



ENERGY EFFICIENCY PROJECT DEVELOPMENT VAS/DEPP3 Programme

OPTIMIZING THE BILLET REHEATING FURNACE COMBUSTION PROCESS FOR A STEEL MANUFACTURING PLANT

Sector: Steel manufacturing
Energy focus: Furnace Optimization

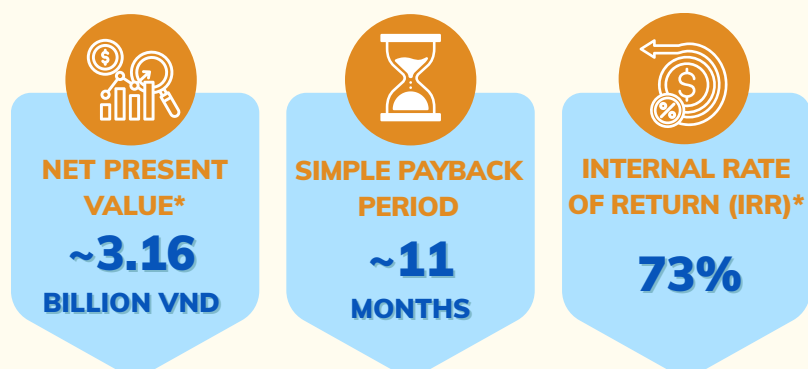
At this steel plant, the existing combustion control system had deteriorated, while some operations were still performed manually, resulting in suboptimal fuel–air ratio control, increased energy losses, and reduced furnace operating efficiency.

Through comprehensive studies, the enterprise identified a solution to **upgrade and optimize the furnace combustion control system**. Key improvements include upgrading the furnace thermal control system, optimizing the fuel–air ratio, and enhancing real-time monitoring and control of combustion conditions.

The solution is expected to:

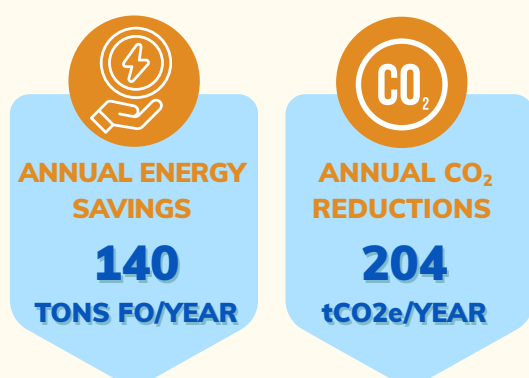
- Save approximately **140 tons of FO fuel/year (2.8%)**;
- Reduce **204 tCO₂/year** in GHG emissions;
- Reduce oxide scale formation by approximately **138,354 kg/year**;
- Improve furnace operation by reducing excess O₂ from **9.8% to ~3%**.

FINANCIAL PERFORMANCE SUMMARY



*= baseline scenario

ENERGY BENEFITS



NON-ENERGY BENEFITS

- **Superior Product Quality:** Minimizes oxide scale and ensures precise dimensions, reducing reject rates.
- **Maximized Uptime:** Cuts downtime for furnace cleaning and routine maintenance.
- **Lower Operational Costs:** Eliminates costly reprocessing and extends rolling equipment lifespan.
- **Greener Operations:** Reduces solid waste and harmful air emissions.
- **Stronger Market Position:** Boosts competitiveness by consistently delivering premium steel.



WHY THIS CASE MATTERS?

The steel industry has high energy consumption and generates significant amounts of waste, while enterprises face increasing pressure to reduce costs and environmental impacts. During billet reheating, oxide scale formation not only affects product quality but also causes material losses and increases the need for equipment cleaning and maintenance.

This case demonstrates that optimizing the furnace combustion control system can deliver benefits beyond energy savings. Reducing oxide scale formation helps improve product quality, lower processing and maintenance costs, enhance production efficiency, reduce waste, and extend equipment lifetime. This solution enables enterprises to improve operational efficiency and competitiveness while supporting a more sustainable steel production pathway.

EXPLORE SIMILAR OPPORTUNITIES

For more information and additional case studies, please visit:



Vietnam – Denmark
Energy Partnership Programme
2020-2025



Energy Efficiency
Center of Excellence



This case was developed under the Voluntary Agreement Scheme (VAS) for the Vietnamese Industrial Sector, part of the DEPP3 Programme (Vietnam – Denmark Energy Partnership Programme Phase III).

VAS supports industrial enterprises in identifying, preparing, and implementing bankable energy efficiency investments through structured audit, pre-feasibility and feasibility assessment processes.