

**TATA STEEL**



Swansea University  
Prifysgol Abertawe



Engineering and  
Physical Sciences  
Research Council



# The impact of process parameters on blast furnace dust output

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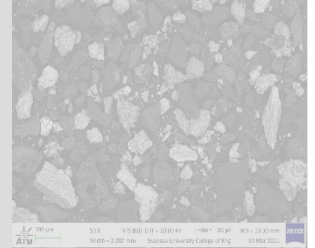
Dr. Hollie Cockings – Academic Supervisor

## TATA Steel Strip UK

Together we make the difference

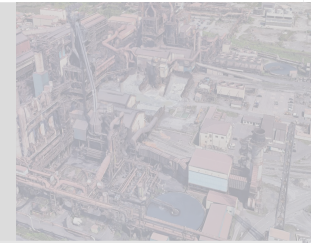
1

## Introduction



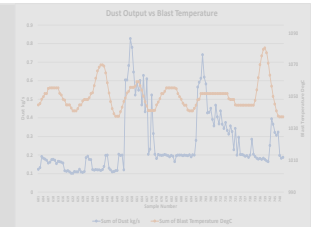
2

## Dust Mass Flow Trials



3

## Initial Observations



4

## Project Potential



5

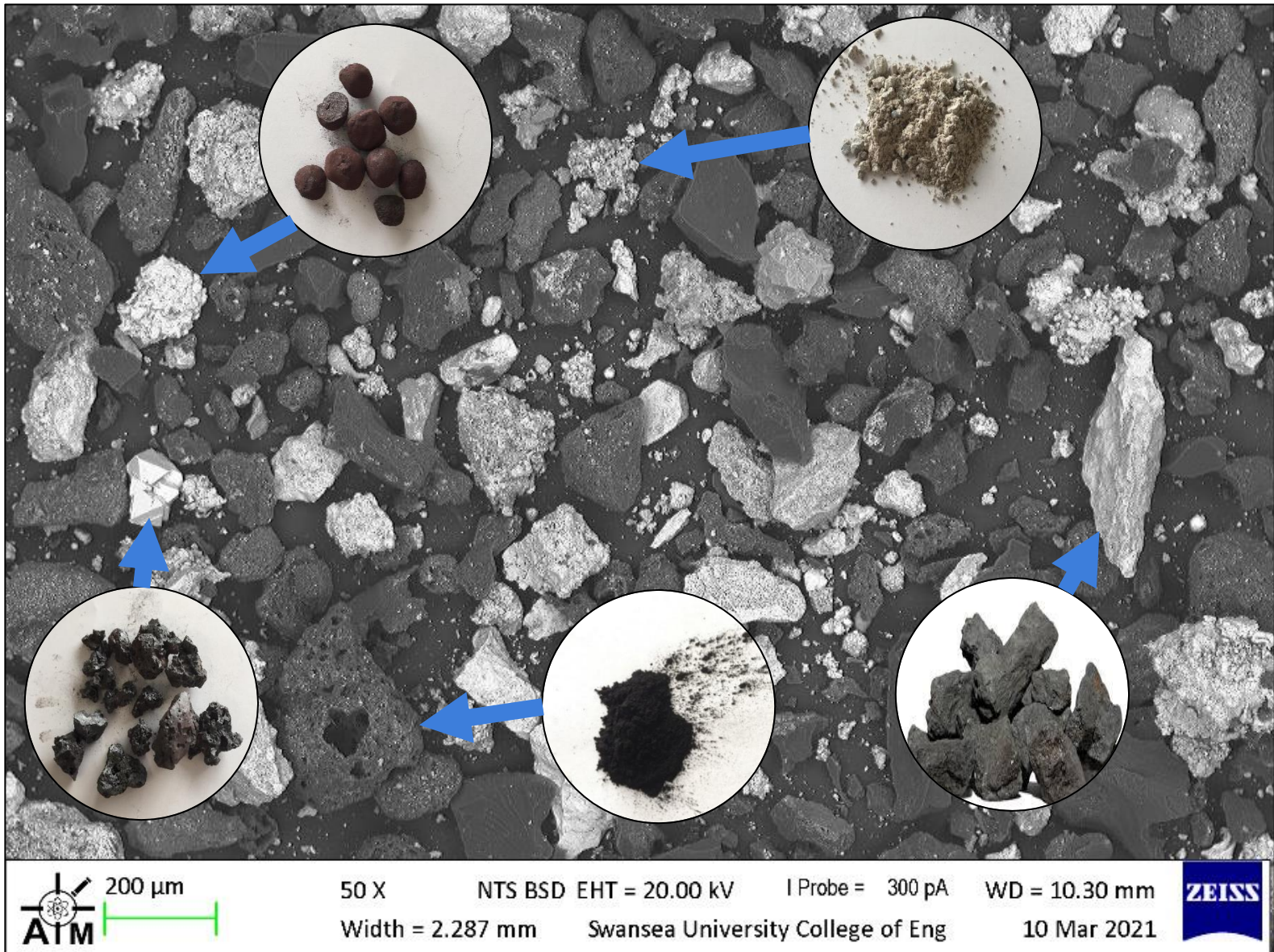
## Question Time



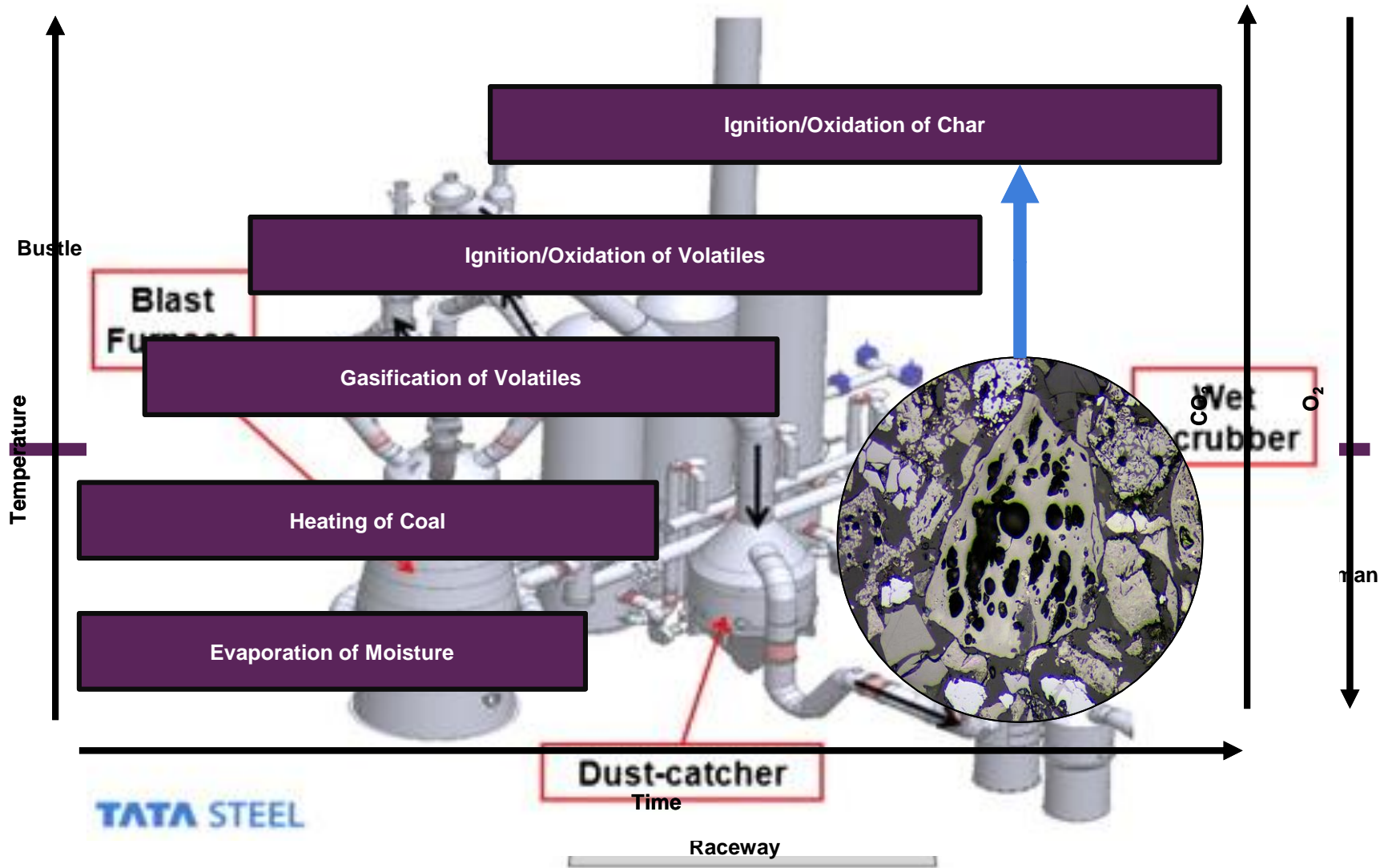
# Introduction – What is Blast Furnace Dust



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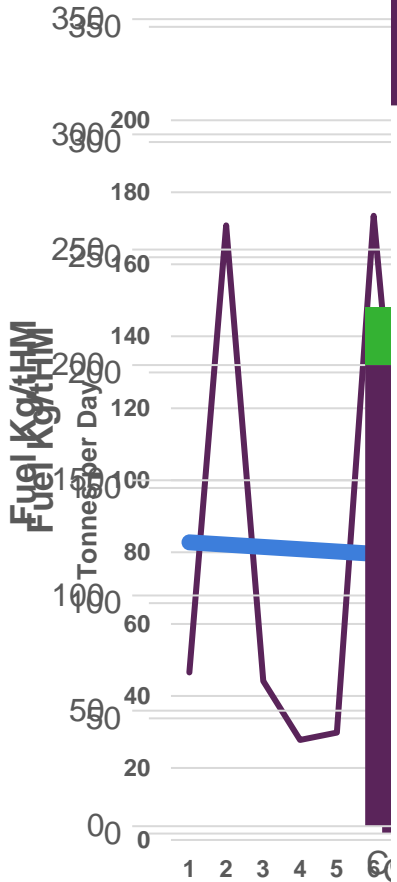
# Coal Injection - Journey through the blast furnace



