

# LEADING THE CHANGE TOWARDS ECO-EFFICIENT FURNACES

## VULKANO project

Novel integrated refurbishment solution as a key path towards creating eco-efficient and competitive furnaces



### MOTIVATION

Intensive industries are continuously facing new challenges in order to increase the efficiency, reliability and flexibility of their processes. In particular, due to being one of the most energy intensive processes, industrial furnaces have been the focus of multiple researches in order to address radical improvements in the competitiveness and energy, environmental and cost performance at system level. For that purpose, the development of improved designs based on new

new materials, alternative feedstocks, equipment and the integration of permanent monitoring and control systems into new and existing furnaces seem to be essential instrument to meet those demands.

In that sense, the overall objective of VULKANO project will contribute not only to update the mainly old-aged European furnaces but also to create a path to follow in order to ensure a successful design in case of new furnaces.

## PREHEATING & MELTING FURNACES

The overall objective of VULKANO project is to design, implement and validate an advanced retrofitting integrated solution to increase the energy and environmental efficiency in existing preheating and melting industrial furnaces currently fed with natural gas

20%

Increase of the **OVERALL EFFICIENCY** in two of the main types of industrial furnaces

27%

Savings of **FUEL CONSUMPTION** with a subsequent reduction of CO<sub>2</sub> emissions

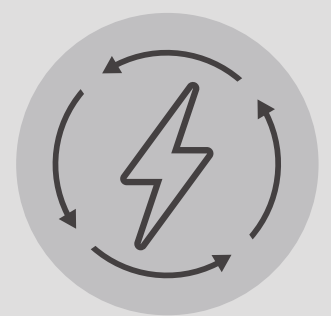
## INTEGRATED SOLUTION

BASED IN 5 TECHNOLOGY INNOVATIONS



### 1. Improved Refractory Materials

Development and implementation of new alternative materials for high-temperature, high-alkali environments capable to operate at higher temperatures or/and for longer periods of time.



### 2. PCM-Based Energy Recovery

PCM has a double purpose acting as a physical filter which is able to recover energy at the same time that smooths fluctuations in the temperature profile working similar to a low-pass filter.



### 3. Co-firing Second Energy Source

Second energy source from renewable/alternative feedstocks with the aim to substitute the high percentage of natural gas in industrial furnaces.



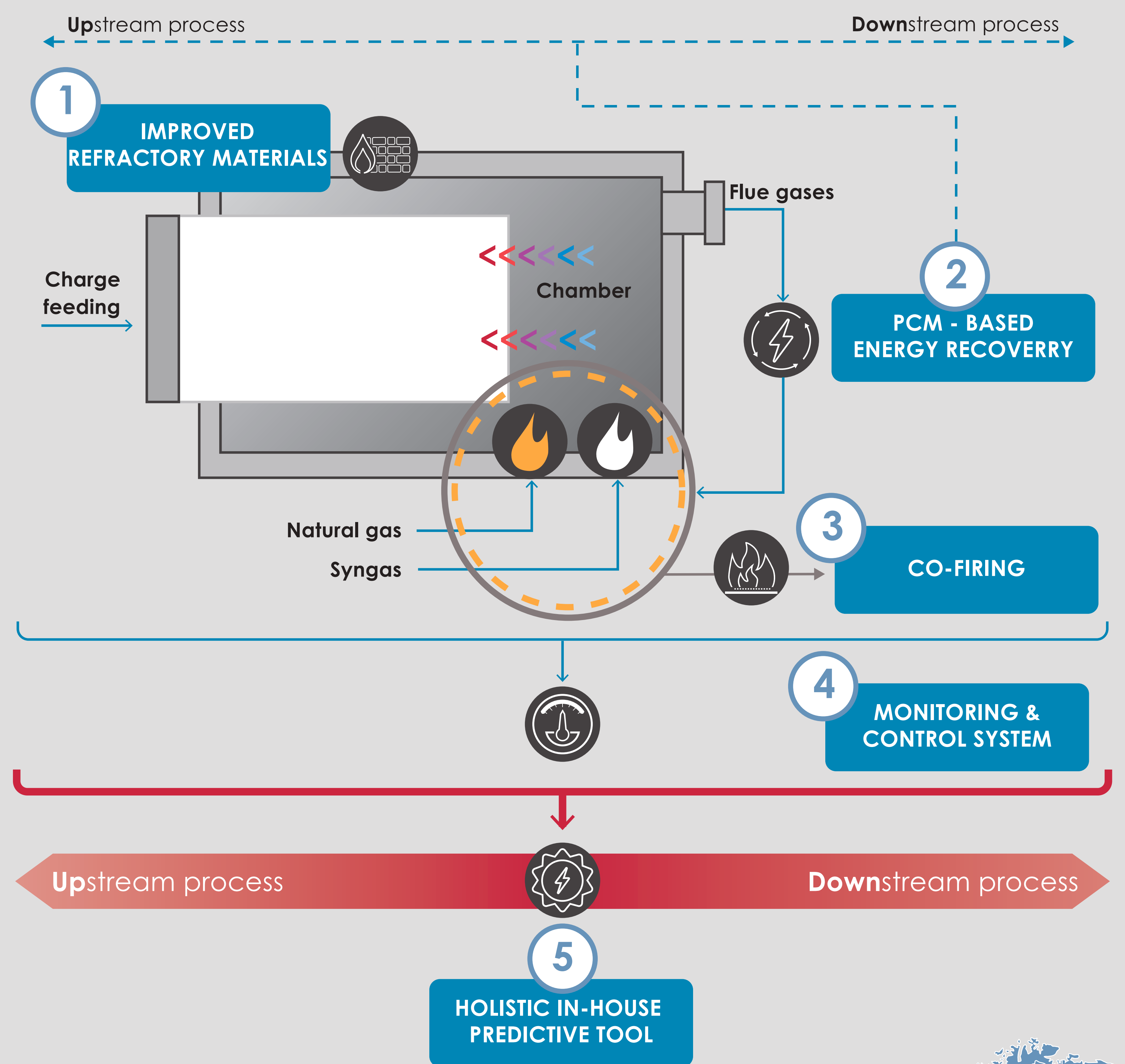
### 4. Integrated Control System

The new and improved control system will directly contribute to achieve a more efficient furnace and consequently important fossil fuel savings.



### 5. Holistic In-house Predictive Tool

Decision support tool to optimize the furnace design and its energy and environmental performance, considering the interaction furnace-retrofitting solutions and upstream/downstream processes.



## DEMONSTRATION

AT 2 REAL INDUSTRIES

**STEEL**

Preheating mould furnace  
Country: Slovenia / Partner: Valji  
Batch Process. 100 - 400 °C

**CERAMIC**

Preheating mould furnace  
Country: Spain / Partner: Torrecid  
Continuous Process. 1500-1580 °C

## REPLICATION

IN OTHER SECTORS

**ALUMINIUM**

Simulation of the integrated solution in an aluminium manufacturing plant  
Country: Turkey / Partner: ASAS  
Preheating and melting process  
450-500 °C / 700-720 °C

## CONSORTIUM

7 COUNTRIES AND 12 PARTNERS

<b>SPAIN</b> TORRECID	<b>FRANCE</b> fives	<b>ITALY</b> RIR
tecnalia	<b>POLAND</b> IBR	<b>UNITED KINGDOM</b> PCM
cidaut	<b>SLOVENIA</b> Bosio	<b>TURKEY</b> ASAS
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