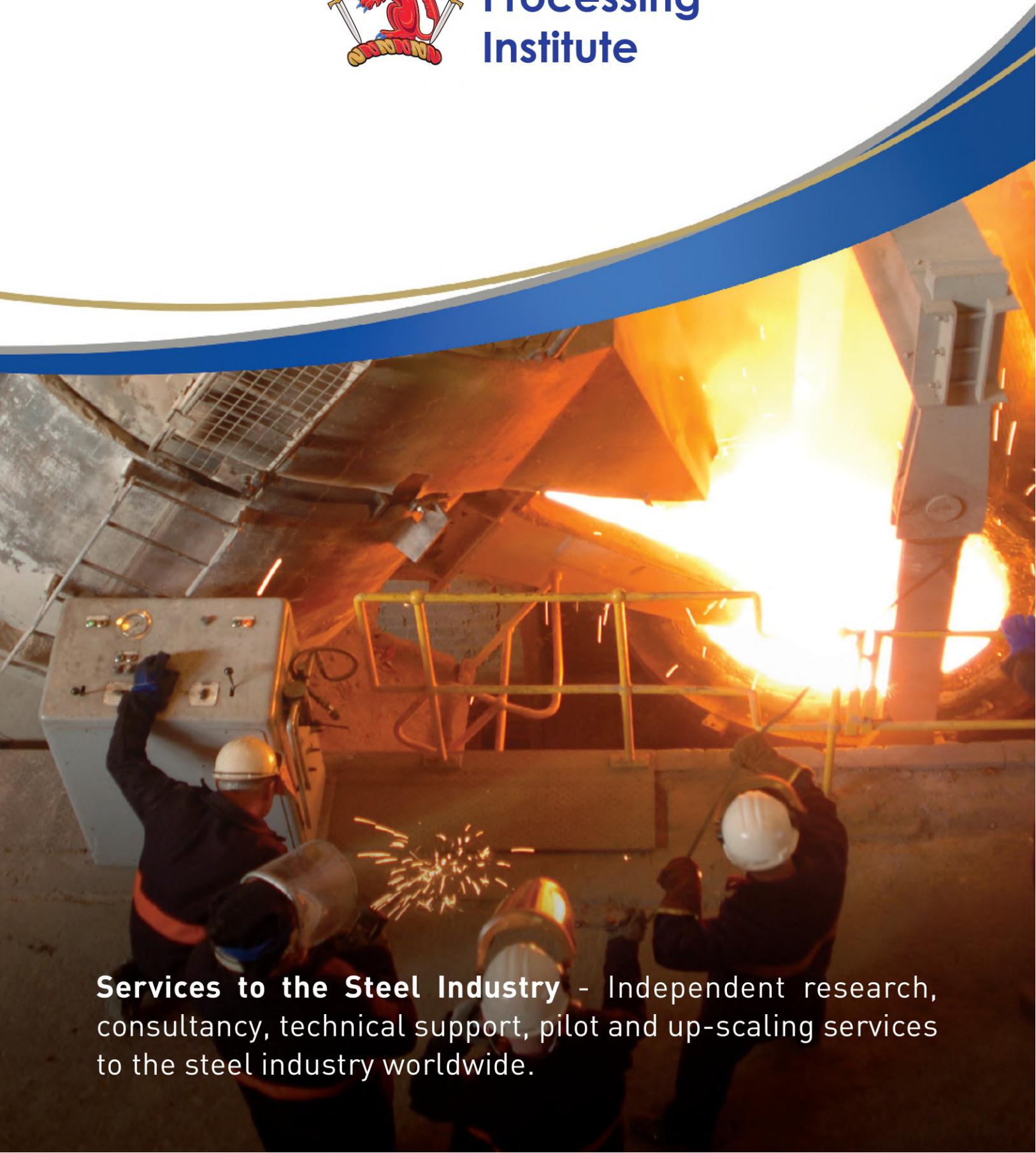




**Materials
Processing
Institute**



Services to the Steel Industry - Independent research, consultancy, technical support, pilot and up-scaling services to the steel industry worldwide.