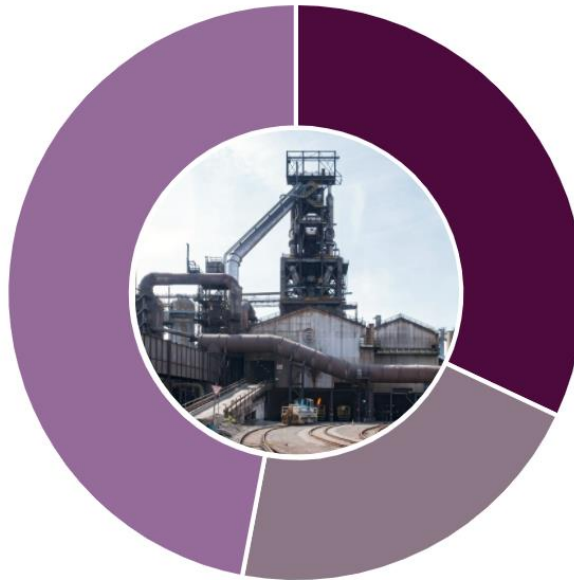
# Coal Injection - The focus on coal

Breakdown of GCI

## GCI Coal Blend

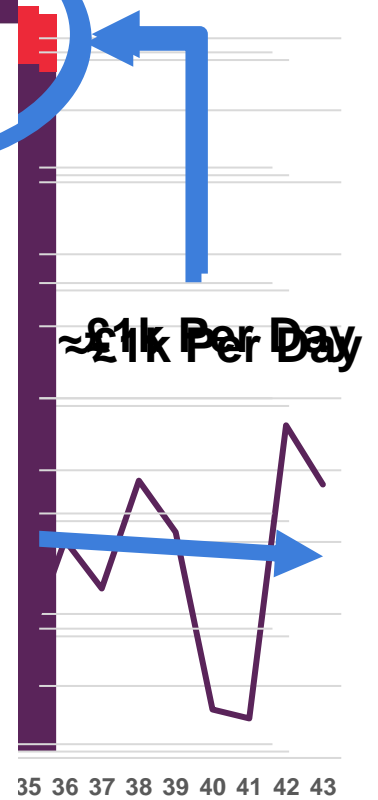


47%  
Coal C



32%  
Coal A

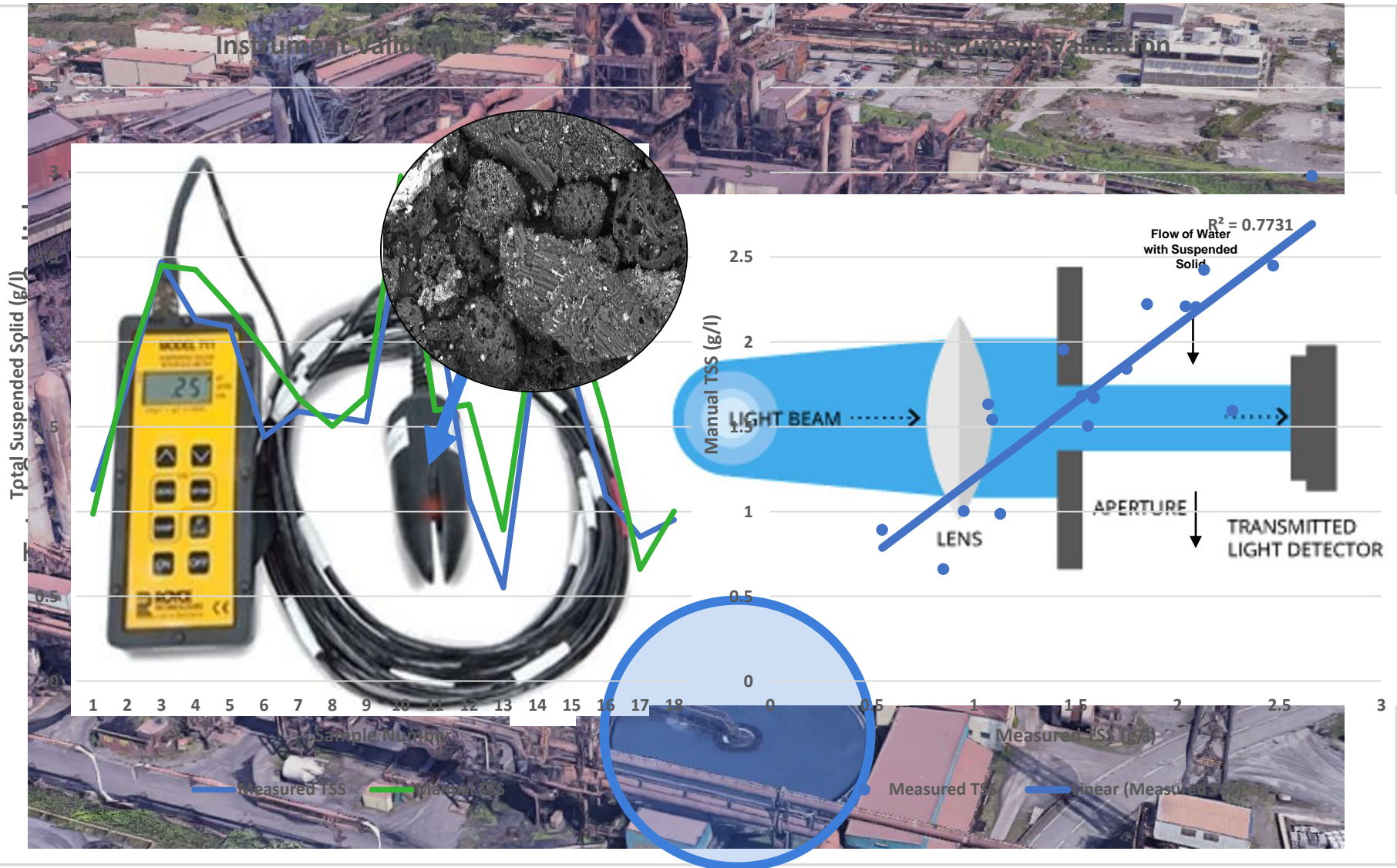
21%  
Coal B



# Coal Injection - The focus on coal



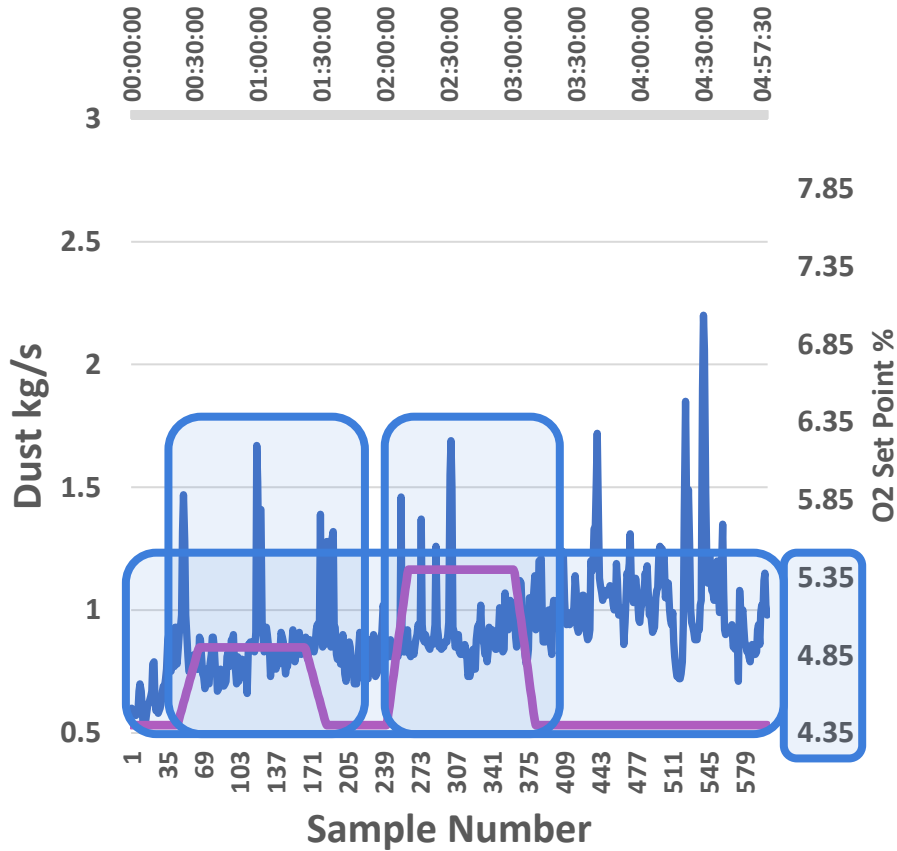
# Measurement – Instrumentation and Technique



