SIEMENS

SIEMENS PROCESS AUTOMATION SOFTWARE

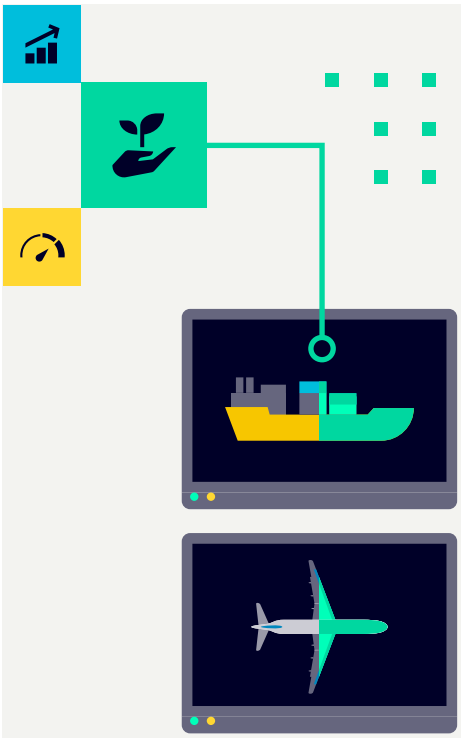
Accelerating Sustainable Fuels & Feedstocks via **Digital Design**

Model, simulate, and optimize complex sustainable fuel processes

siemens.com/gproms

Emerging sustainable fuel technologies—such as e-Fuels and Power-and-Biomass-to-Liquid (PBtL)—are complex systems requiring advanced design and operational control. While promising, their commercial deployment remains challenging. Several high-profile sustainable fuel projects have struggled or failed to scale, underscoring the urgency for smarter, more resilient approaches to accelerate their success and meet the growing global demand for clean fuels.

Siemens Digital Process Twin accelerates innovation by representing the entire sustainable fuel process through a high-fidelity, physics-based model. These mechanistic models are designed to accurately predict process behavior and support process synthesis—enabling engineers to evaluate design options and optimize plant configuration, allowing them to make more informed decisions when developing new equipment, processes, and plants.



Why use a Digital Process Twin?