Over 70 years of experience,
delivering excellence in
technology and innovation





The Materials Processing Institute is independent and delivers quality research in iron and steel, industrial processes, energy and up-scaling technology.

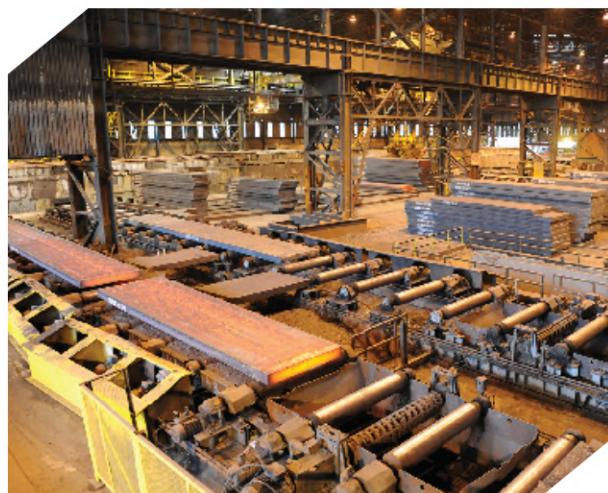
With seventy years of experience in carrying out process research and developing technologies for the world's steel industry, the Institute has a proven track record in delivering global success stories including:

- > **Blast Furnace Coal Injection**
- > **BOF Bath Agitation**
- > **Caster Mould Thermal Monitoring**
- > **Reheat Furnace Data Logging**
- > **Deep Injection for Inclusion Modification**

Research programmes at the Institute have resulted in a number of next generation products for automotive, rail and plate applications.

The main areas of focus include:

- > **Coal, Coke and Raw Materials**
- > **Iron, Steelmaking and Casting Process Development**
- > **Product Development and Pilot Production**
- > **Rolling Mill Technologies and Engineering**
- > **Supporting Science**
- > **Consultancy Services**



PRIMARY PROCESSES

Engineering and process technology equipment and capability

Coal, Coke and Raw Materials

Facilities include pilot and laboratory scale equipment for the characterisation of coal, its transformation to coke and subsequent evaluation. This expertise is equally relevant to the steel industry, seeking greater understanding and control of input materials and to coal mining companies, seeking a better appreciation of processes to meet their client's needs.

The Institute operates a fully instrumented moving wall coke oven with a 350kg capacity for pilot-scale carbonisation.

Facilities and expertise support the assessment and optimisation of raw materials.

This Includes:

- > **Pilot-scale Coke Oven**
- > **Conveying Technology**
- > **Raw Materials Handling**
- > **Blending**
- > **Performance and Value Assessments**

The Institute is able to advise the refiner and raw materials supplier on the value in use of input materials and the optimum use of blends.

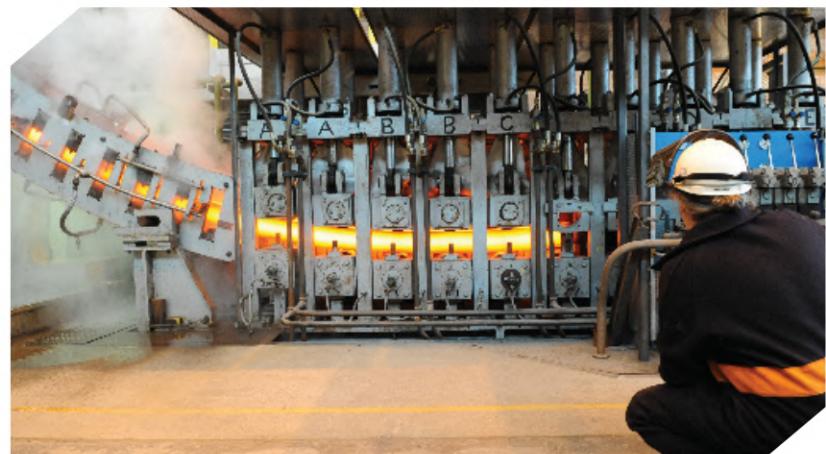
Steelmaking and Casting

Ranging from engineering support, through the process metallurgy of steelmaking and on to the continuous casting plant, the Institute specialises in providing both on plant technical support and off-line research projects.