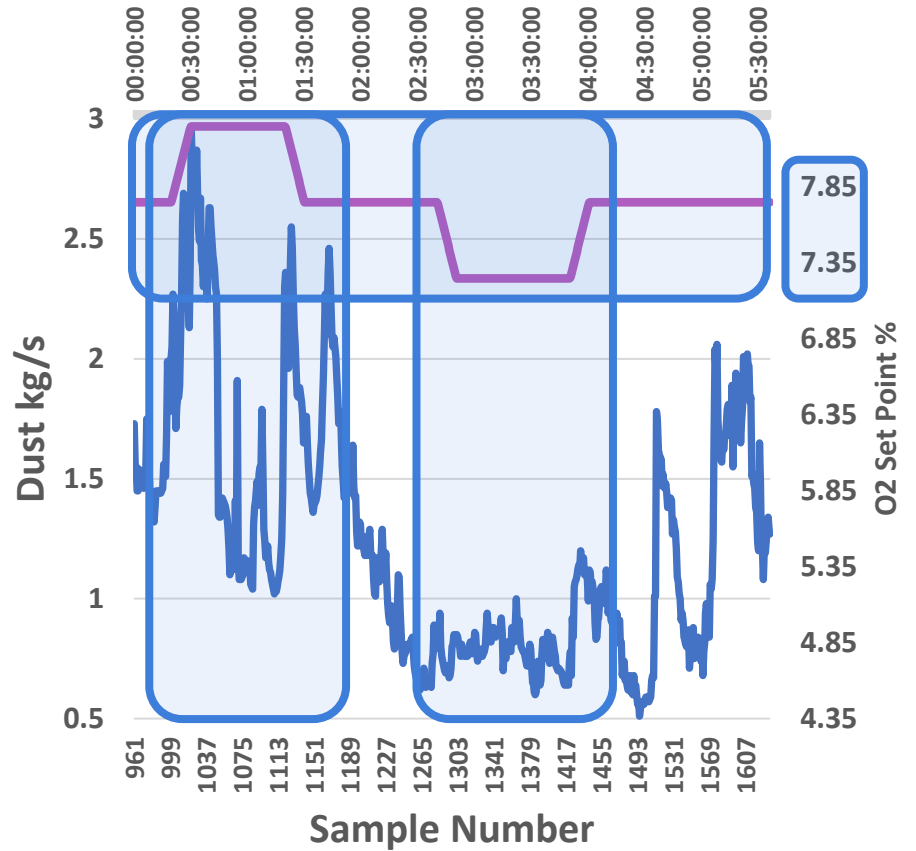


# Introduction to the data

## Dust Output vs Coal Rate Trial 1



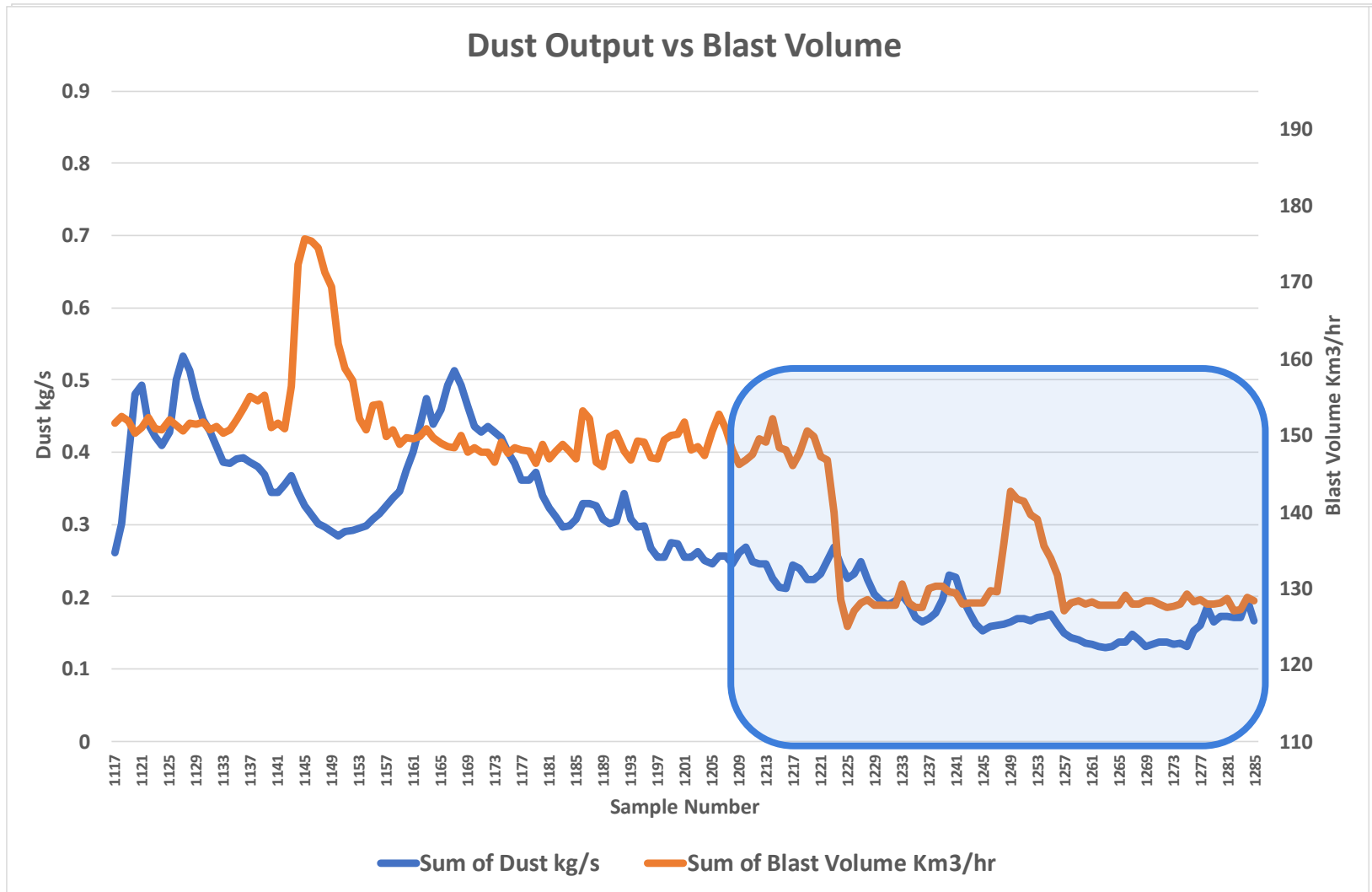
