

PROJECT VULKANO

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

“LEADING THE CHANGE
TOWARDS ECO-EFFICIENT
FURNACES”



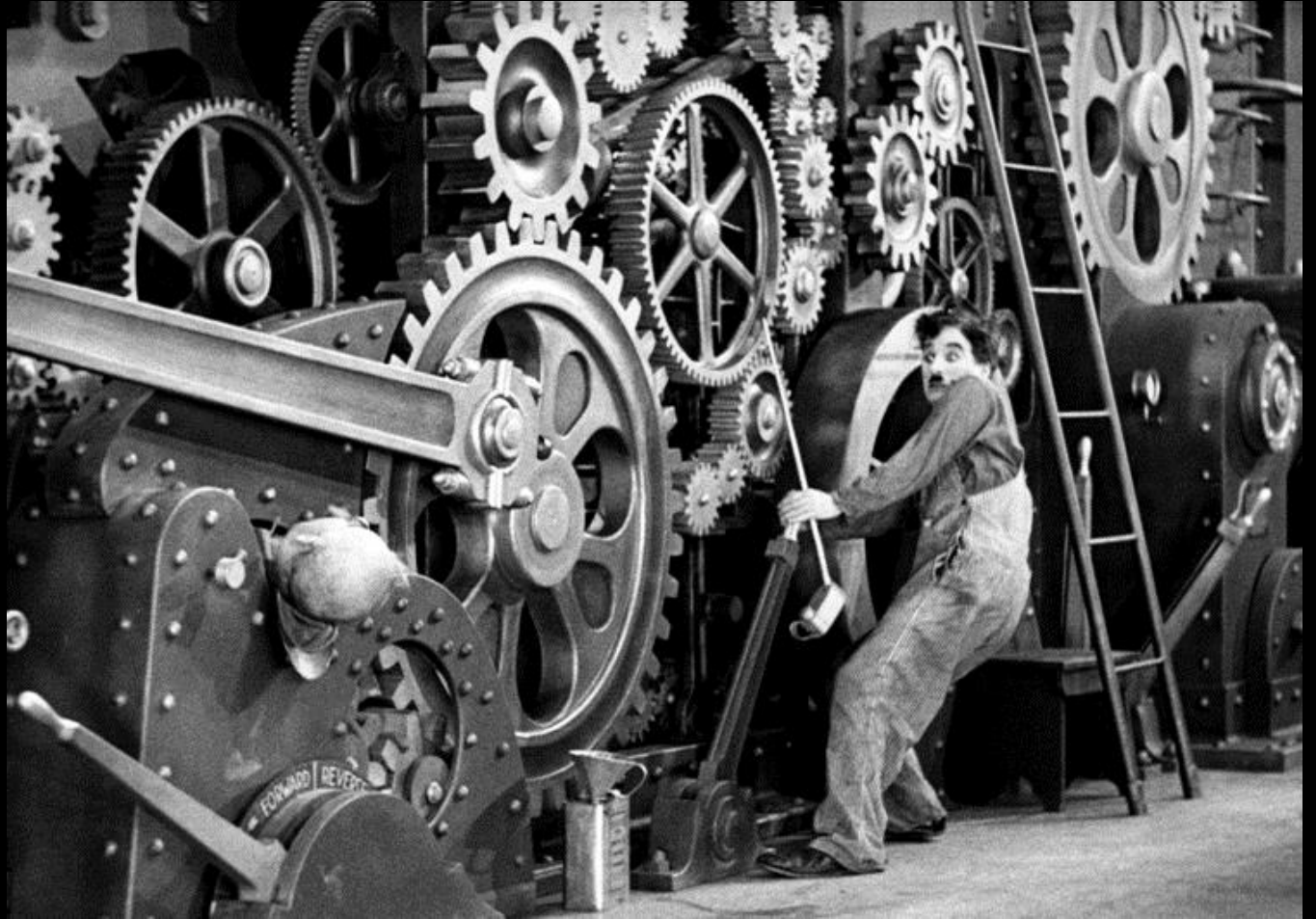
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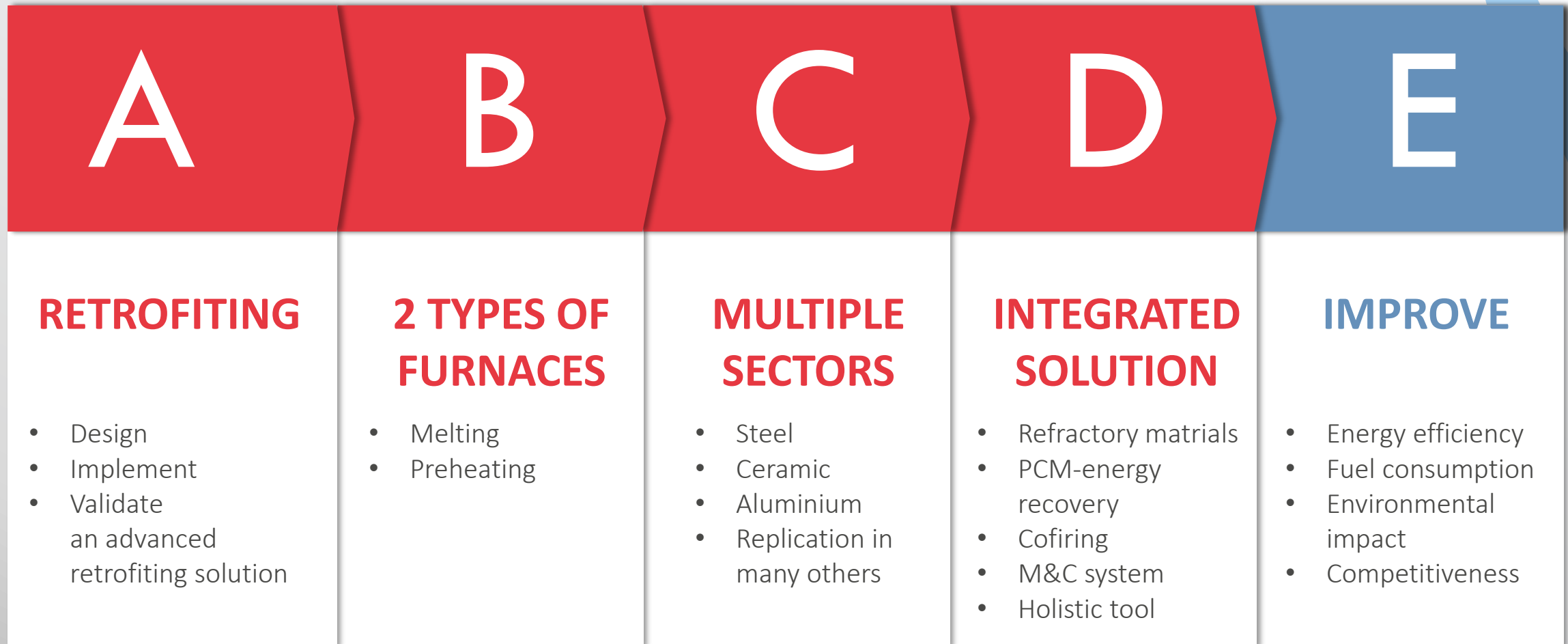
OUR MOTIVATION