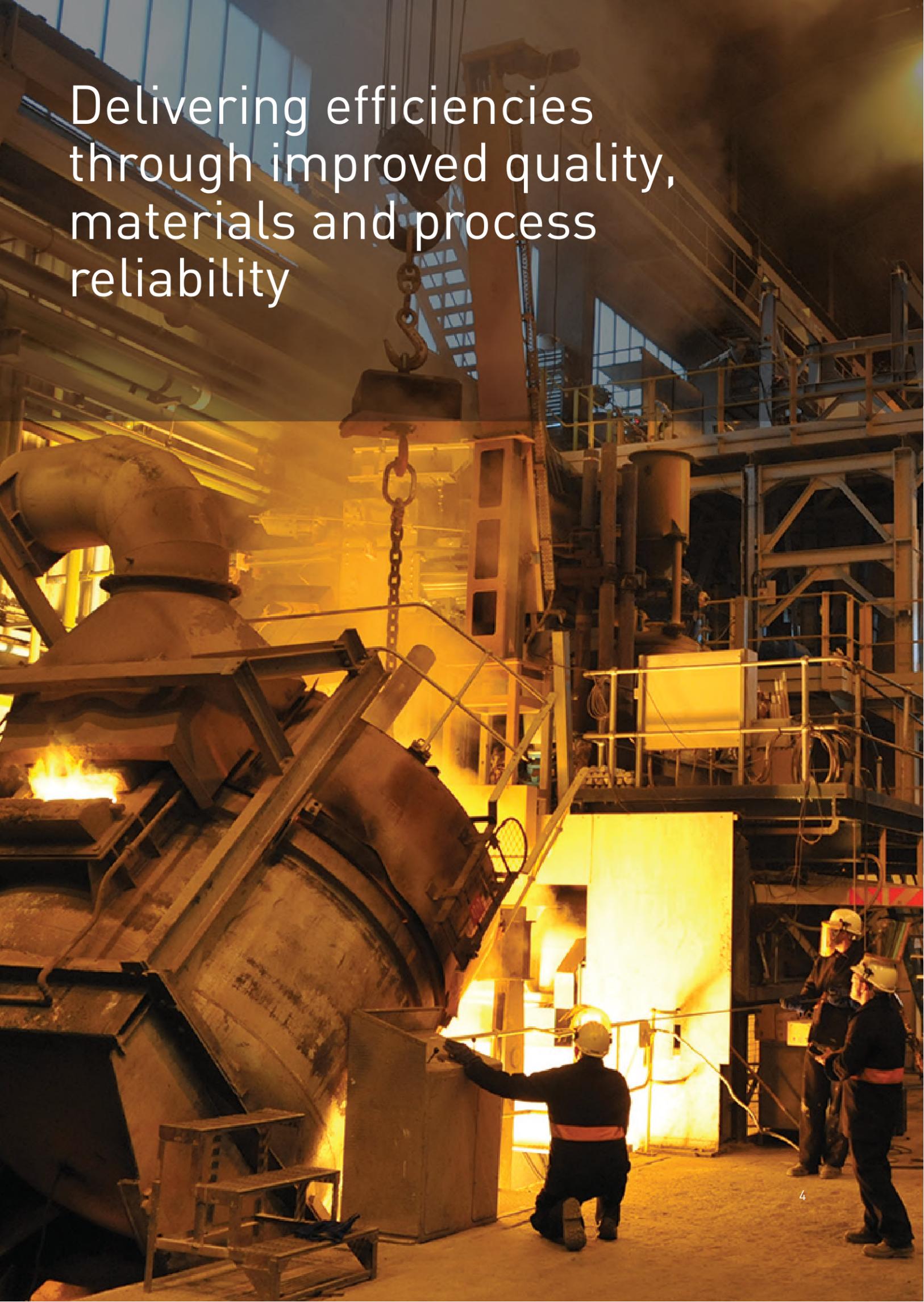
Steelmaking and casting support:

