KBC

A Yokogawa Company

CASE STUDY

From Third Quartile to First: Transforming Refinery Energy Performance

KBC's Strategic Energy Review delivers $20 million in savings and significant emissions reduction

Benefits

- $20 million/year potential energy savings
- 17.5% reduction in CO_2 emissions
- Benchmark improvement from third to first quartile.

Background

- Leading Eastern European oil refinery
- Strategic focus on energy efficiency, profitability, and emissions reduction

KBC Solution

- Site-wide Strategic Energy Review
- Combined use of PFD reviews, BT benchmarking, Pinch Analysis, and steam system modeling
- Development of a practical Investment Roadmap to optimize the site energy demand

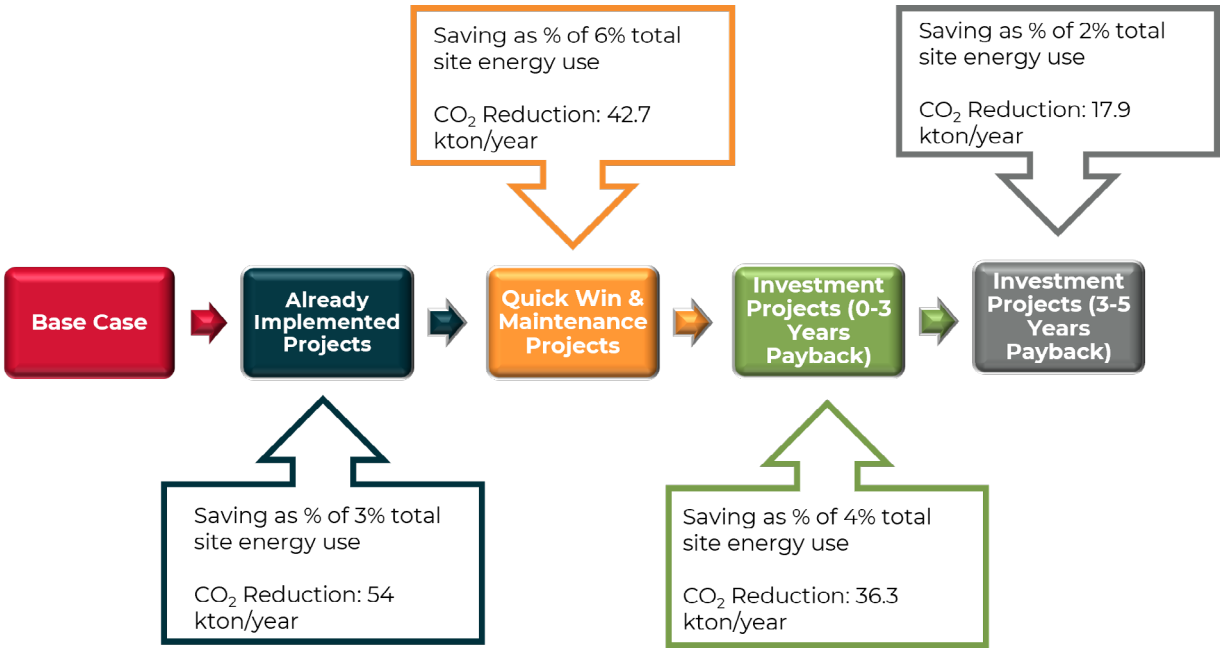
Challenge

An Eastern European oil refinery aimed to strengthen its energy performance by improving energy efficiency and lowering emissions. The refinery sought a clear, data-driven understanding of its energy use and how best to achieve tangible, sustainable and profitable results.

Solution

KBC applied its Strategic Energy Review (SER) methodology to deliver a comprehensive, site-wide assessment of energy performance. The review covered all major energy users, combining Process Flow Diagram (PFD) reviews, KBC Best Technology (BT) benchmarking and gap analysis, Pinch Analysis, steam system modeling, and mechanical walkthroughs to identify potential performance gaps and quantify savings potential.

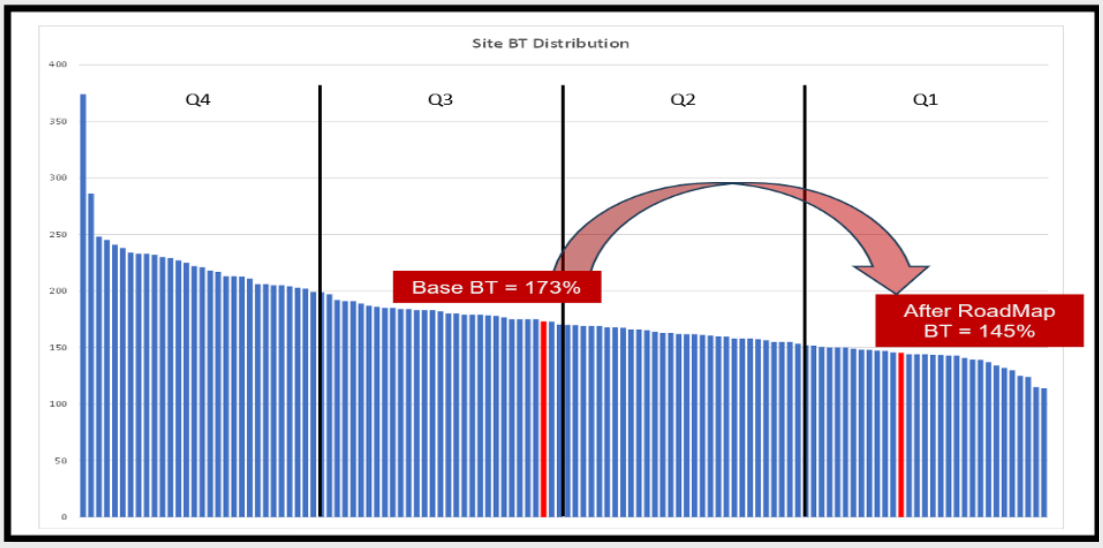
The findings were consolidated into a detailed Investment Roadmap, providing a structured plan for implementation. Each project within the roadmap was evaluated within the site's steam model to ensure realistic and sustainable outcomes, accounting for system constraints such as minimum boiler steam production and potential venting.



Results

The Strategic Energy Review identified 61 energy-saving projects, of which 42 were selected for inclusion in the Investment Roadmap. Together, these projects represented more than $20 million per year in potential savings, equivalent to 15% of total site energy consumption. Example projects included fired heater tuning, steam system optimization, and waste heat recovery.

Implementing the full suite of projects would improve the refinery's Best Technology benchmark from 173% to 145%, as shown in the diagram, moving its energy performance from third quartile to first quartile compared with other refineries benchmarked by KBC, representing a significant improvement in the overall energy efficiency. The roadmap also outlined a path to reduce CO_2 emissions by 17.5%, demonstrating a strong alignment with both operational and sustainability goals.



Best Technology Index for Eastern European oil refinery