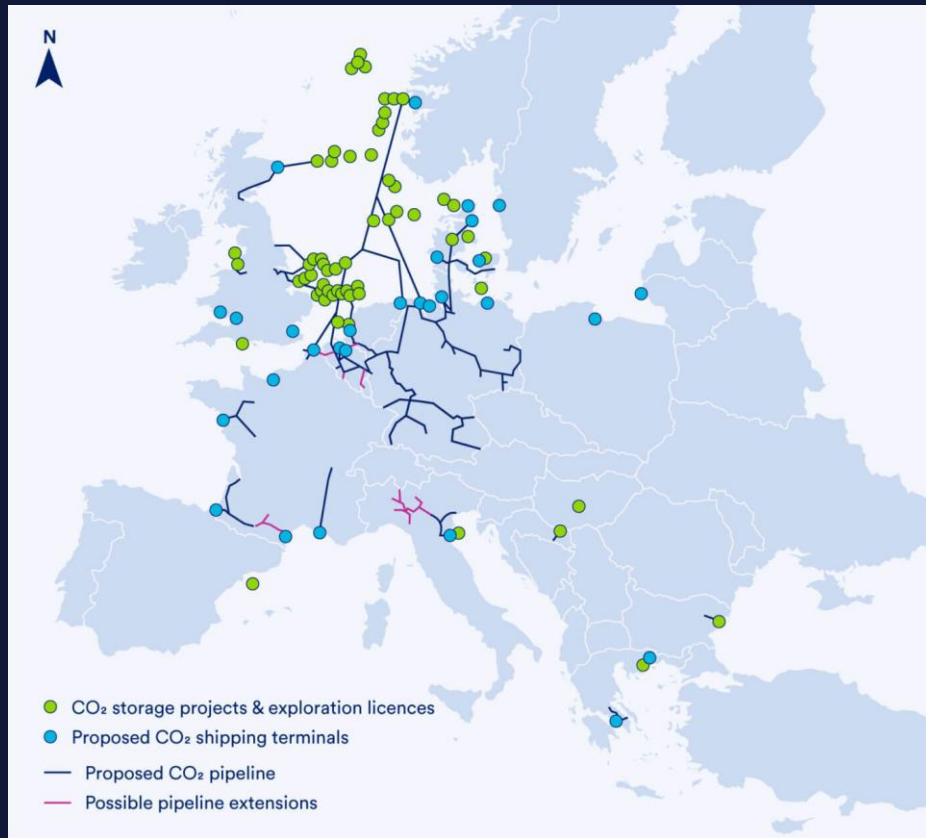


Design & simulation of future proof networks

Enhancing decision making around repurposing of networks & investing in new networks

When building Europe's future CO₂ network, dynamic modelling through a Digital Twin can help assure investments

Proposed European CO₂ infrastructure



Design & Simulation

- Assuring value of investments into future CO₂ networks
- Dynamic network modelling instead of static engineering for investment decisions
- Modelling impact of repurposing of existing pipelines

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Real time control & optimization

- Creating daily operating envelop, from injections into network to sub-surface reservoir or CO₂ consumer
- (Re-)Nominating CO₂ emissions to be injected into network on basis of planning and actual network flows
- Reducing compressor energy use by optimising flows across networks
- Optimizing energy procurement for compressors based on real-time prices

Questions? Looking forward to further discussion

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