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**



SOURCE: Modern Times. 1936

MAIN OBJECTIVE



VULKANO PROJECT

20%

Increase of the overall efficiency
in two of the main types
of industrial furnaces

SPECIFIC OBJECTIVES

20%

INCREASE

in the overall efficiency of the furnaces

27%

SAVING

of fuel consumption

15-40%

REDUCTION

of fossil fuel consumption



DEVELOPMENT

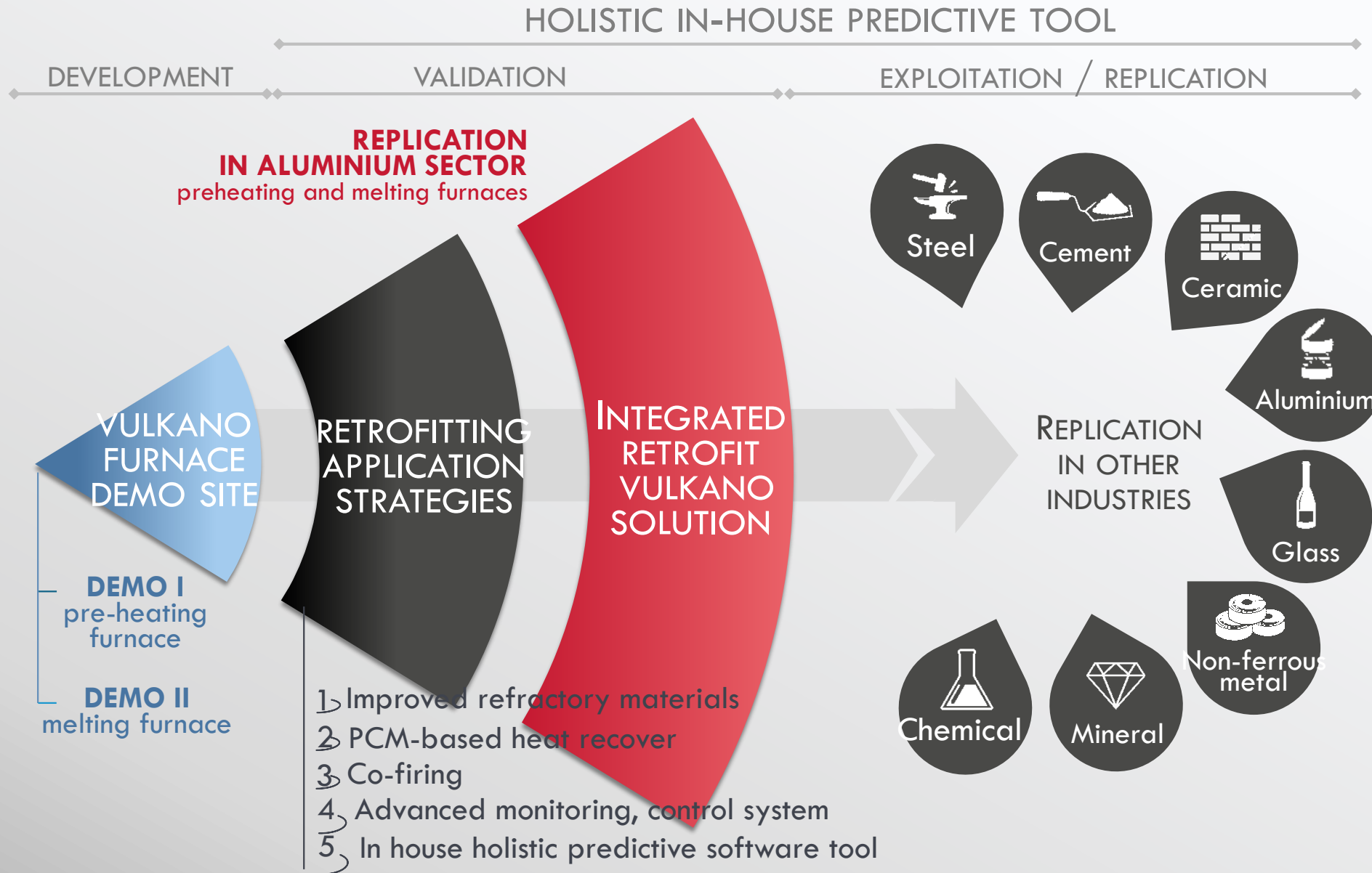
of an optimization methodology for preheating/melting furnaces