- > **Short term technical projects that address clearly defined issues and challenges**
- > **Long term and strategic research programmes**

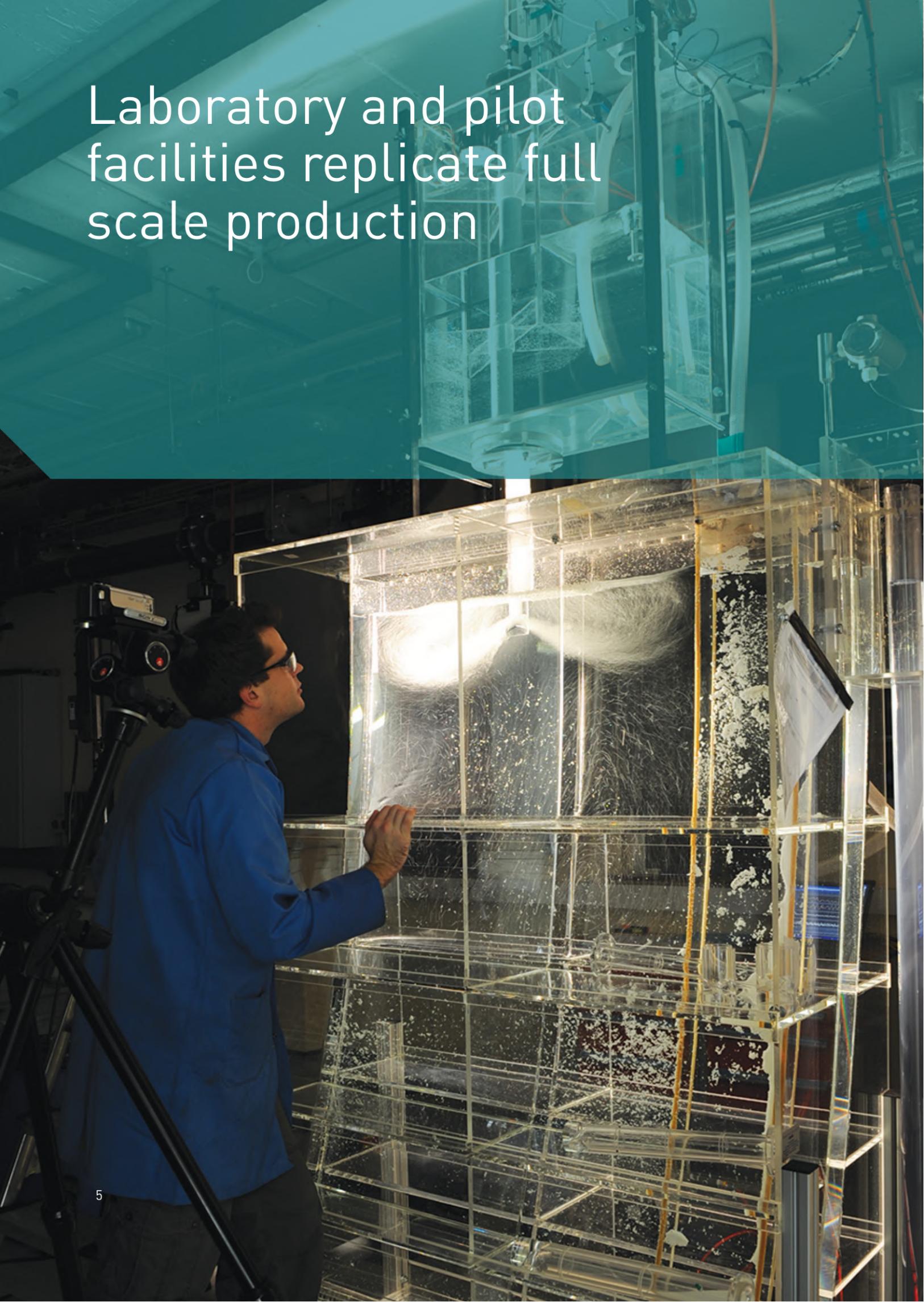
Project teams and engineers at the Institute have many years practical experience covering steel plant, continuous casting and rolling mill operations; this is supported by science based expertise, extensive laboratories and supporting facilities.