## Dust Output vs Coal Rate Trial 2



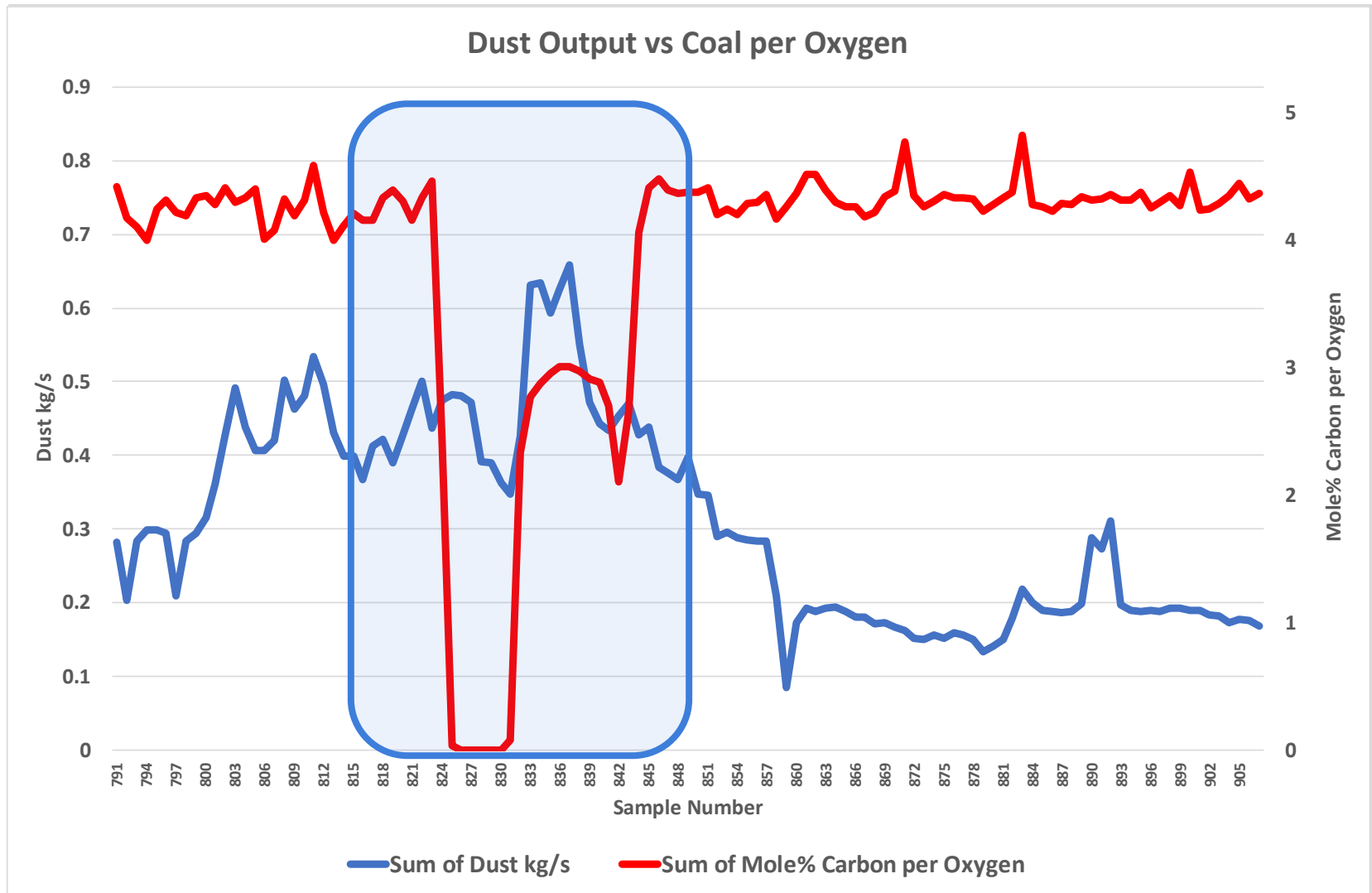
— Sum of TSS g/L — Sum of O2 Set Point %