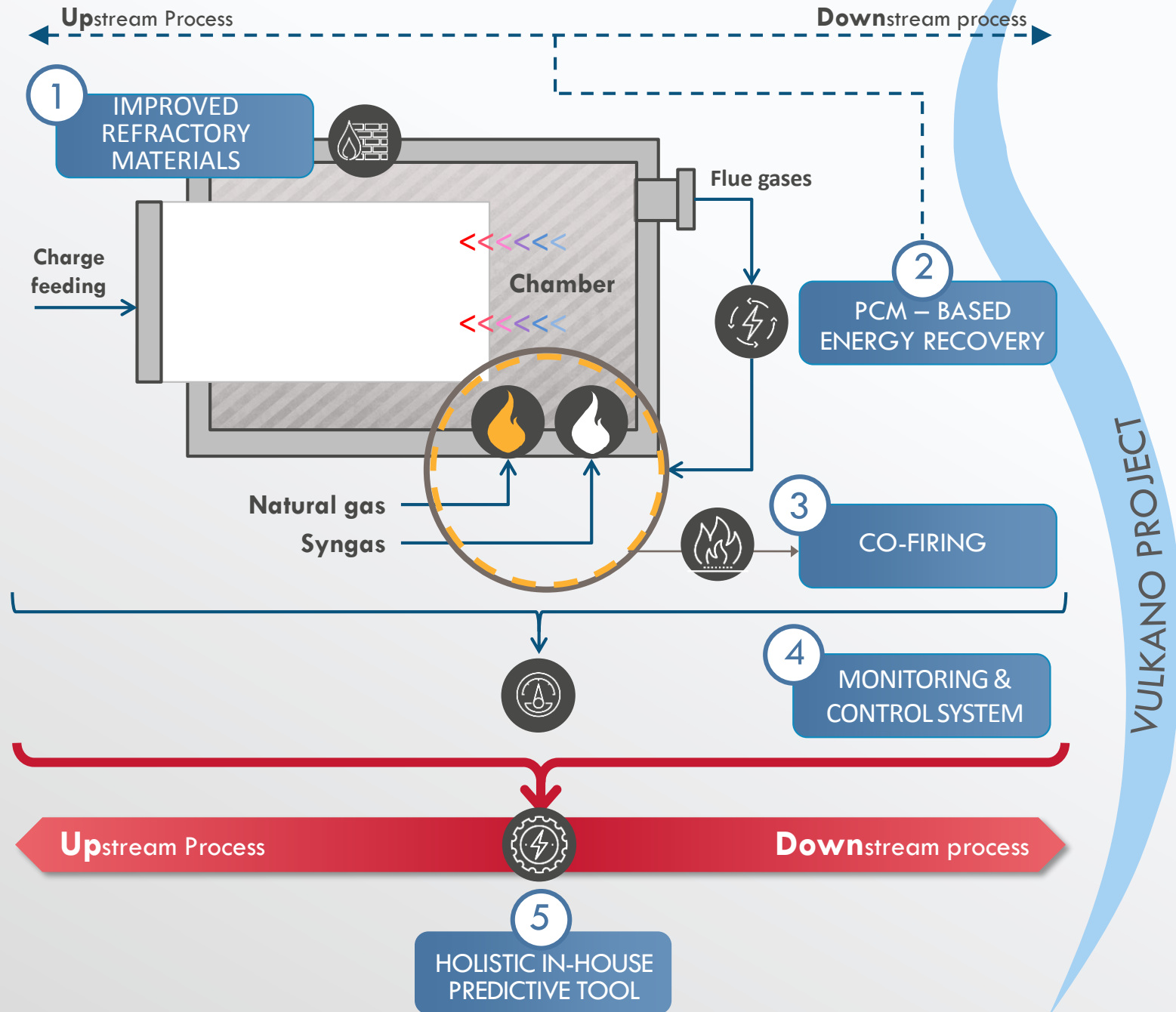
ESTABLISHMENT

of the basis for the market uptake of the Vulkano tool

VULKANO'S PROCEDURE: FROM RESEARCH TO REAL APPLICATION