Delivering efficiencies
through improved quality,
materials and process
reliability



Laboratory and pilot facilities replicate full scale production



PRODUCT AND PROCESS DEVELOPMENT

Research has resulted in next generation products for automotive, rail and plate applications

Product and Process Development

The Institute operates tonnage scale melting and casting facilities. These include steelmaking capability at heat sizes of up to 7 tonnes, supported by ladle metallurgy and tank degassing units.

Fully instrumented pilot facilities replicate a full-scale steel plant and are complimented by a pilot continuous casting machine, which can produce billet and mini-slab in a range of sizes.

This supports clients by:

- **Proving the next generation of process developments in a controlled off-line environment, away from the pressures and risks associated with carrying out development work during tonnage production.**
- **Providing a production facility for pilot quantities of new steel grades to support product development programmes.**



Energy and Engineering

The Institute has extensive experience in process integration and extension. Many of today's steelmaking plants are a mix of new installations and the continued development of existing assets, with each bringing a range of very different technical challenges.

Client support includes:

- **Wide-ranging expertise in maximising the capability of existing assets, either in terms of productivity, or in the form of new product capability. This applies to the asset itself, as well as overall process performance.**
- **Caster development, from fundamental engineering, flow visualisation and modelling, through to improved process monitoring and control; delivering reduced costs and extending the capability of already installed concast plants.**
- **Continued development work on new installations to increase product range and improve operating performance.**
- **Advice on value in use of both raw materials and works arisings, including a clear understanding of the environmental impact of every stage of the steelmaking process.**

SUPPORTING SCIENCE

Fully equipped laboratories, experienced scientists and project teams

Process Simulation and Design

Process simulation is carried out to support process and product development. Techniques utilised include CFD, FEM and extensive physical modelling.

These combine to enable the Institute to gain that fundamental understanding of what is actually taking place on plant, to help drive process improvements from a position of sound knowledge.

Refractories and Mould Powders

The Institute combines thermodynamic modelling with a well-equipped ceramics laboratory, where the performance and properties of powders and lubricants are determined.

Facilities and equipment includes a high temperature viscometer, STA, a wettability and hot stage microscope used to evaluate the impact of powder chemistry and morphology on physical properties and process parameters.

These are complimented by expertise and testing capability covering a wide range of refractory materials.



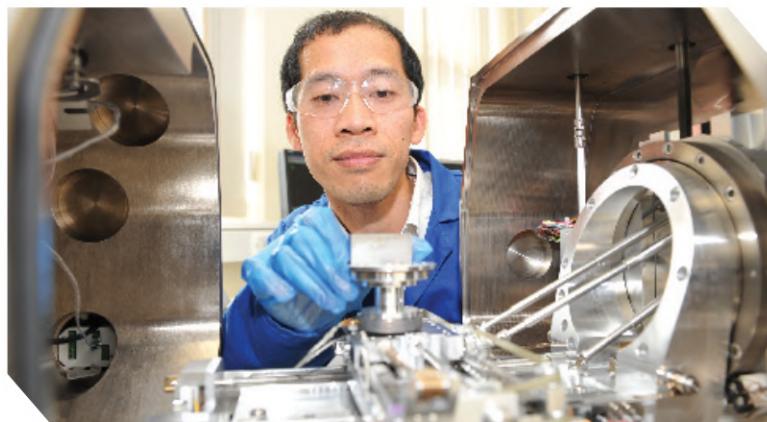
Metallurgical

The Institute's metallography laboratory includes a wide range of optical microscopy equipment, complemented by a state of the art FEG-SEM. This equipment, in combination with experienced scientists and engineers, enables the Institute to offer fundamental forensic investigations into the root causes of many typical production defects, plus those that are more novel.

