



CASE STUDY

# Ammobia is Accelerating Ammonia Plant Development with CVector Platform's Techno-economic Analytics.



## Executive Summary

Ammobia, a leading chemical reactor and energy equipment manufacturer, has teamed up with CVector to elevate their process of designing and simulating the operations of optimized ammonia production facilities. CVector's technology aides Ammobia in conducting real-time, techno-economic scenario analysis with clients and accelerates their R&D decisions, leading to dramatically improved feasibility studies, client engagement outcomes, and a more efficient evolution of their technology.

“Our partnership with CVector gives us the analytical capabilities of a much larger company at a fraction of the cost and headcount”

**Tristan Gilbert**, Ammobia's CTO

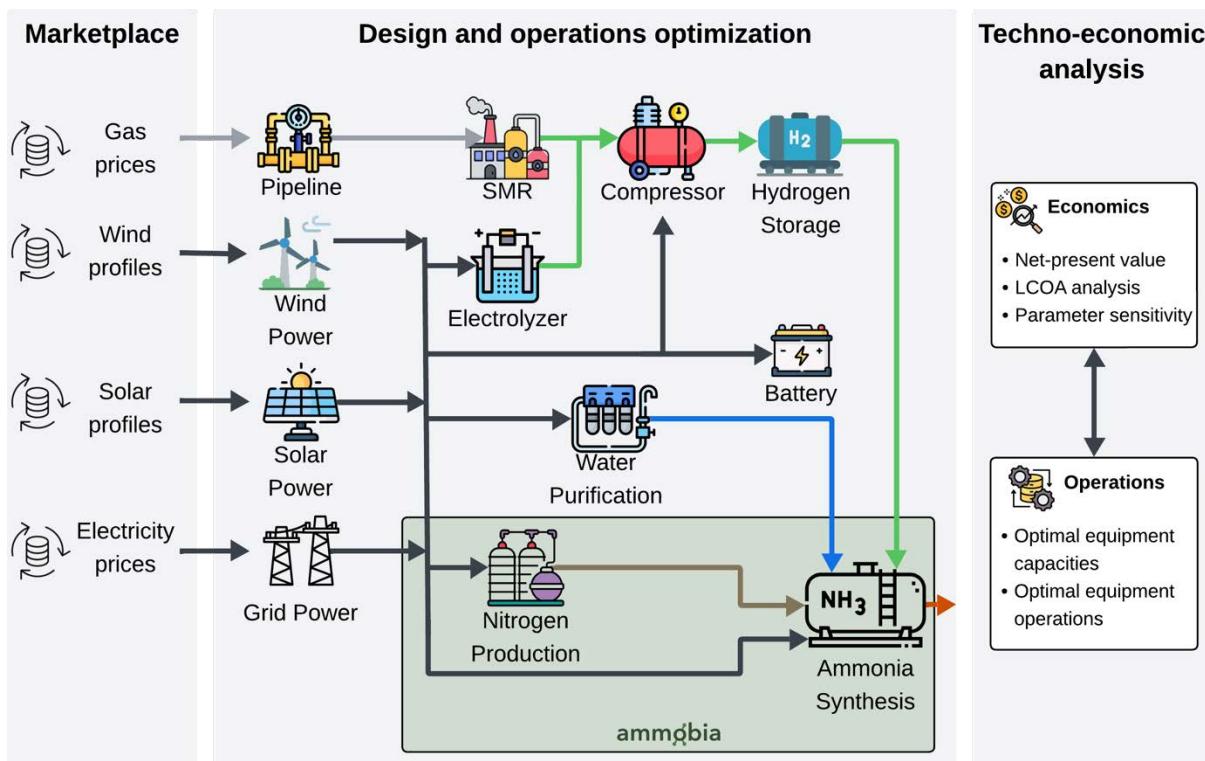
## Challenge

Ammonia production is an energy-intense business. It is critical to incorporate volatile energy market details when modeling the financials of the ammonia production process. Conventional techno-economic modeling tools in the chemical and energy industries rely on static, spreadsheet-based calculations applicable only to already-designed projects and are poorly suited towards project design and dynamic plant operations.

## Solution

In early 2025, CVector and Ammobia partnered to integrate Ammobia's technology and expertise into CVector's techno-economic model. The co-developed model allows Ammobia to analyze project economics globally and outpace the competition in quickly assessing project feasibility across different market conditions.

