Energy X360

Real Time Plant-wide energy and utility network optimization

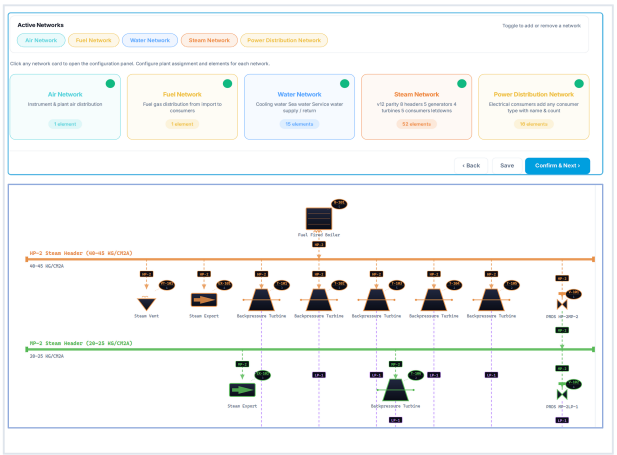
MODULE OF THE INGENEROX360 AI SUITE

PRODUCT OVERVIEW

EnergyX360 is a real-time decision-support solution that identifies the most energy-efficient operating strategy for a process plant. It uses real-time plant data, process engineering models, equipment operating constraints and MINLP-based optimization to determine the best combination of boilers, turbines, motors, compressors and utility systems that satisfies plant demand. Optimization opportunities are converted into quantified, actionable recommendations for the process and operations teams, configured for each plant's utility set-up, equipment limits and operating philosophy.

01 Plant & Utility Network Configuration

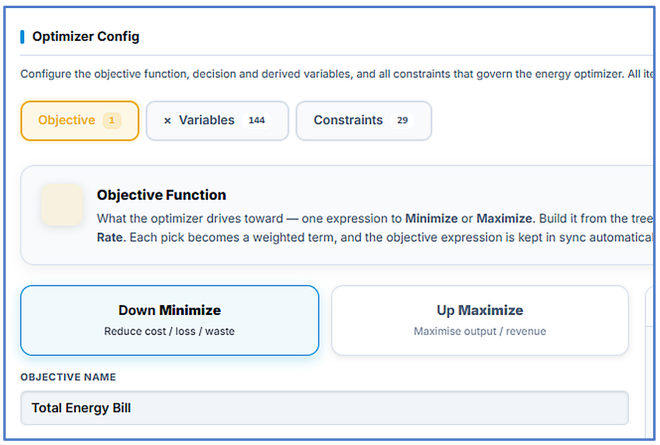
Shown: plant utility configuration, equipment relationships



Steam System	*HP/MP/LP steam headers, generation, consumption, venting and dumping*
Boiler System	*boiler operating limits, minimum/maximum loads, fuel consumption and steam generation characteristics*
Rotating Equip.	*turbine- and motor-driven pumps/compressors with capacities, limits and changeover options*
Utility Systems	*BFW, DMW, condensate, deaerator, cooling water and compressed air; linked to process-unit demand*

02 MINLP Optimization Engine

Shown: configured plant utility system, real-time operating condition and optimisation workflow.



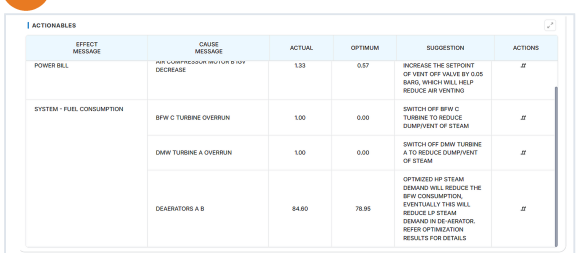
Inputs	*Define Objective Function, Constraints, Variables, equipment status, process loads and utility demands*
Processing	*Tag validation, operating-condition identification.*
Outputs	*MILP-optimized targets, equipment switchover recommendations, utility allocation and savings*

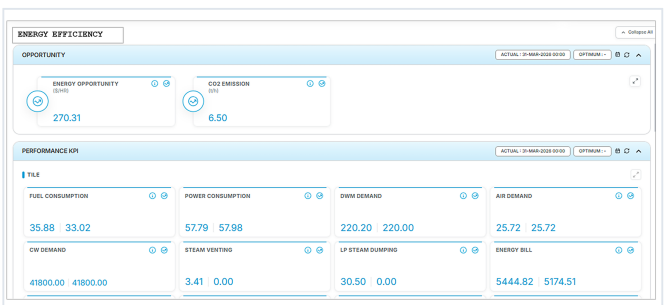
03 Optimization Modules

A site enables only those optimisation modules supported by its assets, operating philosophy and available data.

Steam System Optimization	*Optimizes HP/MP/LP steam generation and consumption while minimizing excess dumping and venting*
Turbine–Motor Drive Switchover	*Evaluates turbine and motor-driven equipment and recommends switchovers to reduce steam consumption*
Boiler System Optimization	*Optimizes boiler loading and steam generation to reduce fuel consumption within operating constraints*
Air Compressor System Optimization	*Optimizes compressor loading and IGV operation to reduce excess air venting*
BFW & DMW Optimization	*Optimizes BFW generation, condensate return, DMW makeup and deaerator steam requirements for new steam demand*
Cooling Water Optimization	*Optimises the number and type of CW drives in operation based on actual demand*

04 Optimization Opportunities & Operator Actions





2-3%	**Energy Bill Reduction**	from compressor, BFW, Steam turbines and cooling-water network optimization
3-4 %	**CO2 Emissions Reduction**	net reduction across all optimization actions
3-5%	**Energy Saving**	Steam and Power Savings

Operator Actions: Turbine → Motor changeover, Optimized boiler loading, cooling-water pump and air compressor drive optimization and Steam Allocation for Actual Steam Demand.

05 Platform & Deployment

Historian Connectivity	**Optimisation Engine**	**Operator Dashboard**	**Daily Reporting**	**Scalable Deployment**
connects to PI/DCS data for continuous monitoring	MILP-based optimisation with what-if analysis of changes	current conditions, recommendations, impact and savings	tracks performance, actions recommended, taken and realised savings	reusable framework adaptable to different plants and configurations

DELIVERY
Configured, validated and commissioned by Ingenero process engineers.

FLEXIBILITY
Any utility configuration; selectable optimisation modules; configurable constraints

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

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