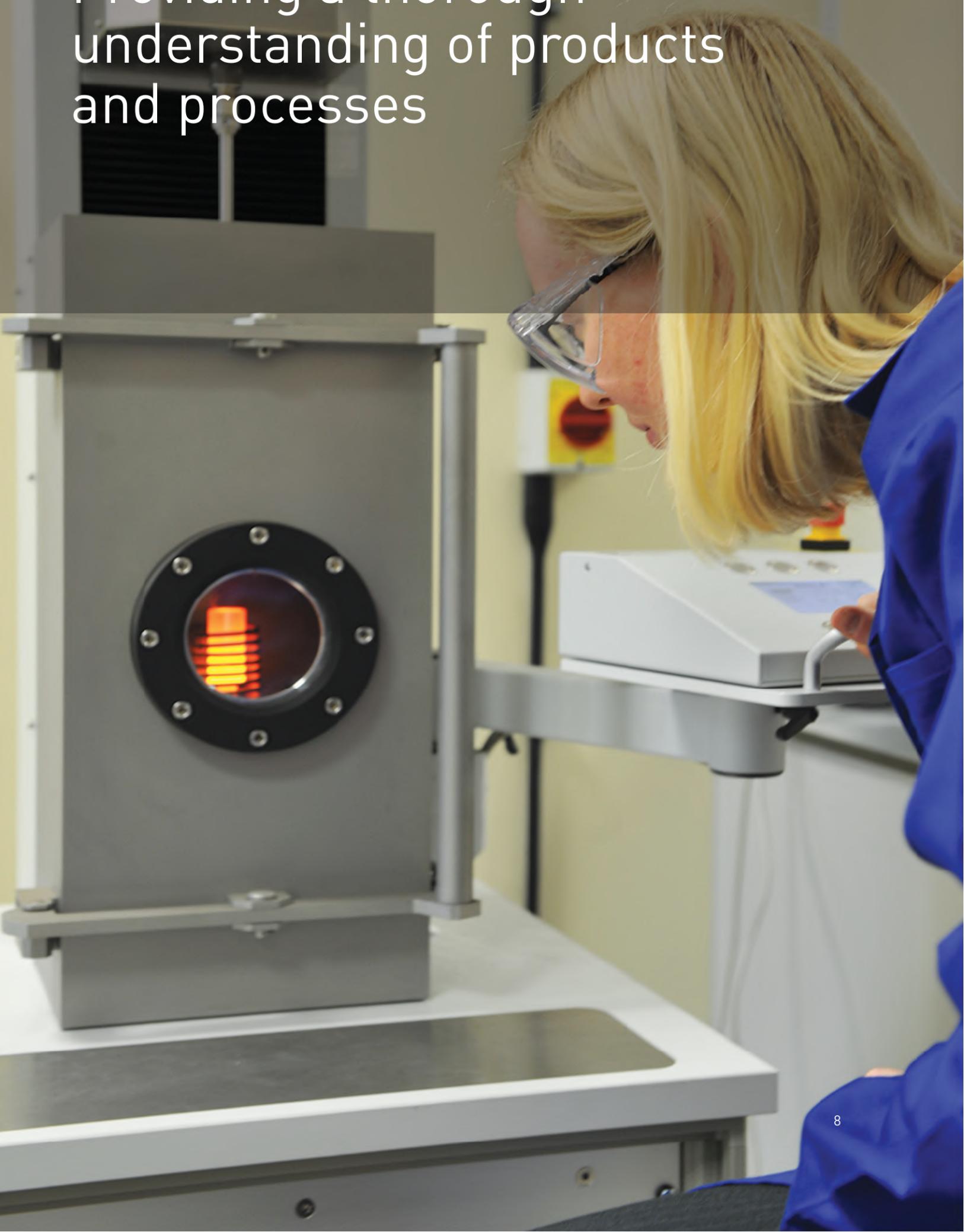
This service is often combined with process design and engineering to deliver comprehensive solutions. Metallurgical expertise also plays a leading role in understanding the fundamental effects of composition on the behaviour of steel products.

Technical Training

The institute runs a regular programme of technical training courses that cover all the areas commonly associated with today's steel industry. In addition, the Institute can offer bespoke technical courses that meet a client's specific needs.

