Materials Processing Institute

OPPORTUNITY FOR GREEN STEEL

A speech given at the launch of the UK2070 Commission Teesside Taskforce.

28 October 2020

Materials Processing Institute

Introduction

I would like to start by welcoming the creation of this Teesside Task Force and thanking Lord Kerslake and the UK2070 Commission for inviting me to participate.

I have worked in and around the steel sector for over 20 years and I guess I am quite well known to many of you, particularly in championing industry, both in Teesside and beyond.

In 2014 I rescued what is now the Materials Processing Institute, returning it to independent ownership, breathing new life into this 75 year old Teesside based innovation centre and anchor institution. Having long been the UKs national facility for steel research, the Institute is now driving forward innovation in industrial decarbonisation, the circular economy, advanced materials and digital technologies, which is why government entrusted us with £22m of support announced in the March 2020 budget, to drive forward innovation in the steel and metals sector.

It is this ability, in Teesside, to build on world leading, hard won skills and decades of embedded investment, that gives us an opportunity to lead in this period of unprecedented global change, not only the COVID-19 pandemic, but the 4th industrial revolution and adoption of digital technologies; the fastest pace of technological change for 200 years.

The Case for Green Steel & The Circular Economy

This morning I want to talk about one particular opportunity for Teesside, that of Green Steel.
Teessiders are rightly proud of our shared industrial heritage in steel, in shipbuilding and in chemicals, but I know that when I mention 'steel' many people will be weary of years of uncertainty and false dawns. I experienced the very real heartache of the Redcar blast furnace closing almost exactly five years ago, but I have to tell you there is no suggestion here, of ever bringing back that plant, or anything like it.

Everyone, everywhere, needs steel. Each one of us in the UK consumes about a quarter of a tonne of steel, every year. This could be personal consumption in food and drink packaging, or the purchase of domestic appliances, but also our collective share of public infrastructure, such as railways, roads and civic buildings. In fact, in 2017 the UK government published a report written by my Institute which showed continual growth in UK steel demand through to 2030 and a £3bn opportunity for UK steel production to fill the gap caused by this growth and imports.

Steel as a material is infinitely recyclable. In fact whereas most materials, such as paper, are 'downcycled' from copier paper to egg boxes, for instance, steel can be 'upcycled', to new steel types that are stronger, lighter and harder. So when your washing machine breaks, or a building is demolished, then the steel is recovered as scrap steel and made ready for remelting and turning back into new products.

Incredibly, the UK exports up to 10m tonnes of scrap steel every year. That is the second highest amount of scrap exported per head, of any country in the world and amazingly it is about the same as the amount of steel that we re-import back into the country. This means that instead of using this valuable raw material to support our own industrial supply chains, we export it to other countries and the buy back, at a much higher cost, steel and manufacturing goods, primarily from Western Europe.

Scrap steel may be the most obvious and visible part of the circular economy, but there are other opportunities too. The UK is also the world's biggest exporter of waste electrical and electronic equipment per head of population and here at the Materials Processing Institute we have recently started a project on extracting lithium from end of life car batteries and we are looking at options for recovery of tungsten too.

Globally, the steel industry faces an enormous challenge from carbon emissions, with as much as 2 tonnes of carbon dioxide produced for every tonne of steel. For a global industry that makes 1.8 billion tonnes of steel, that is a lot of carbon dioxide!

At the same time, many of the blast furnaces around the world are reaching the end of their life and with ambitions to be net zero by 2050, and a 20 year investment cycle on blast furnace technology, it makes little sense to invest in new blast furnaces beyond 2030.

This means that this next decade, the 2020s, will be one of new investment in the latest steel manufacturing technologies, that are hyper productive and zero emissions. More factory than foundry, these facilities can make the same amount of finished steel as did our former Redcar plant with a quarter of the workforce and a fraction of the footprint, but what this steel industry brings are very highly paid jobs, multiplied throughout the local supply chain and they act as a nexus for the building of an upstream economy around recycling and a downstream economy around advanced manufacturing and infrastructure.

The Case for Teesside

The race is now on to win the inward investment to be amongst the first places in Europe to start establishing these new facilities. This will be the biggest race to build new steel plants since the 1970s and the biggest overhaul of steel production since the end of the 19th Century.

