

# PreMoBAF

## Data-driven Methods for Predicting and Monitoring the Behavior of Blast Furnace and Electric Arc Furnace



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### MOTIVATION & GOALS

- **Blast furnace (BF) and electric arc furnace (EAF) are key processes** in the iron and steel production. **Stability** of these processes is **crucial** due to the complexity of the physical and chemical processes that take place during the operation.
- **Overall dynamics** of these processes are **difficult to model** as the processes inside of the furnaces are **barely accessible for direct measurements**.
- **Data-driven approaches** have been applied to model the complex behavior **with limited success**. Existing models could capture some of the process dynamics **but give no insight to the underlying mechanisms**.
- Goal of this research is to utilize **data-driven and explainable AI (xAI) methods** to **better understand the inner dynamics** of the blast furnace and electric arc furnace operation.

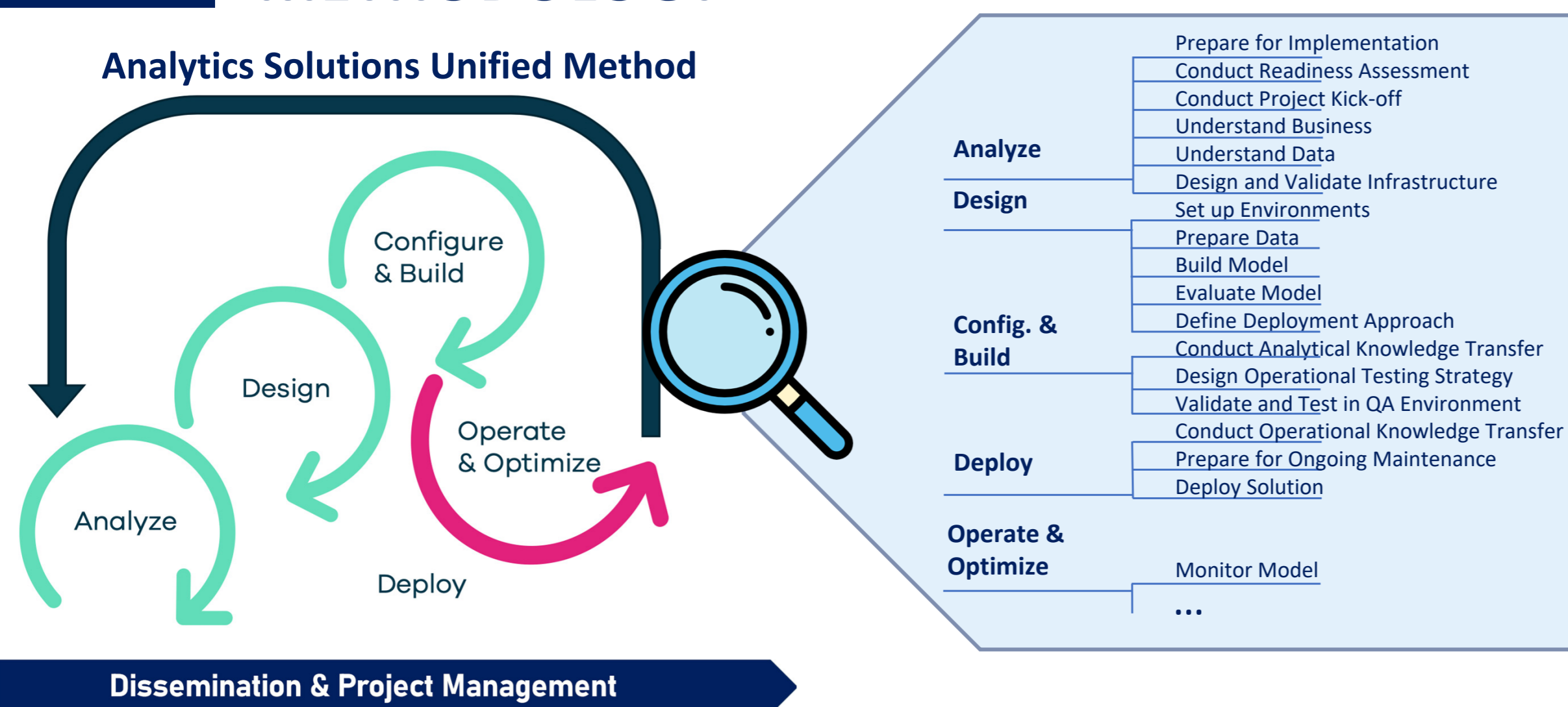
#### Project FactBox

**Project Name** PreMoBAF  
**Project ID** MFP II 3.1.2  
**Duration** 48 Months

**Area 3**  
Cognitive Decision Making

**Project Lead**  
DI Dr. Belgin Mutlu

### METHODOLOGY



### CONTRIBUTION

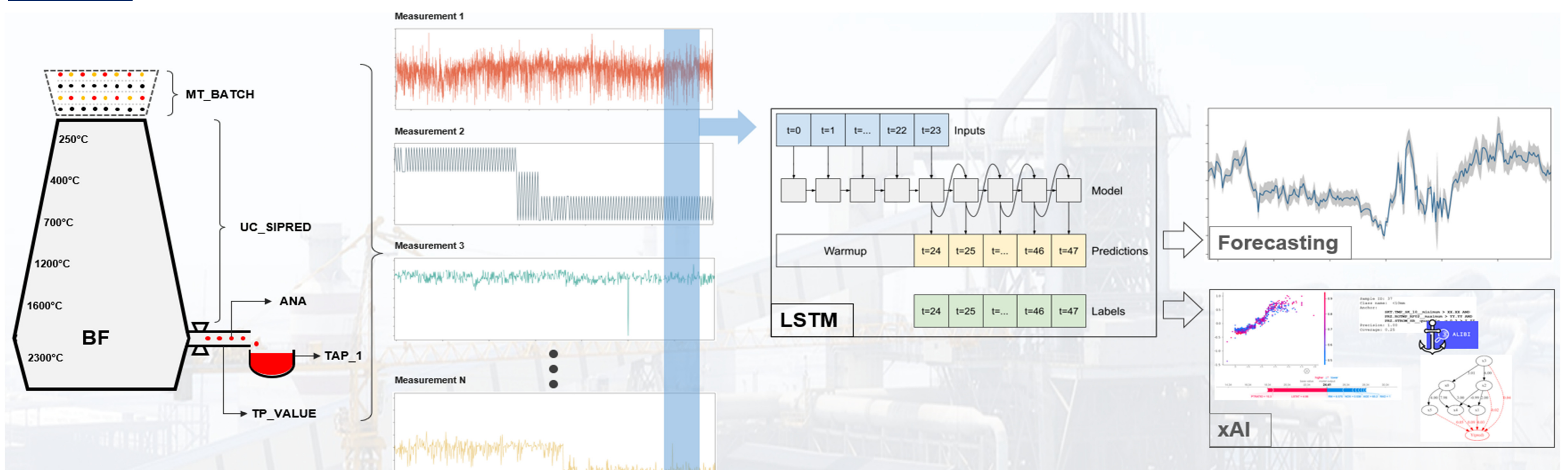
#### Scientific contribution

- Application of deep learning (DL) models in production scenarios
- Methods for knowledge discovery from ML/DL models
- Research on factors crucial for acceptance of ML/DL models in industry (xAI, causal AI, integration of domain knowledge)
- Application of causal discovery in complex industrial process

#### Economic contribution

- Modelling domain knowledge from data-driven methods in BF and EAF processes
- Integration of ML/DL models in automated decision making
- Improvements in process control

### SYSTEM ARCHITECTURE



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