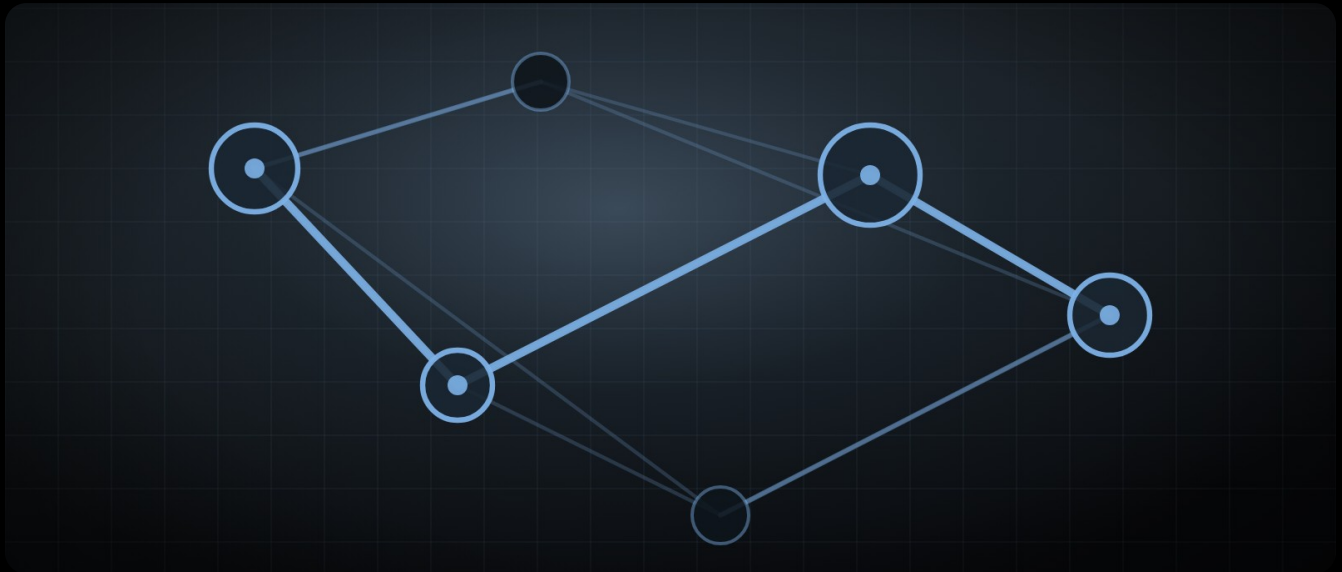




ENERGY · PRODUCTION & ASSETS

Hydrogen Network Optimization Across Reformers

A hydrogen producer used Quantum One to load its reformers by cost — utilization of the cost-effective units up from 87% to 100%.

IMPACT

5–10%

Uplift in individual unit efficiency

87% -> 100%

Increase in utilization of the cost-effective units

Network load distributed by cost, not by habit

CLIENT PROFILE

CLIENT

A hydrogen producer

COMPANY TYPE

Industrial gas operator

INDUSTRY

Energy

SCENARIO

Production & assets

CHALLENGES

- A steam methane reformer produces hydrogen by reacting methane from natural gas with steam at high temperatures.
- Frequent changes in hydrogen demand result in suboptimal manual adjustments to operating parameters, and unplanned shutdowns have to be handled at short notice by operators.
- At network level, load is distributed without accounting for cost factors or for each unit's optimal load.

APPROACH

At unit level, a set of ML models predicts fuel gas consumption, steam net export and constraint limits from operating parameters, and a genetic algorithm searches the feasible operating space for the lowest-cost parameter set that respects every predicted constraint.

At network level, an optimization algorithm sets production levels across the hydrogen producers to meet demand, taking network architecture and operational and capacity constraints into account.

BENEFITS

- ML prediction of fuel gas consumption, steam net export and constraint limits
- Genetic algorithm search for the lowest-cost feasible parameter set
- All predicted constraints respected inside the search
- Network-level production levels set against demand
- Network architecture and capacity constraints accounted for

TIME TO PRODUCTION

Stage	Quantum One	Typical process	
Problem definition	1 week	2–3 weeks	
Proof of concept	2–3 weeks	4–6 weeks	
MVP	4–6 weeks	8–12 weeks	
Scale-up	1–2 months	3–4 months	
Maintenance	Ongoing	—	

TAKE THE NEXT STEP

Speak with our experts to discuss tailored AI solutions for your industry

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