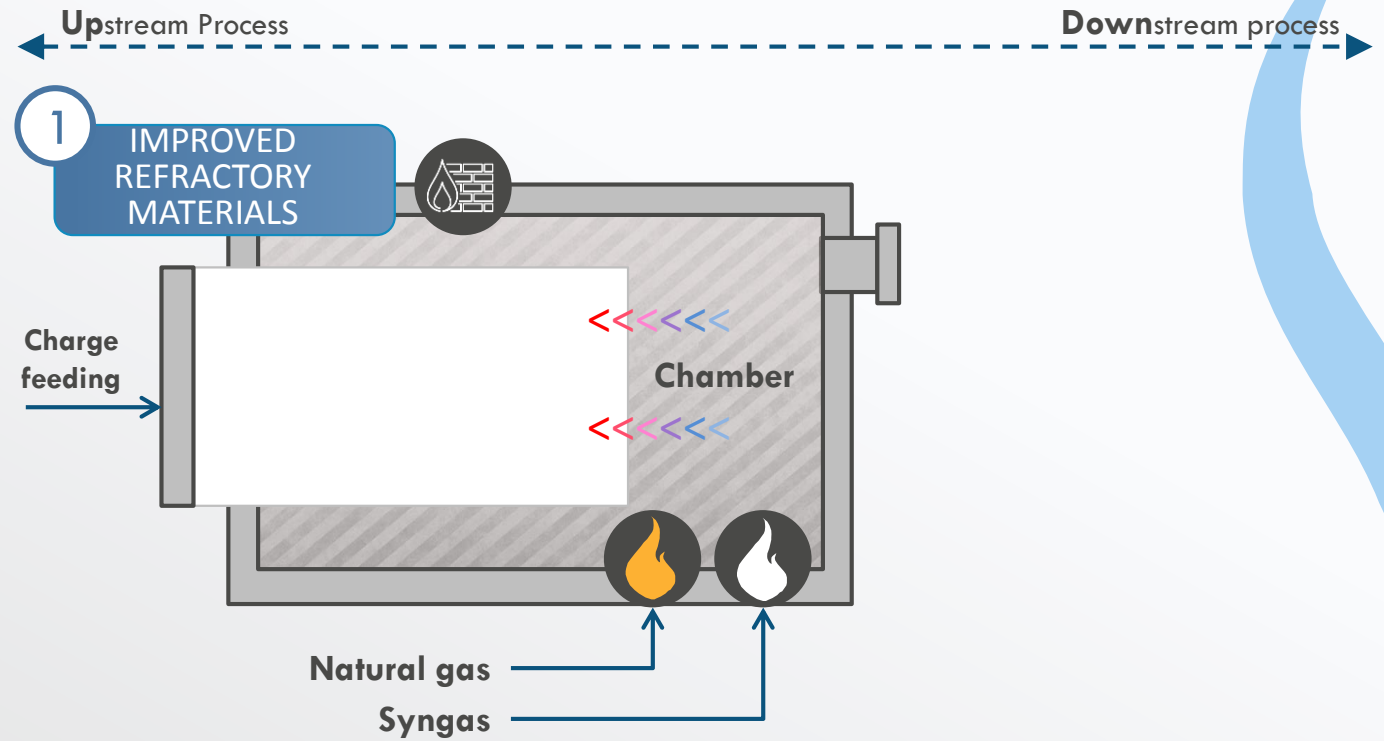
THE PROCESS



THE PROCESS

IMPROVED REFRACTORY MATERIALS

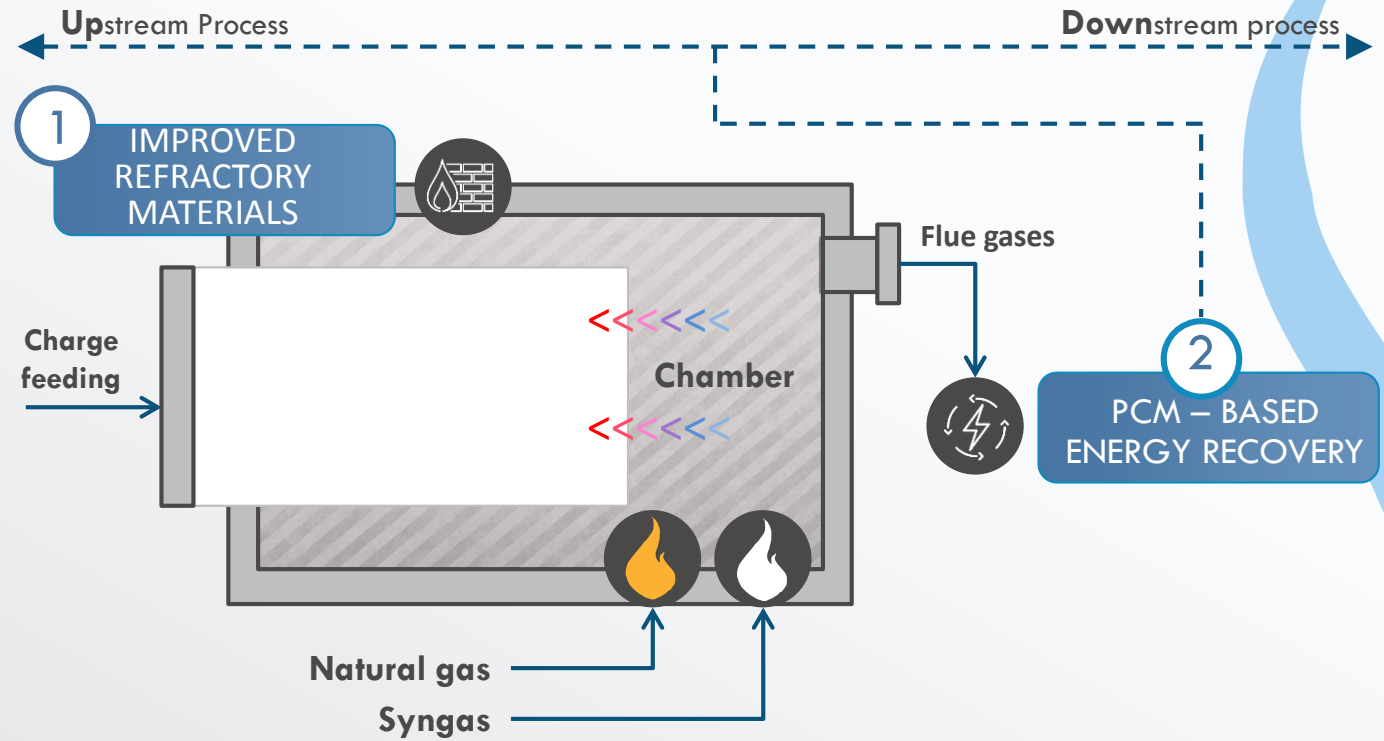
Development and implementation of **new alternative materials** for high-temperature, high-alkali environments capable to operate at higher temperatures or/and for longer periods of time.



