

TEKFEN ENGINEERING

Tekfen Engineering Adopts Concurrent Engineering to Accelerate Carbon Capture FEED Proposals

“Seamless integration minimizes manual input, shortens feasibility cycles and enhances the credibility of early-stage techno-economic assessments.”

—Volkan Topaloglu, Process Engineer, Tekfen Engineering

TIC estimates generated in hours instead of 3–4 weeks

3D layout built in 2 days instead of 2 weeks, with rapid layout iterations

CHALLENGE

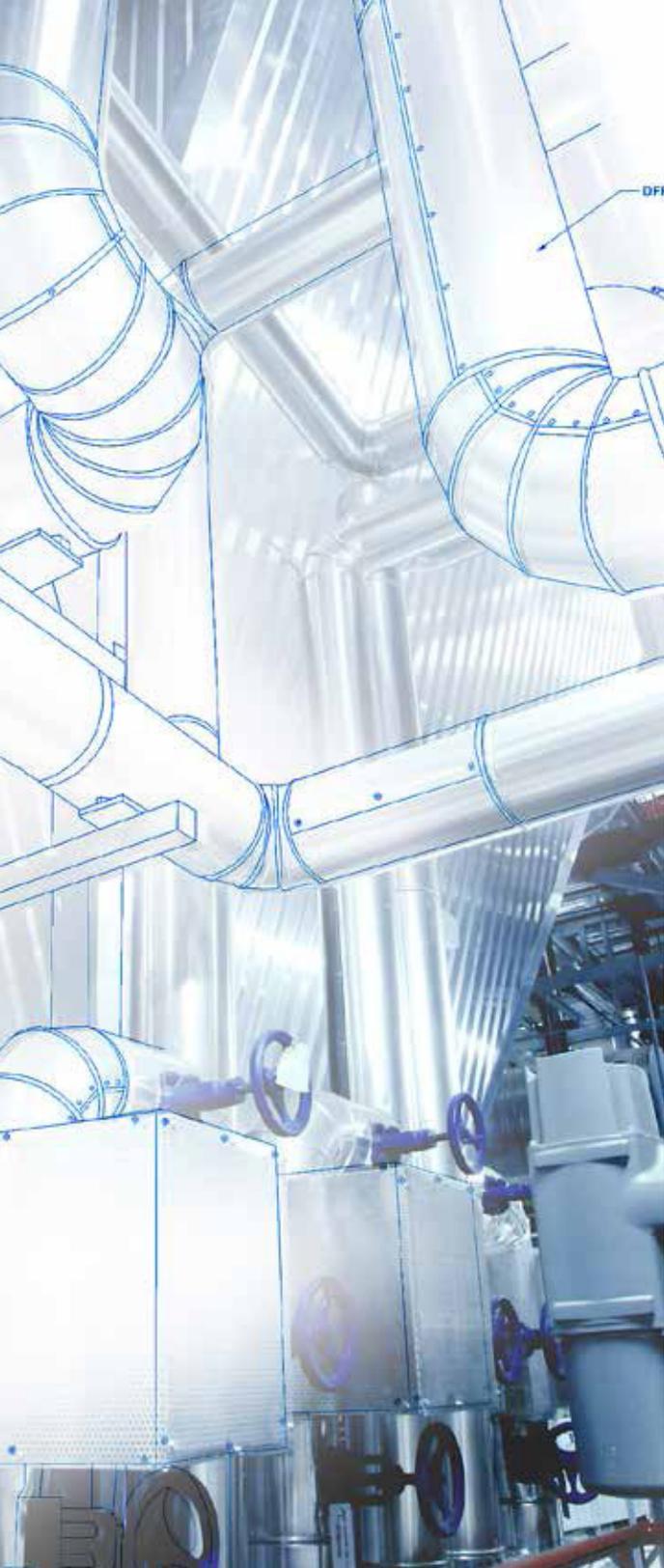
FEED proposals are significantly delayed waiting for vendor data to create TIC estimates, reducing the number of design scenarios that can be evaluated.

SOLUTION

AspenTech’s Concurrent Engineering solution establishes a collaborative workflow to accelerate FEED proposals including designs for process, economics and layouts.

