

## Opportunities for Thermal Coal Research

### Introduction

A review of research supported by ACARP, NERCCDC and the coal CRCs on Australian thermal coals has revealed that the effort has slowed in recent years. In this period new technologies and novel analytical techniques for coal, its products and impacts have emerged which provide the need and opportunities for research.

In particular, the use of Australian coals of HELE (High Efficiency Low Emission) units is expanding, burners, furnaces and additional plant are based on enhancing the control of emissions, PCI into blast furnaces has become more common, and utilities now comply with more stringent regulations. ACARP will support construction/modification of a lab scale combustion testing facility suited for research on HELE plant. New tools for characterising coal and volatiles include LDI-TOF-MS, for char include CGA, optical and SEM techniques and for mineral matter includes SEM-EDS.

Therefore, this year ACARP especially encourages appropriate proposals on thermal coals.

### Relating coal quality to its utilisation

Thermal coal is commonly fired through burners in pulverised form with heating yielding combustible volatile matter and char. Following heat release solid and gaseous products result, heat is transferred through furnace walls to the working fluid - steam - and cleaned gas results following gas cleaning and ash collection. The schematic pictured on Fig 1 illustrates the associated processes with operational and regulatory impacts.

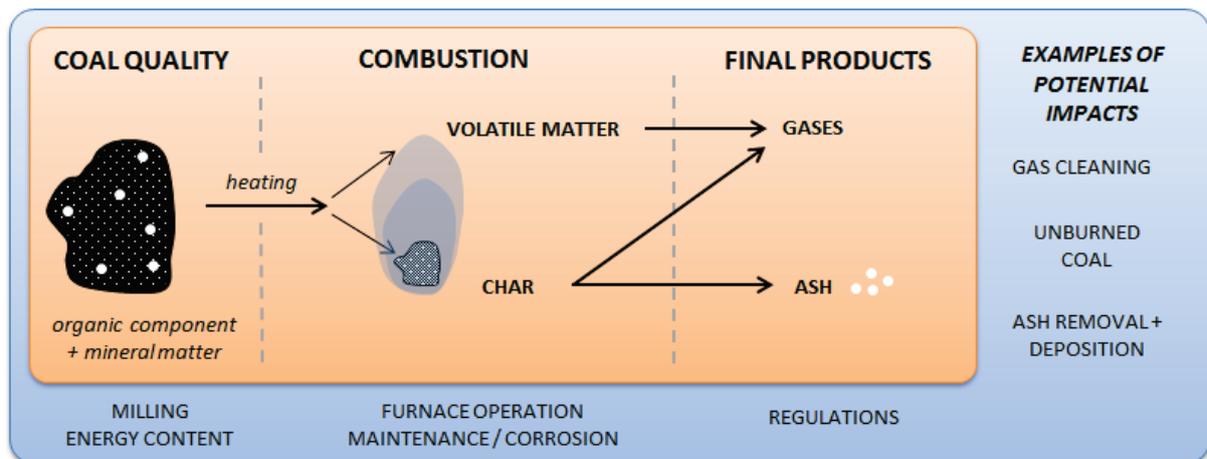


Fig 1: Combustion mechanisms linking coal quality on impacts



## Opportunities for Thermal Coal Research cont...

### Gaps and opportunities for future research

Following interviews of stakeholders involved in the export and local use of Australian thermal coals, researchers, consultants and laboratories a number of study areas have been identified which may lead to a better appreciation of the impact of coal quality on its value and use, including

- To facilitate further research and understanding of Australian coals performance in High Efficiency Low Emission (HELE) power plants, the industry requires the establishment of lab scale combustion testing facilities with capability to characterize and simulate HELE combustion behaviour.
- Critical review on Australian coal quality impacts on High Efficiency Low Emission (HELE) power plants. Assessing coal analysis techniques associated with regulations and standards for Australian thermal coal utilisation, including those determining acceptable export quality and ISO standards.
- The use of advanced analytical techniques as characterisation options for coal utilisation issues.
- Evaluating performance of Australian coals in a world sensitive to climate change with regard to sustainability. What characterises Australian coals?
- Blending Australian thermal coals with international coals, including alleviating issues with troublesome local coals, blending with biomass, biochar and wastes, and as blending partners with Indian and Indonesian coals. What coal quality best suits the blending partners?
- Utilisation of secondary thermal products from coal preparation plants, including by-products and recovered wastes from coal washing of export coal.
- Emerging competitive coals to Australian coals, by comparative studies to establish rational economic value.
- Future markets for thermal coal and prospective coal reserves, particularly for low volatile coals, for coals from new basins being developed (including research into milling options for low HGI Surat basin coals) and for new potential markets or alternate applications (such as hydrogen production).
- ACARP white papers and state-of-the-art reviews similar to those existing on the Reports - Technical Market Support tab at [www.acarp.com.au](http://www.acarp.com.au), in particular:
  - Updating existing but dated white papers
  - New white papers on coal quality techniques or coal utilisation technologies

### Abbreviations

CGA- coal grain analysis

CRCs- Cooperative Research Centres for Black Coal Utilisation, and for Coal in Sustainable Development

ISO- International Standards Organisation

LDI-TOF-MS - laser desorption/ionisation time of flight mass spectrometry

NERDDC- National Energy Research, Development and Demonstration

PCI- pulverised coal injection

SEM- scanning electron microscopy