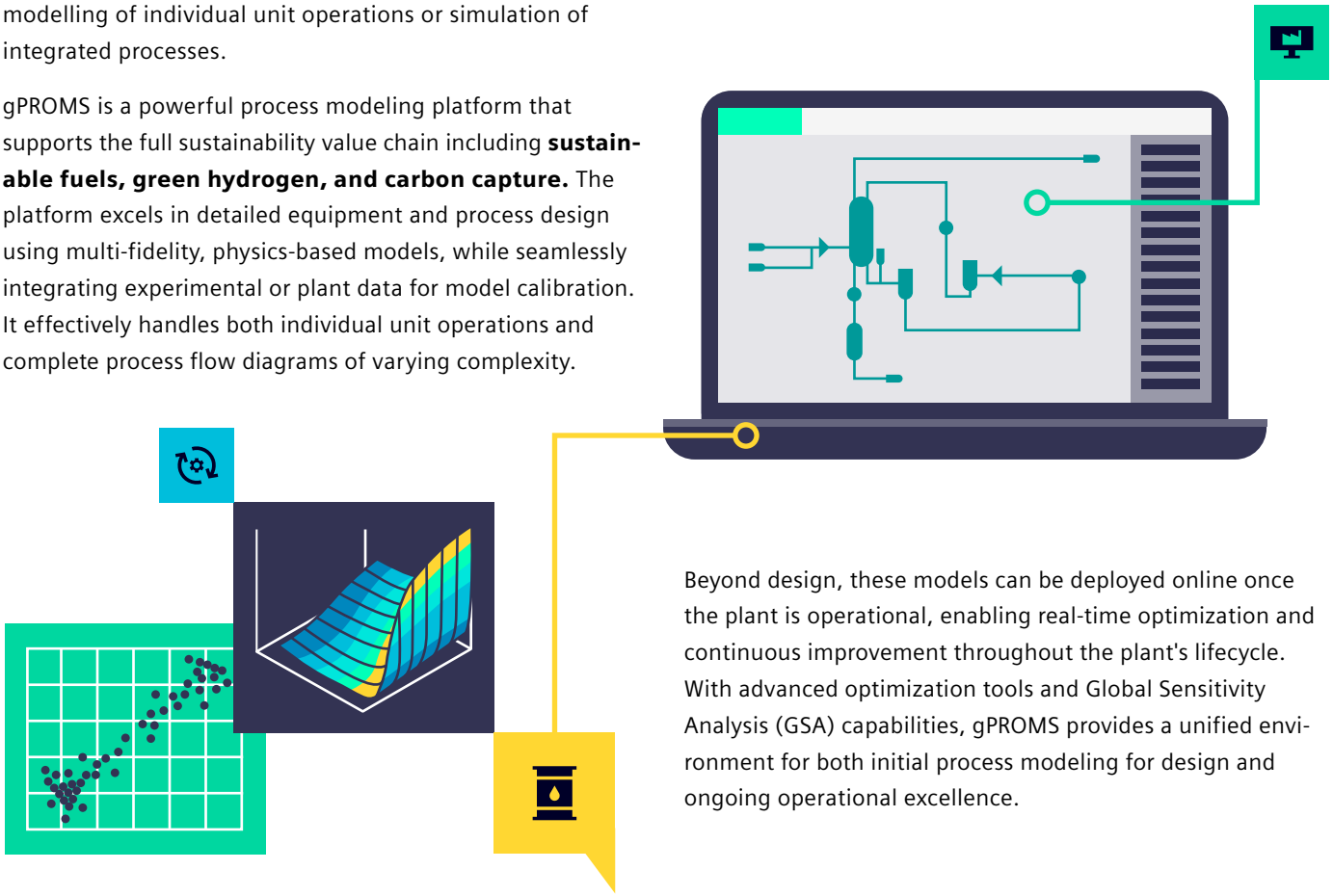
Incorporating a Digital Process Twin in sustainable fuel processes can...

- Deliver optimal return on investment
- Identify best achievable design and accurately quantify risks
- Reduce time-to-market
- Improve process economics
- Increase yield and sustainability
- Ensure final fuel follows ATSM standards

Detailed design and process analysis using SIEMENS gPROMS

Siemens gPROMS software is used for high fidelity modelling of individual unit operations or simulation of integrated processes.

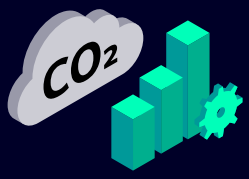
gPROMS is a powerful process modeling platform that supports the full sustainability value chain including **sustainable fuels, green hydrogen, and carbon capture.** The platform excels in detailed equipment and process design using multi-fidelity, physics-based models, while seamlessly integrating experimental or plant data for model calibration. It effectively handles both individual unit operations and complete process flow diagrams of varying complexity.



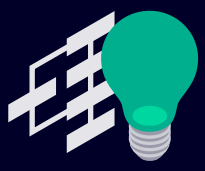
Beyond design, these models can be deployed online once the plant is operational, enabling real-time optimization and continuous improvement throughout the plant's lifecycle. With advanced optimization tools and Global Sensitivity Analysis (GSA) capabilities, gPROMS provides a unified environment for both initial process modeling for design and ongoing operational excellence.

Key Application Areas

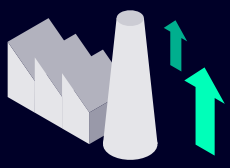
Siemens **gPROMS** enables organizations in the sustainable fuels industry to improve their existing processes through advanced optimization techniques, as well as rapidly innovate new processes to keep up to date with changing markets.



