

Coal Switching

Supporting Fuel Flexibility Without Compromising Performance

Why Fuel Switching Needs Expert Support

In an evolving energy market, coal-fired power plants are increasingly required to adapt to changes in coal supply and quality. Whether driven by cost, availability, or compliance requirements, switching to alternative coal sources poses complex technical and operational challenges.

HRL's Coal Switching Service supports plant owners and operators in assessing the feasibility and implications of changing fuel sources—ensuring continued reliability, efficiency, and regulatory compliance.

Switching coal types is far more than a procurement decision. Each coal type presents different combustion properties, slagging and fouling behaviour, milling performance, and emissions profiles. Without proper assessment, switching fuels can lead to:

- Reduced plant efficiency and increased heat rate
- Accelerated component wear or failure
- Emissions non-compliance
- Poor combustion or slagging/fouling in boilers

HRL combines deep combustion engineering expertise, advanced thermodynamic modelling, and on-site testing capabilities to de-risk coal switching projects and ensure successful implementation.



HRL Approach

Coal switching activities undertaken by HRL are tailored to suit each plant and project objective, and typically include the following:

- ① Fuel Switching / Blending Study
 - Review plant documentation and fuel specifications
 - Review combustion impacts, including slagging/fouling risks
 - Thermodynamic modelling using Thermoflow software for alternative coals
 - Assessment of impacts on coal use, air requirements, flue gas temperatures, auxiliary power, and emissions
 - Review impacts on key equipment including boiler, mills, attemperators, heat exchangers, air heater, fans, dust collection, and ash handling.
 - Identify recommended plant modifications and operational controls (where required).

- ② Targeted Activities (where required)
 - Coal blending
 - Plant trial with proposed fuel
 - Plant modifications
 - Plant performance testing and combustion tuning
 - CFD modelling to assess fuel combustion in detail

- ③ Plant Monitoring & Optimisation
 - Implementation of monitoring tools (e.g., EUtech systems)
 - Ongoing optimisation of combustion and temperature distribution
 - Support for long-term reliability and efficiency improvements



HRL Relevant Projects

Pulverised Coal Switch Feasibility

HRL assessed nine alternative coal sources for a client seeking to diversify fuel supply. Using calibrated Thermoflex modelling and a detailed KPI matrix, HRL identified suitable candidates and provided operational risk mitigation strategies—supporting informed decision-making on coal procurement.

Mitigating Reheater Tube Failures

A client using lower CV coal experienced frequent reheater tube failures. HRL applied CFD and thermodynamic analysis to trace the root cause to flow-induced hot spots in the furnace. Design modifications and performance strategies were implemented to reduce overheating and improve unit efficiency.

Operational Performance Optimisation

As part of a broader plant review, HRL performed site testing and performance modelling to assess and improve combustion performance under different coal conditions. Using laser and microwave diagnostic tools (EUcoalflow), HRL mapped PF distribution and combustion profiles to guide boiler tuning.

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