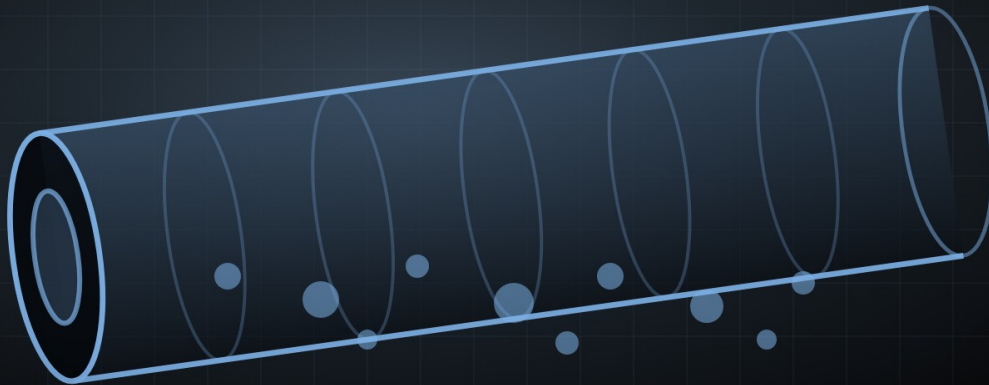




ENERGY · PRODUCTION & ASSETS

Calcined Petroleum Coke Quality Optimization

A refiner used Quantum One to run coking and calcining as one chain — up to 95% fewer off-spec days.

IMPACT

3%

Value increase on DCU products

up to 95%

Reduction of off-spec product days

**Decisions optimized
across the full DCU ->
CCU chain**

CLIENT PROFILE

CLIENT

A refiner

COMPANY TYPE

Refining operator

INDUSTRY

Energy

SCENARIO

Production & assets

CHALLENGES

- The delayed coking unit converts residual oils into lighter products and green coke; the calcining unit then calcines that coke into calcined petroleum coke.
- Calcined coke must meet vibrated bulk density and other specifications; off-spec production leads to heavy penalties, rejected shipments, and direct loss of saleable product.
- The feed became lighter, requiring slurry addition and tighter blend and severity control to preserve coke quality — and because coking output drives calcining quality, the decisions have to be optimized across both units at once.

APPROACH

A coupled digital twin links the two units: models predict the coking unit's product yield split and green coke properties from feed and blend properties and operating setpoints, and further models predict calcined coke qualities from those green coke parameters and the calcining setpoints.

A joint optimization engine then searches the controllables of both units at the same time to maximize the economic objective while holding quality constraints and operational feasibility bounds.

BENEFITS

- DCU simulation — yield distribution and green coke parameters predicted from feed and setpoints
- CCU simulation — calcined coke qualities such as VBD and real density predicted
- Coupled optimization across both units simultaneously
- Quality constraints and feasibility bounds enforced inside the optimization
- Auxiliary-product margin improved alongside coke quality

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

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