Carbon footprint assessment



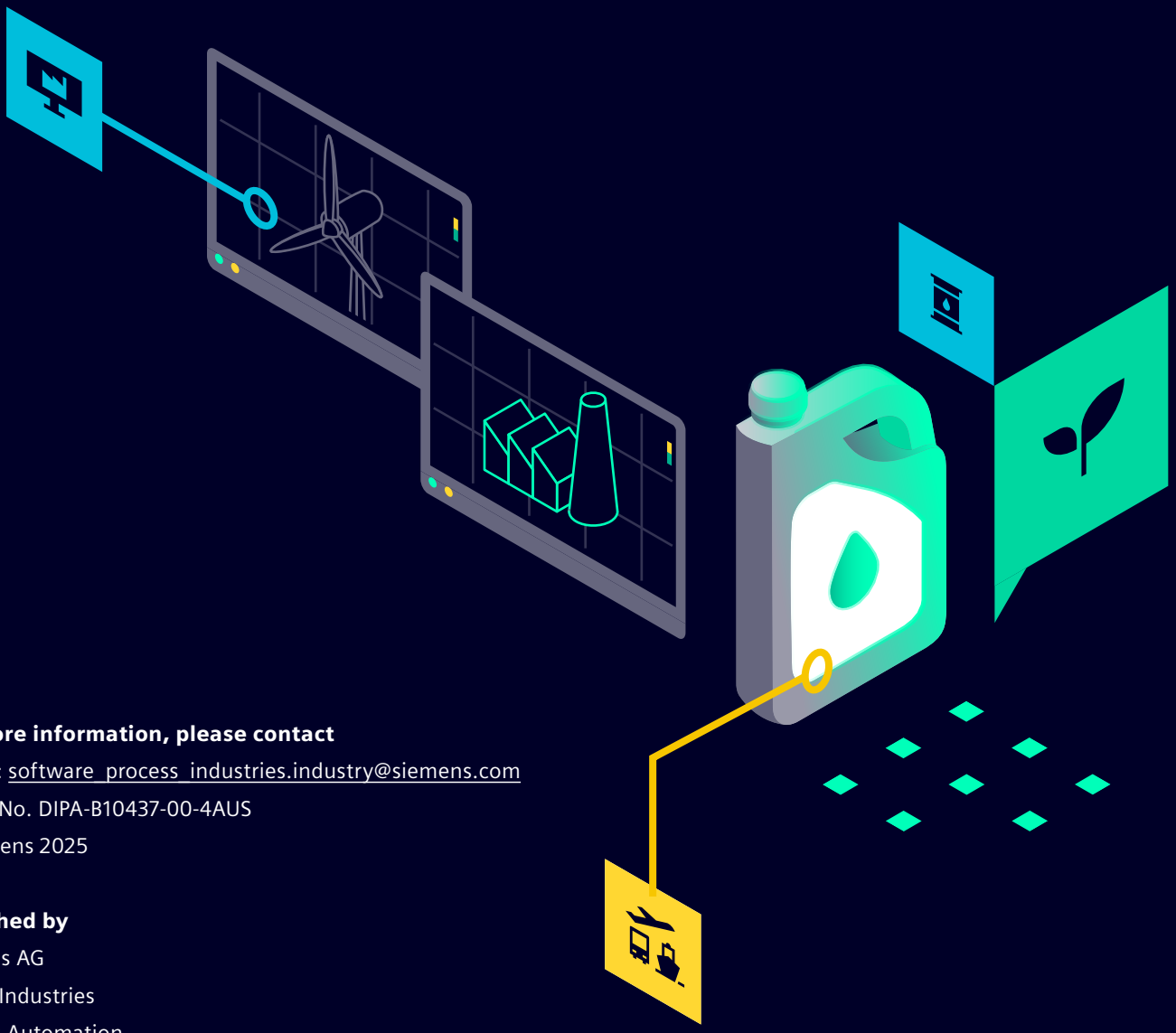
Conceptual process design and FEED



Model-based scale up

Technology validation

Operational Excellence and Control



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