To be successful we can supply what the steel industry needs, a skilled workforce, ample scrap raw materials, incredible logistics and transport capability and access to zero carbon electricity and hydrogen. We also have the engineering skills and crucially, for this high technology industry, world leading innovation capability at the Materials Processing Institute. The steel industry has always been driven by new innovation, relentlessly improving productivity and developing new steel products. Now the industry, and the experts at my Institute, are at the forefront of the application of new data driven and digital technologies and we can provide that support locally here in Teesside to ensure that any investment remains competitive in the long term.

Bringing Green Steel to Teesside is an enormous challenge, but one that I, and I know the Mayor, the Combined Authority and UK2070 Commission are determined to address.

Teesside's industrial strategy, built as it is on low carbon industries, such as hydrogen, offshore wind and carbon capture and storage, or utilisation, is perfectly suited to be the home of Green Steel for the UK and Europe, but more than this, Teesside's industrial strategy provides the solutions for the great challenges of our era, of environmentally sustainable development, of jobs, growth and levelling up around the UK, creating the foundation of skills and good work, that will be with us, our children and our children's children for years and indeed decades to come.

Thank you.

Materials Processing Institute

Chris McDonald is the Chief Executive Officer of the Materials Processing Institute. The Institute carries out industrial research and innovation in advanced materials, industrial decarbonisation, digital technologies and the circular economy supporting the materials, processing and energy sectors for over 75 years. Chris led the divestment and return to independent, not-for-profit ownership of the Institute in 2014.

Chris's background is in industrial research and manufacturing, where he has worked internationally. A graduate of Cambridge University, Chris is a Fellow the Institute of Chemical Engineers and of the Institute of Materials, Minerals and Mining. He sits on industrial advisory boards at a number of universities, including Oxford and Sheffield.

Chris has an interest in innovation management and industry dynamics and in addition to leading the Institute, he provides expert opinion and consultancy support to companies, institutes, Governments and public bodies in innovation and technology strategy and management. He also advises on the technical due diligence aspects of mergers and acquisitions.

Chris is prominent in the development of public policy, around innovation, steel, SMEs, where he works to support growth and inward investment. Chris is the policy chair for Innovation and Enterprise for the Federation of Small Businesses, a member of the CBI Regional Council and Shadow Monetary Policy Committee for the North East, the Chair of the UK Metals Council and a member of the Steel Advisory Board for UK Steel (EEF).

Chris is often called to commentate in the media on innovation leadership and the steel industry.

“Chris is often called to commentate in the media on innovation leadership and the steel industry”

Chris McDonald
Chief Executive Officer
Materials Processing Institute

Materials Processing Institute

Materials Processing Institute

The Materials Processing Institute is an independent, open access and not-for-profit technology and innovation centre working with industry, government and academia worldwide. Support ranges from small scale, site based investigations, through to long term collaborative research programmes.

The Materials Processing Institute is expert in advanced materials, industrial decarbonisation, digital technologies and the circular economy, specialising in challenging processes, particularly those involving high specification materials, high temperatures and difficult operating conditions.

The Institute has over 75 years' experience as a leading UK technology provider. Extensive materials processing knowledge is supported by state-of-the-art facilities with a broad range of equipment, from laboratories through to demonstration, scale-up and production plant.

Scientists and engineers work with industry and apply their expertise to develop and implement robust solutions to research and development and improvements for products and processes.

Expertise is spread across a wide range of disciplines, including:

- Materials Characterisation, Research and Development
- Simulation and Design
- Monitoring, Measurement and Control in Hostile Environments
- Process Development and Upscaling
- Specialist Melting and Steel / Alloy Production
- Engineering / Asset Management
- Materials Handling
- Minerals and Ores

Research and project management teams deliver support across a wide range of industrial and manufacturing sectors including:

- Metals and Metals Manufacture
- Chemicals and Process
- Nuclear
- Oil & Gas
- Energy
- Aerospace and Defence
- Mining and Quarrying

Materials Processing Institute

Materials Processing Institute
Eston Road
Middlesbrough
TS6 6US
United Kingdom

+44 (0)1642 382000
enquiries@mpiuk.com
www.mpiuk.com

1944 - 2019
75
YEARS OF
INNOVATION

SPEECHES 01/02/2021