THE PROCESS

PCM-BASED ENERGY RECOVERY

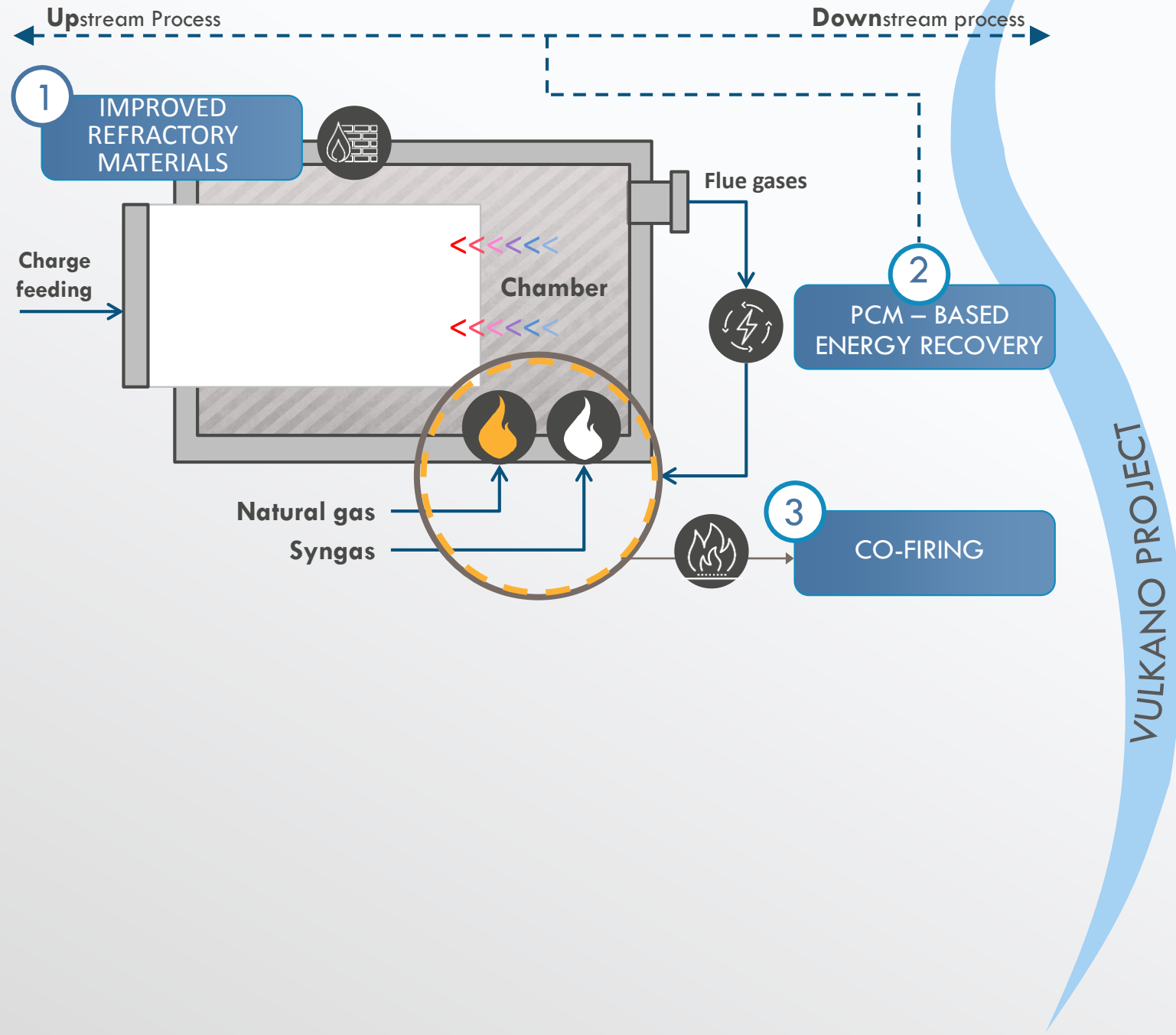
PCM has a double purpose acting as a physical filter which is able to recover energy at the same time that smooths fluctuations in the temperature profile working similar to a low-pass filter



