cduX360

Predictive decision support for the crude distillation unit

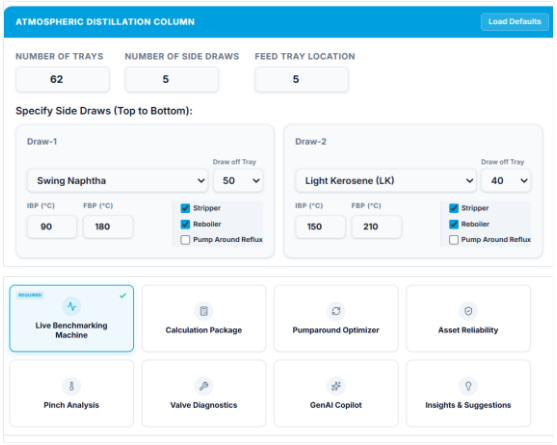
MODULE OF THE INGENEROX360 AI SUITE

PRODUCT OVERVIEW

CDUX360 is an AI-powered decision support application for crude distillation units. Domain and machine-learning agents benchmark unit performance and identify optimization opportunities—from cut point and pump-around optimization to preheater fouling, stack losses, and valve health. Each opportunity is linked to its driving parameter, providing clear root-cause insight. Configured and commissioned by Ingenero engineers to match each unit's own operating envelope.

01 Unit Configuration

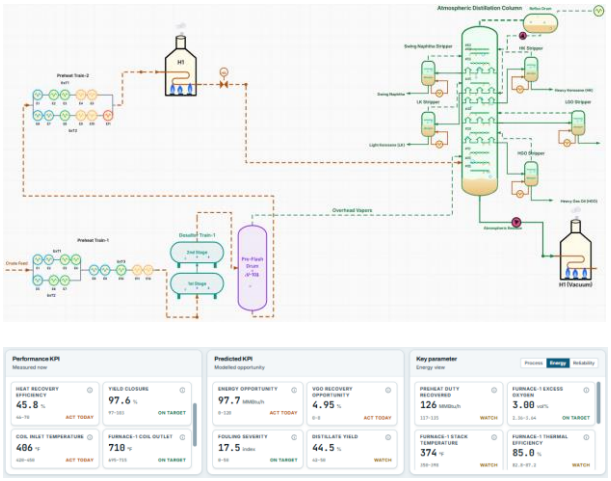
Shown: column configuration, then model selection against the assets.



Asset hierarchy	*preheat train, furnace, column, strippers, pumparounds*
Column internals	*tray count, side draws and feed tray location*
Side draws	*product cut, draw-off tray, IBP and FBP per draw*
Operating modes	*normal, turndown and crude switch; KPIs per asset*

02 Plant Data and Model Execution

Shown: the configured unit as a process flow, with live KPIs and trends.



Inputs	*crude API, feed rate, COT, draw rates*
Processing	*tag validation, steady state framing and mode segmentation*
Outputs	*predicted KPIs, ranked actionables with cause, trends, alerts*

03 AI-Powered Model Agent Suite

A site enables only the models its assets and available data can support.

Live Benchmarking	*Benchmarks column performance against historical best.*
Preheat Fouling Monitor	*Flags fouled exchangers and ranks cleaning priority.*
Pumparound Optimizer	*Improves heat recovery and minimizes fuels consumption in heater*
Asset Reliability	*Outlier detection flags anomalies and failure risk.*
Cut Point Optimizer	*Improves distillate yield while maintaining product specification*
Energy Optimizer	*Cuts fuel loss from excess oxygen and flue-gas heat.*
Pinch Analysis	*Targets preheat train heat recovery against the pinch.*
Valve Diagnostics	*Tracks control valve health and find tuning gaps.*
GenAI Copilot	*Answers plant questions inside the operating workflow.*
Insights & Suggestions	*Quantified actions reported against operating envelope deviations.*
Column Performance Monitor	*Detects flooding, weeping and ΔP and tray temperature swings.*
Product Quality Soft Sensors	*Provides visibility on quality parameters to minimize giveaways.*

04 Opportunity and Operator Actions



BUSINESS KPI	CAUSE MESSAGE	ACTUAL	OPTIMUM	SUGGESTION
LOW DISTILLATE YIELD	LOW HEATER OUTLET TEMPERATURE	680 °F	685 °F	INCREASE CDU HEATER OUTLET TEMPERATURE TO OPTIMUM TO IMPROVE DISTILLATE YIELD
	HIGH CDU COLUMN PRESSURE	18.1 PSIA	17.7 PSIA	REDUCE COLUMN PRESSURE TO OPTIMUM TO IMPROVE DISTILLATION SEPARATION.
HIGH FUEL GAS CONSUMPTION	HIGH HEATER EXCESS O_2	3.2 %	2 %	REDUCE EXCESS O_2 TO OPTIMUM TO LOWER FUEL GAS CONSUMPTION WHILE MAINTAINING SAFE COMBUSTION.
	LOW CRUDE PREHEAT EXCHANGER DUTY	63 MMBTU/H	65 MMBTU/H	INCREASE HEAT RECOVERY ACROSS THE PREHEAT EXCHANGER TO REDUCE FURNACE FUEL CONSUMPTION

Distillate recovery : +0.5–2 wt%
Cut point optimization, distillate recovery maximization, yield soft sensors

Reduction in Heater Duty : 2-5 %
Fouling monitoring, exchanger cleaning prioritization, Excess O2 optimization

Quality Giveaway Reduction : 0.5–2 %
Diesel FBP, Kero Flash Point, VGO quality soft sensors, quality giveaway reduction

Increased throughput : +1–3%
Pump around optimization and improved column performance

05 Platform

Historian connectivity
connects directly with leading plant historians

Simulation integration
third-party simulators integrate without custom engineering

Daily reporting
downloadable daily reports with interactive trends

GenAI Copilot
answers plant questions in the operating workflow

Build your own dashboard
engineers assemble the views each unit needs

DELIVERY
Configured, validated and commissioned by Ingenero process engineers.

FLEXIBILITY
Any crude slate; selectable KPI set; selectable virtual analyzers.

SCALE
Repeat sites reuse the configuration, with no/minimal rework per plant.

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