CVector's integrated industrial AI platform with techno-economic modeling capabilities combines real-time asset data with contextual market information such as energy prices, commodity markets, and renewable power forecasts (**Fig. 1**).



**Figure 1:** Example equipment configuration for a project that highlights the integration of Ammobia's process model with the interconnected CVector Marketplace and the Design and Operations platform.

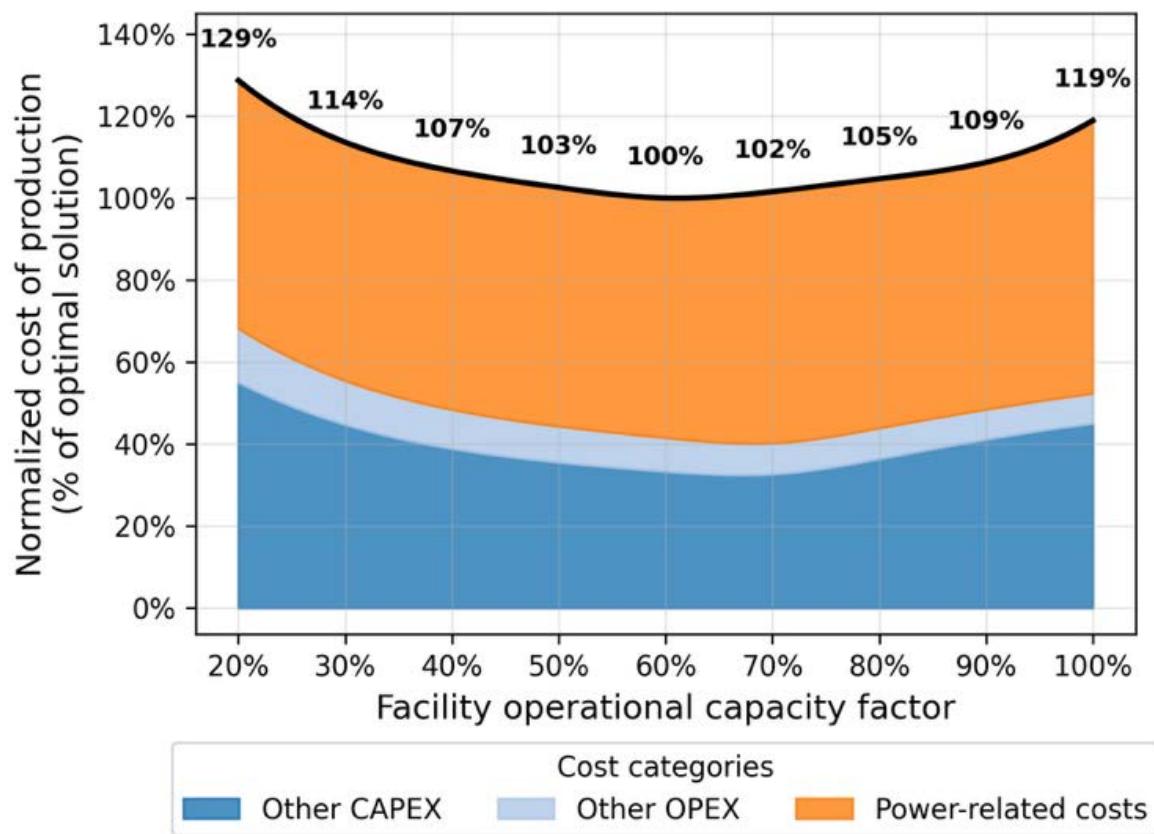
By applying the capabilities of CVector's platform to some of Ammobia's process models, the companies co-developed an ammonia production project model which has enabled:

- **Project optimization:** CVector's optimization algorithms couple with Ammobia's process model to size subsystems and schedule power and hydrogen dispatch for least-cost ammonia production. The CVector platform delivers global energy characteristics for optimization of plants across locations, which Ammobia implements for site-specific feasibility studies with customers.
- **Dynamic scenario modeling:** The value of different equipment choices and configurations can rapidly be assessed with real-time project feasibility studies and techno-economic analysis across multiple project scenarios. Ammobia conducts global sensitivity analysis to set product specifications and to inform development decisions (**Fig. 2**).
- **Market-integrated analysis:** Live integration of supply and demand data with location-specific variables allows models to be highly site-specific and up to date with the latest feedstock prices and costs for competitors and alternative production methods.
- **Interactive web app:** The web app enables on-demand modeling during customer meetings providing a deeper degree of engagement with customers and the ability



to rapidly respond to customer questions live. Customer project specifications and cost assumptions are updated live for precise project studies.