— Sum of TSS g/L — Sum of O2 Set Point %

## Blast Volume



# Coal per unit Oxygen

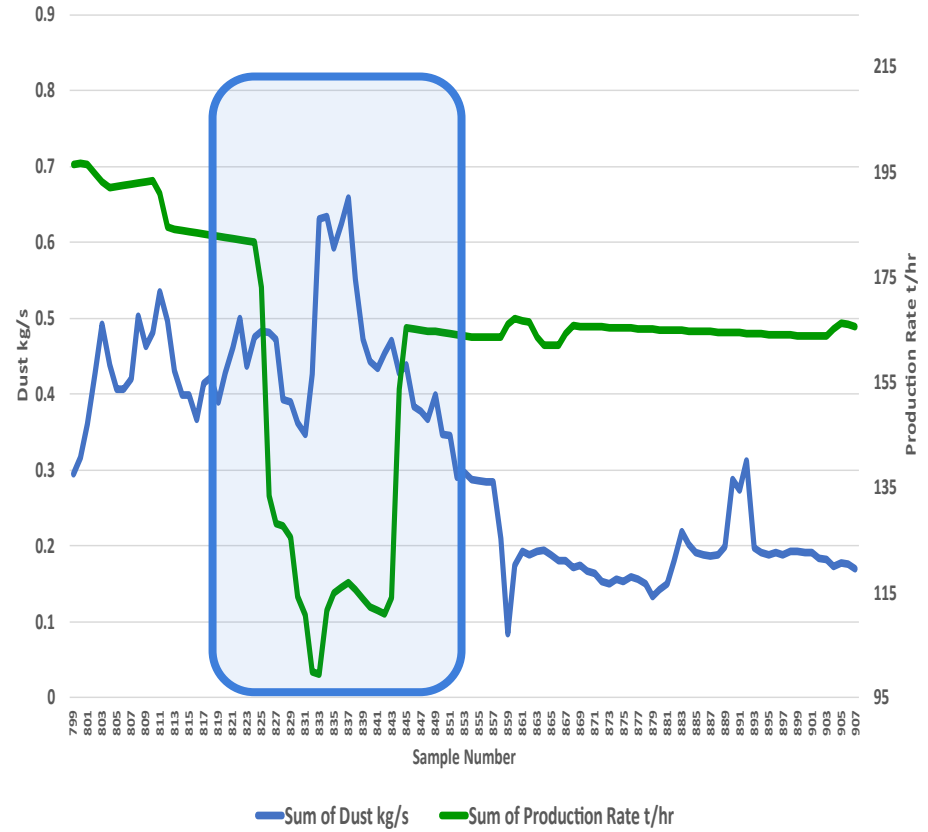


# Coal per unit Oxygen

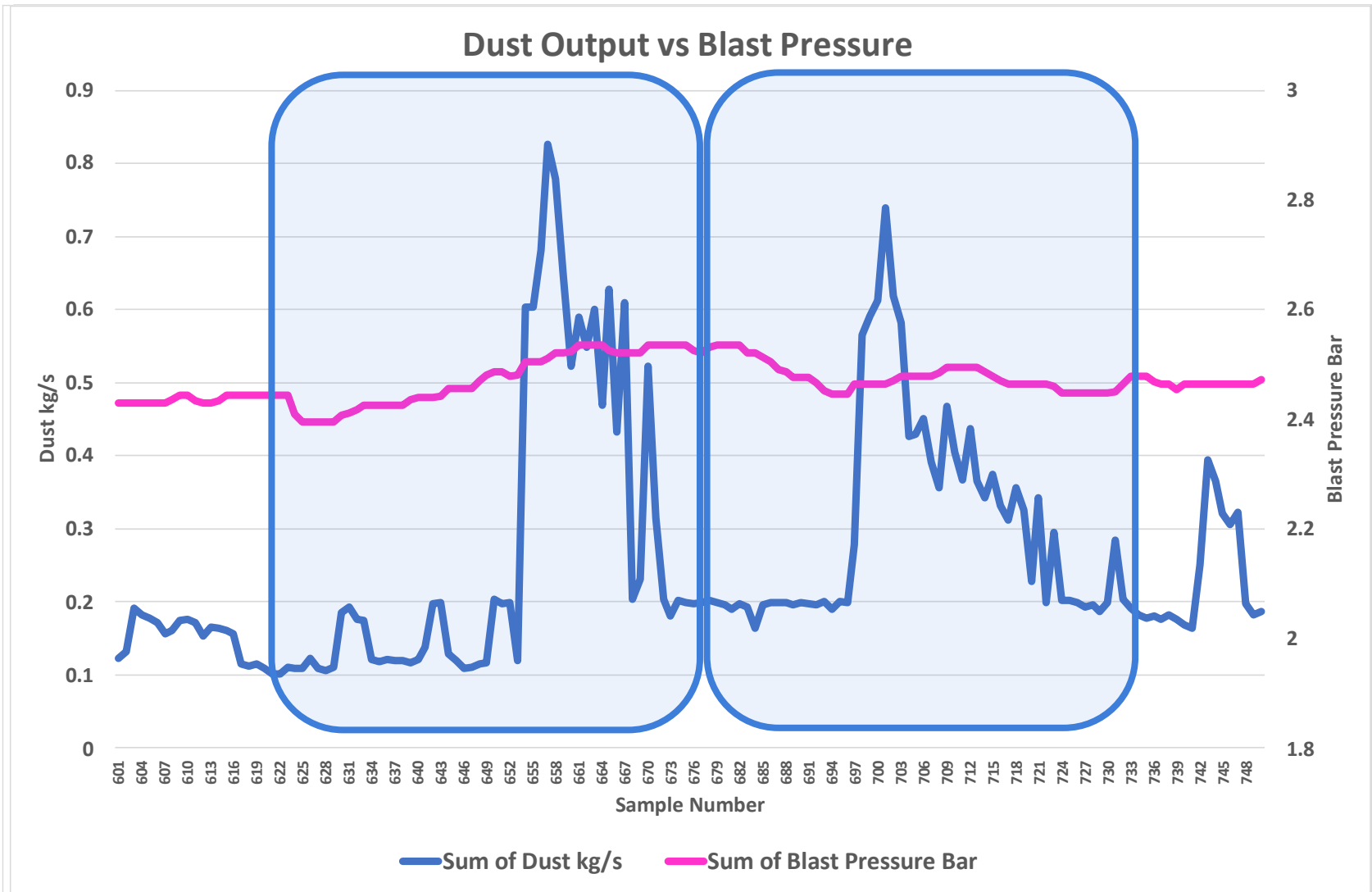
### Dust Output vs Total Oxygen



### Dust Output vs Production Rate

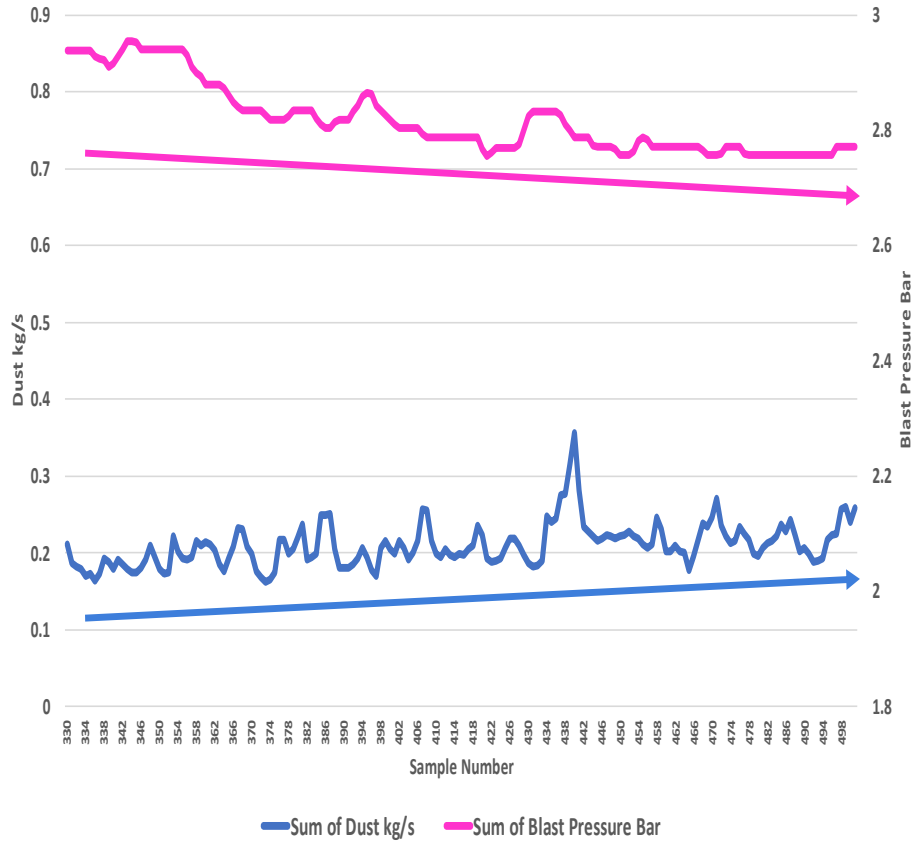


# Blast Pressure

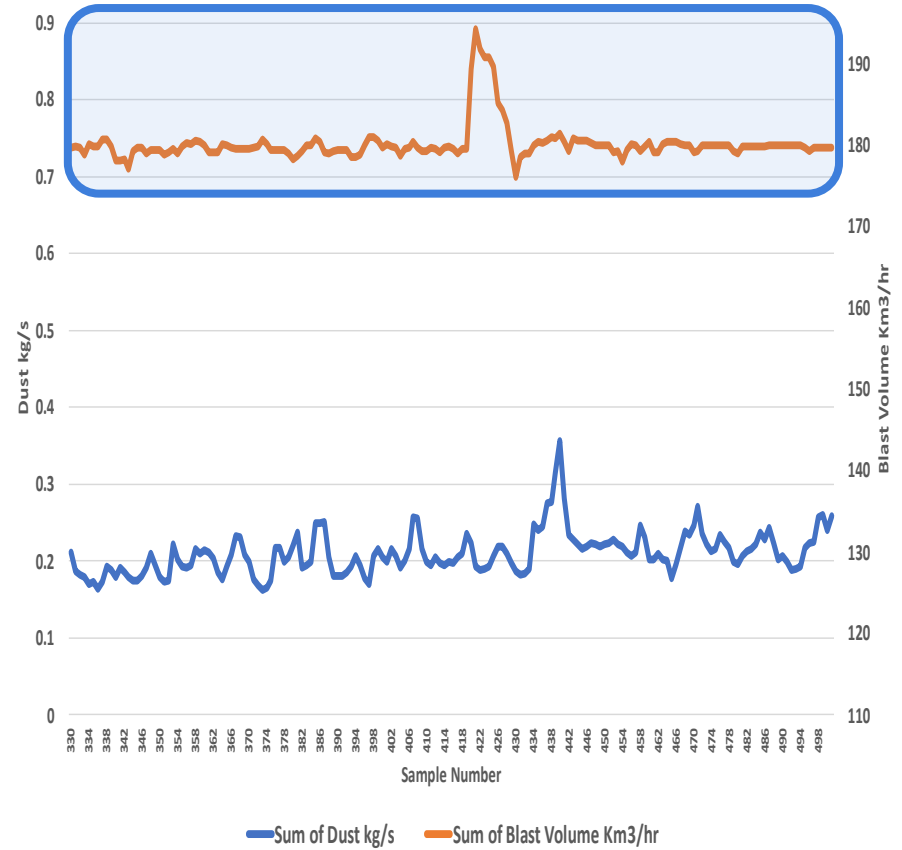


# Blast Pressure – Contradiction 1

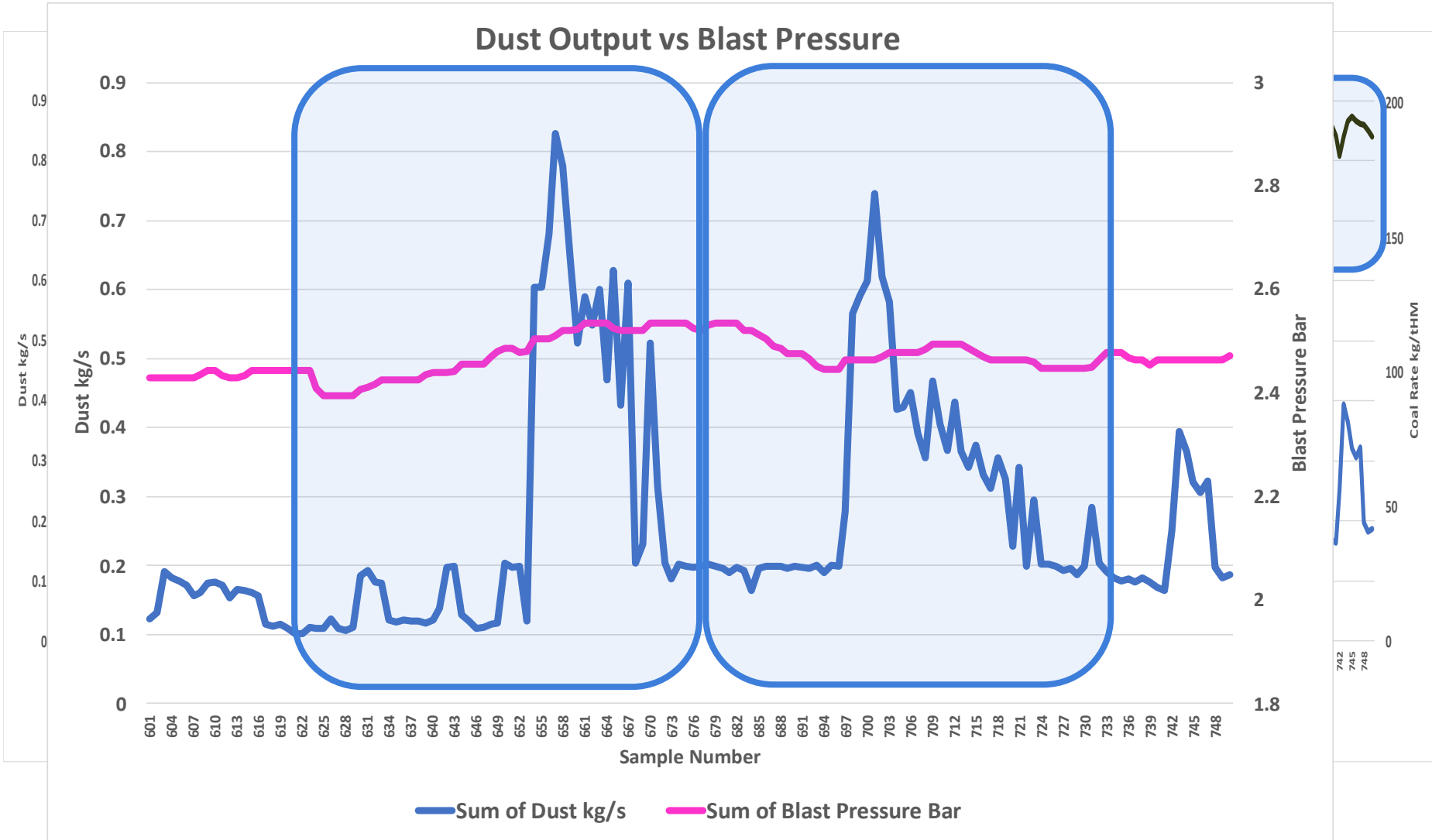
Dust Output vs Blast Pressure