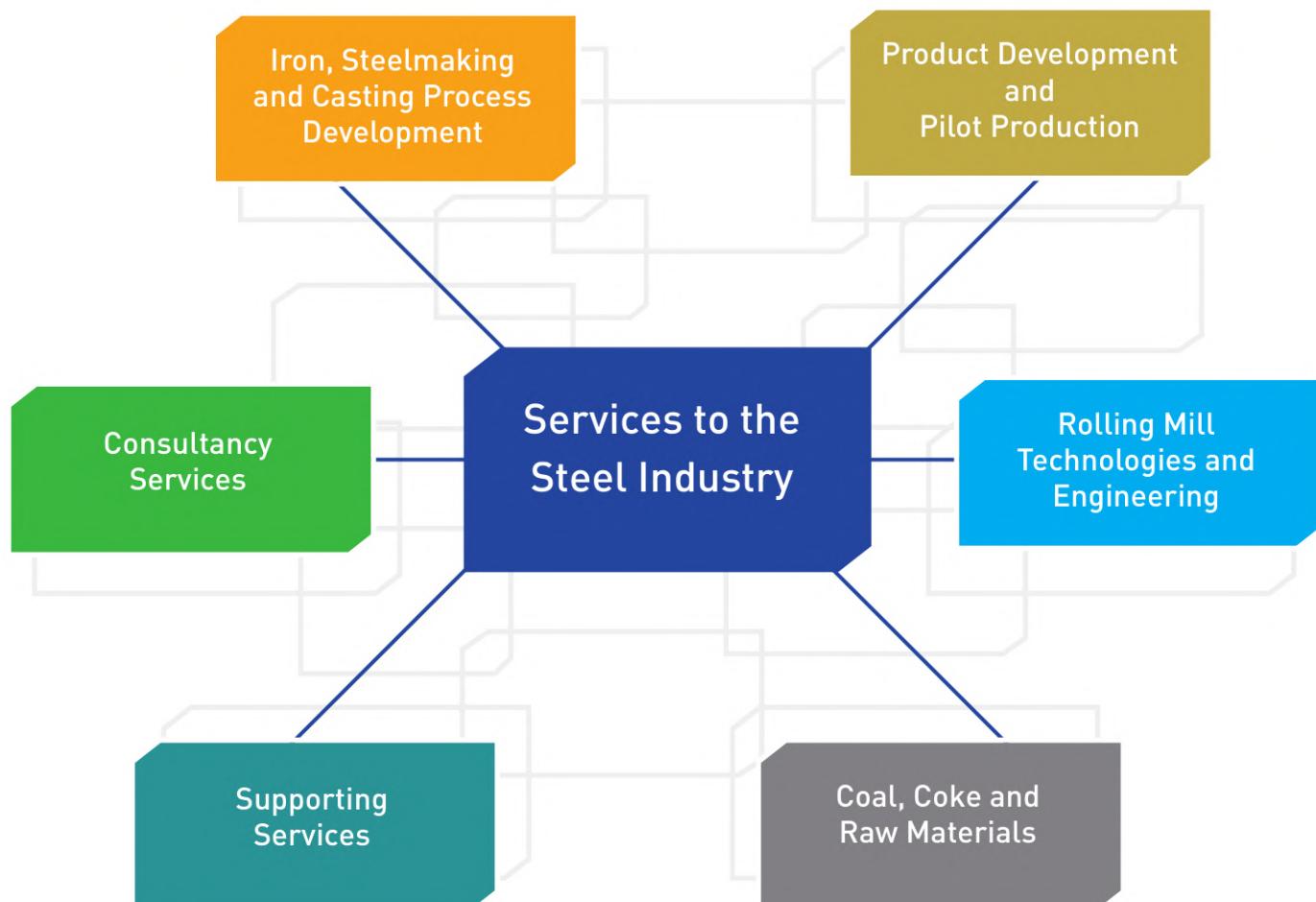


Providing a thorough
understanding of products
and processes



SERVICES TO THE STEEL INDUSTRY

Providing facilities
and expertise



Extensive site facilities include well equipped laboratories and heavy pilot plant, pilot steelmaking, casting and coke production.







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