VALUE CREATED

- Reduced feasibility cycle times during early engineering stages by up to 88%
- Ensured cross-discipline data consistency and accuracy
- Compared multiple design scenarios using real-time cost and economic insights



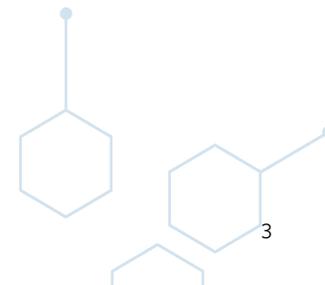
Moving Away from Manual Cost, Layout Workflows to Reduce Feasibility Cycles Times

Tekfen Engineering is a multidisciplinary engineering firm serving global clients across industrial plants, oil and gas, infrastructure and sustainability projects. Using a client-focused approach, ISO-certified quality systems and advanced tools such as 3D and simulation models, the provider delivers integrated services from concept to completion, with a focus on ensuring safety, reliability and cost optimization while meeting strict performance, schedule and budget goals.

As sustainability projects like carbon capture become a strategic focus, Tekfen Engineering increasingly needs to accelerate FEED proposals and provide clients with early-stage cost insights to support investment decisions. This requires seamless collaboration across multiple disciplines and maintaining data consistency through numerous design iterations.

FEED proposals for carbon capture projects are inherently complex. One of Tekfen Engineering's sites identified more than 12 technically viable design options, each with different economic parameters (i.e., payback periods, TIC, revenue). Selecting the optimal design demanded an integrated approach to evaluate technical feasibility, layout constraints and economic performance simultaneously.

Traditional workflows were significantly slowing projects at Tekfen Engineering. For example, manual data transfers between tools, reliance on vendor quotes for cost estimation and repeated design iterations extended feasibility cycles by weeks, delaying client decisions and increasing project risk. The company needed a way to streamline processes, reduce cycle times and improve decision quality without compromising accuracy or safety.





A Digital Workflow Integrating Simulation, Cost Estimation and 3D Modeling

To achieve these objectives and others, Tekfen Engineering adopted AspenTech's Concurrent Engineering workflow, creating an integrated digital framework that connects process simulation, 3D layout and economic analysis in real time. This approach eliminated data silos, reduced manual rework and enabled rapid evaluation of all the alternative design scenarios—both technically and economically, while considering layout design.

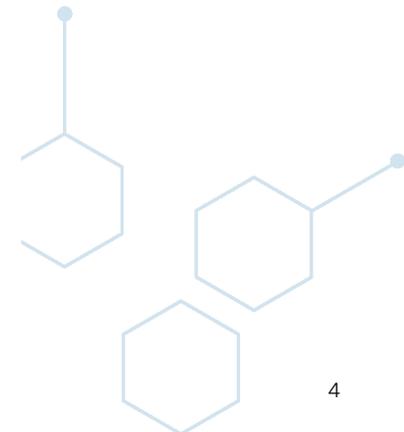
The integrated workflow has delivered measurable results for Tekfen Engineering:

- **Reduced feasibility cycle times by up to 88%**, accelerating design iterations and improving responsiveness
- **Ensured cross-discipline data consistency and accuracy**, while eliminating manual re-entry and reducing rework
- **Improved decision quality** during early project stages, comparing multiple design scenarios with real-time cost and economic insights.

Workflow Steps

1. Rigorous Process Simulation with Aspen Plus®

Tekfen Engineering began by modeling the carbon capture process in Aspen Plus, leveraging its extensive thermodynamic database to ensure accurate heat and material balances validated against experimental data. This allowed the team to assess technical feasibility early, explore recycling and disposal strategies for by-products and optimize energy integration, all during the conceptual design stage.



2. Accelerated Layout Development with Aspen OptiPlant 3D Layout™

Simulation results were transferred to Aspen OptiPlant 3D Layout, enabling Tekfen Engineering to quickly build and visualize multiple layout alternatives. This step helped identify plot-space constraints and tie-in points early, reducing layout uncertainty and accelerating MTO preparation from two weeks to just two days, a dramatic improvement for FEED

A unified workflow integrating process simulation, cost estimation, and 3D modeling enables real-time collaboration—delivering faster timelines and reduced costs.