Dust Output vs Blast Volume

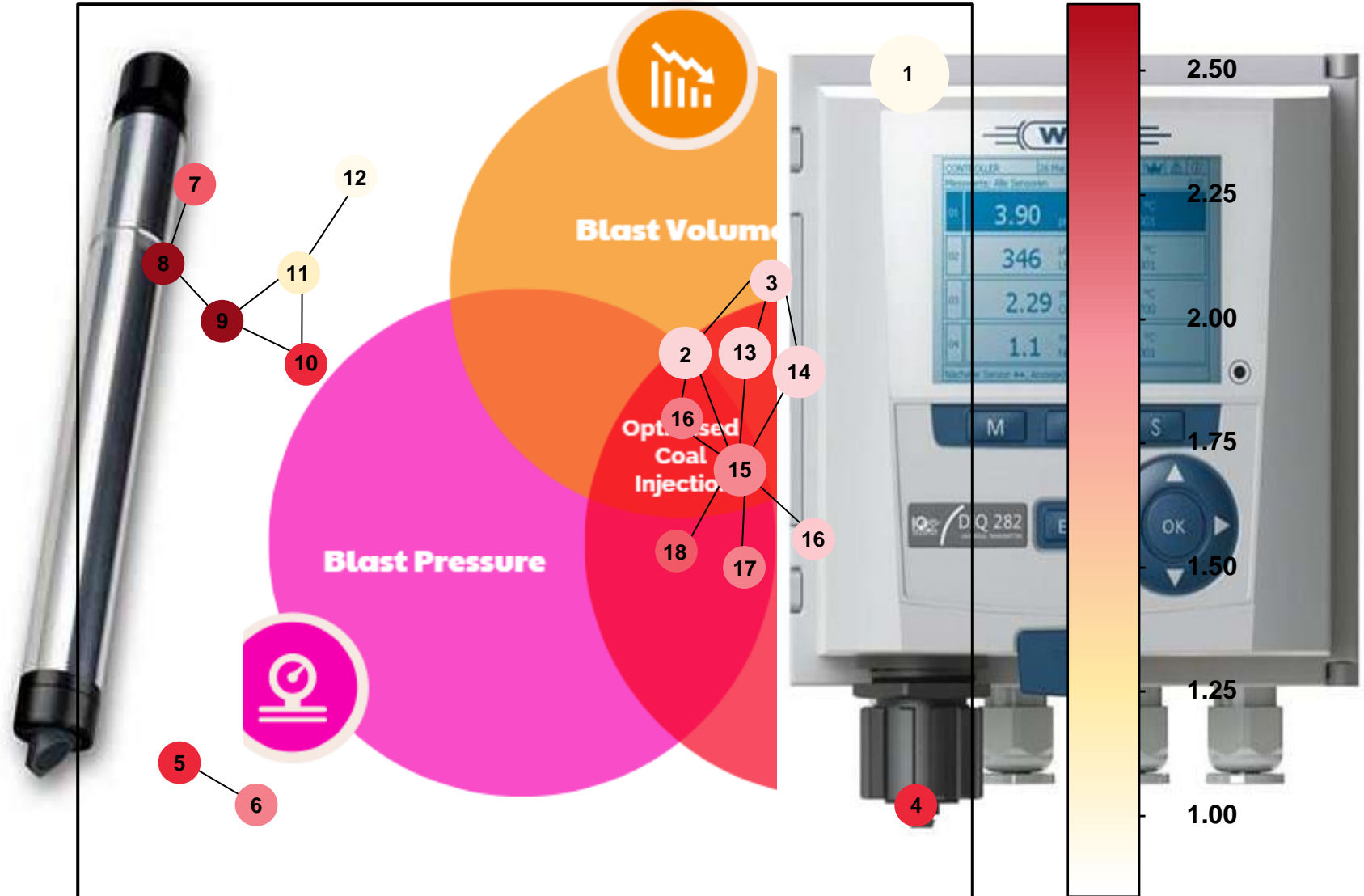


# Blast Pressure – Contradiction 2



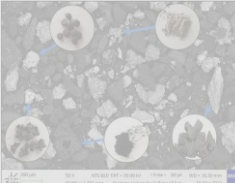

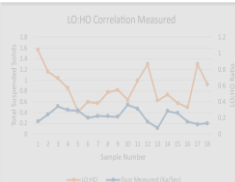
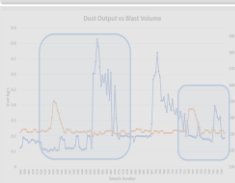
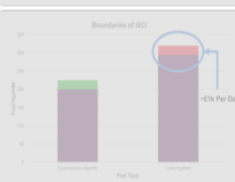
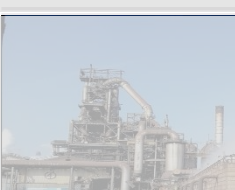
# What's Next?

## Total Suspended Solids Node Map





## Key Messages

<p><b>Blast furnace dust</b></p>	<p>Coal, Coke Ore, Sinter Flux</p>	
<p><b>Coal combustion</b></p>	<p>Influenced by conditions and coal properties</p>	
<p><b>Dust output</b></p>	<p>Correlates strongly with low order carbon type</p>	
<p><b>Key influencing parameters</b></p>	<p>Blast volume is key but not in isolation</p>	
<p><b>Benefits</b></p>	<p>£1k per day per furnace 7kt reduction in carbon Reducing 1 million tonnes of waste worldwide</p>	
<p><b>Understanding</b></p>	<p>Live problem solving and process flexibility</p>	

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Any Questions?