## Levelized production cost by facility operations



**Figure 2:** Levelized cost of production across a range of operational paradigms indicating planning systems to operate below 100% capacity can be cost-optimal.



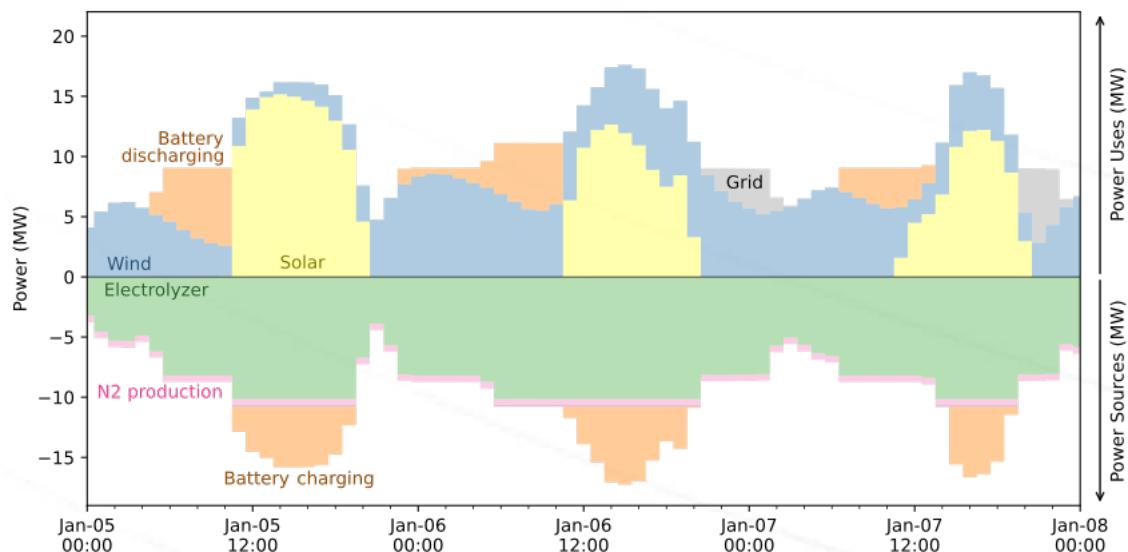
## Results & Impact

**Enhanced Product Development Capabilities:** Tristan Gilbert, Ammobia's CTO, emphasized the platform's value: *"We've successfully integrated CVector's platform with our process development workflow, linking project-level cost insights to day-to-day design and tests campaigns. The modeling tools and support have been invaluable."*

Tyler Ruggles, CVector's CTO added, *"seeing the modeling platform we co-developed used to inform the R&D decisions of a leading deep tech company is inspirational. Our team is proud of the innovative work we are doing together."*

**Accelerated Business Development:** Operational flexibility in Ammobia's production technology enables 20-50% savings on ammonia production costs in specific locations (**Fig. 3**). Integrating Ammobia's process model into CVector's dynamic, site-specific techno-economic model enables project developers to make these comparisons.

Ammobia's commercial team has reported breakthrough success in client meetings, with one representative noting: *"Developers and offtakers are really excited by the CVector optimization models, showing the unique value proposition of Ammobia's technology across a range of different scenarios."* The ability to demonstrate ammonia cost projections based on real energy scenarios and client project data provided clear direction for their partners' site selection research.



**Figure 3:** Operational model showing the balance of power production and use across three January days at a modeled Ammobia facility. The flexibility of Ammobia's technology allows facilities to increase and decrease production rates to more cost-effectively align with low-cost power.



## Key Benefits

- Incorporate the latest location-specific energy dynamics in project and technology assessments
- Quantify value of system operational flexibility to customers and investors through dynamic client interfaces
- Enhance project feasibility studies across multiple locations
- Improve product development efficiency with advanced operations simulation capabilities

These benefits can apply to any company, especially companies working to stay lean.

*“Our partnership with CVector gives us the analytical capabilities of a much larger company at a fraction of the cost and headcount,”* concluded Gilbert.

*“This has been an excellent partnership,”* stated Ruggles. *“We look forward to our next steps where we deliver dynamic, real-time operations of Ammobia’s production units.”*

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