



# Optimizing Energy Efficiency Across Complex Refineries

Data-driven strategies to optimize investments, reduce emissions, and enhance sustainability

## Key Benefits

- Identified and prioritized energy gap closure projects
- Provided a roadmap for the client's energy transition
- Delivered significant energy and cost savings
- Reduced greenhouse gas (GHG) to support sustainability goals

## Background

- Three complex refineries benchmarked for energy performance
- Limited clarity on project definitions, cost savings, and utility interactions
- Needed expertise to optimize efficiency and identify high-impact projects

## Solution / Results

- Implemented a Strategic Energy Review approach
- Applied Best Technology energy assessment and gap analysis
- Used Pinch Analysis to optimize heat integration and utility placement
- Simulated utility systems to evaluate steam, power, and fuel impacts
- Developed shortlist of energy saving projects
- Saved up to 215 Gcal/h fuel savings and 440 kteCO<sub>2</sub>/yr emissions reduction

## Client Challenge

Three complex refineries were benchmarked for energy performance, which required strategic investment decisions. The client needed a seasoned partner to optimize energy performance, prioritize investments, and close efficiency gaps. They sought expertise in cost analysis, savings potential, and complex utility interactions.

## The Solution

KBC implemented a Strategic Energy Review, conducting a deep-dive assessment across its three refineries. The approach leveraged:

- Best Technology energy assessment and gap analysis to identify priority plant areas
- Pinch Analysis to detect opportunities for heat integration and utility distribution improvements
- Simulation of utility systems to evaluate steam, power, and fuel interactions, including condensate return and water makeup
- Highly-collaborative efforts with technical specialists to shortlist high-impact energy-saving projects



A Yokogawa Company



### The Results

For each refinery, KBC applied rigorous simulations to develop a structured roadmap that detailed the best course of action. These recommendations were designed to drive energy efficiency across multiple investment cycles. The study uncovered substantial cost and energy savings, along with significant GHG reductions that supported the client's sustainability goals. The recommendations could save up to 215 Gcal/h of fuel and reduce emissions by 440 kteCO<sub>2</sub>/year. These insights positioned the company to make data-driven decisions that ensured sound investment allocation and long-term energy performance improvements while Bringing Decarbonization to Life®.



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**DECARBONIZATION**  
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