3. Faster Cost Estimation with Aspen Capital Cost Estimator™ (ACCE)

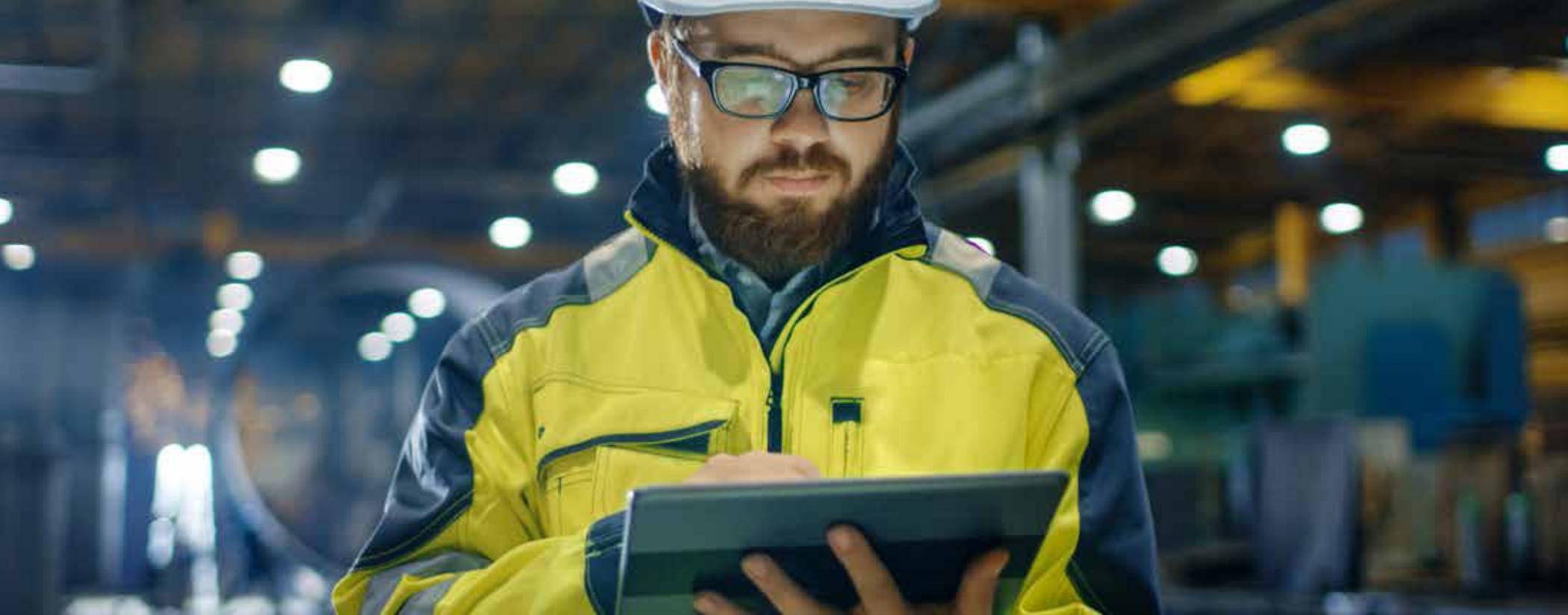
With Concurrent Engineering, Tekfen Engineering integrated layout data, including equipment sizing and MTOs, into ACCE to produce total installed cost (TIC) estimates within minutes, compared to the traditional three-to-four weeks required when waiting for vendor quotes. This eliminated manual data re-entry and provided accurate, consistent cost data for every design iteration.

4. Scalable Financial Analysis with Aspen Process Economic Analyzer™ (APEA)

Tekfen Engineering leveraged the seamless integration between ACCE and APEA to scale economic evaluations and calculate key financial metrics (i.e., NPV, IRR, pay-back period) for every design scenario. APEA's automated Excel reports improved transparency and communication with clients, highlighting sensitivities such as raw material and utility costs.

By integrating these tools into a concurrent workflow, Tekfen Engineering **achieved data consistency across disciplines, streamlined collaboration and enabled rapid scenario evaluation**, transforming what was once a slow, fragmented process into a fast, data-driven decision-making framework.





A Transformative Digital Solution for Tekfen Engineering

What previously required weeks or months of manual work was streamlined into a single collaborative workflow, enabling the company to evaluate technical feasibility, layout constraints and economic performance in parallel.

AspenTech's Concurrent Engineering solution has enabled Tekfen Engineering to evaluate, compare and optimize carbon capture designs and scenarios, evaluating multiple compositions, raw material costs, utilities and capacities. The approach demonstrates how digitalization and Concurrent Engineering are not only efficiency drivers, they are strategic enablers for sustainability projects like carbon capture, where speed, accuracy and cost optimization are critical to success.





About Aspen Technology

Aspen Technology, now part of Emerson, is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance life-cycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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