THE PROCESS

CO-FIRING 2ND ENERGY SOURCE

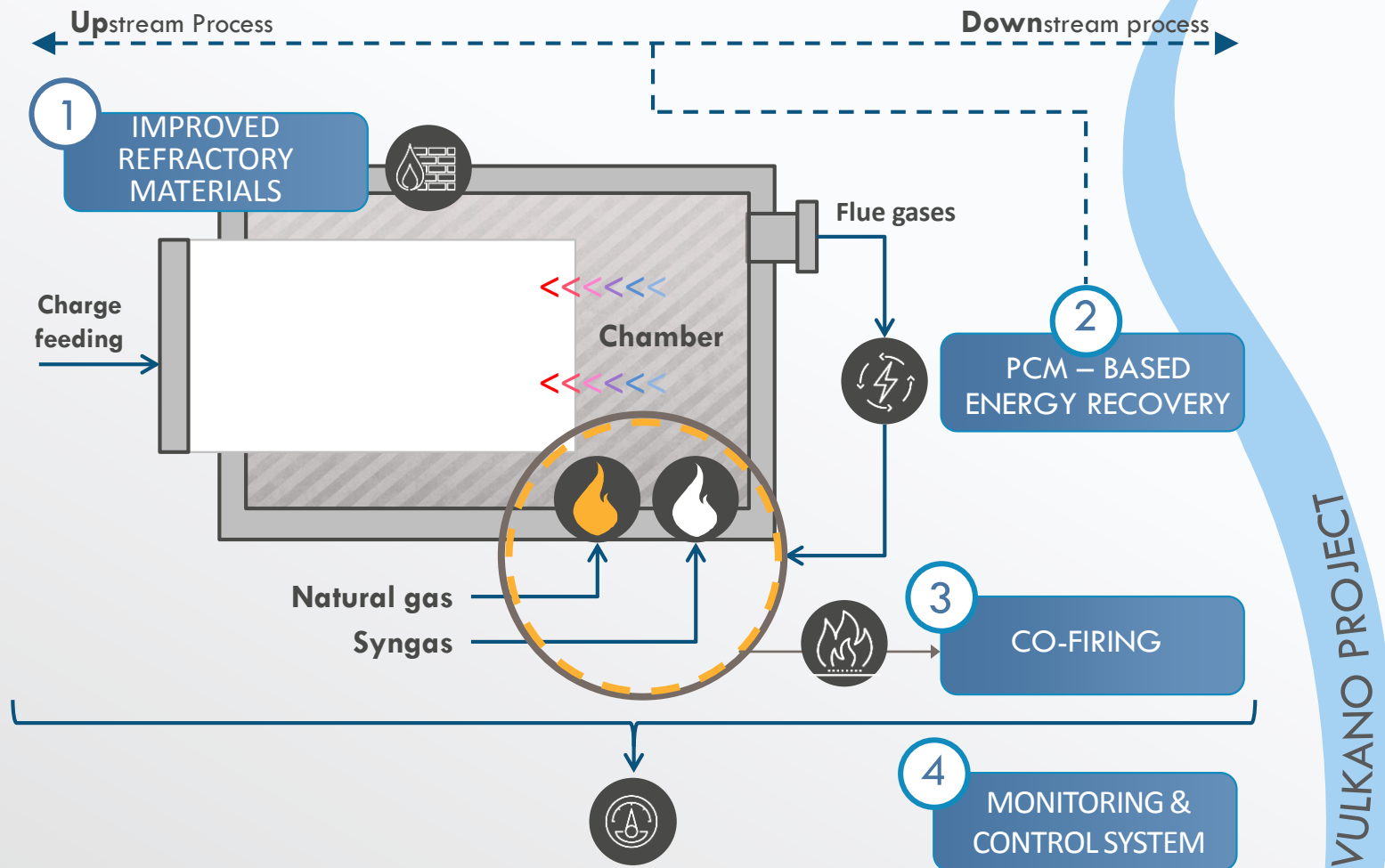
Second energy source from renewable/alternative feedstocks with the aim to substitute the high percentage of natural gas in industrial furnaces.



THE PROCESS

INTEGRATED CONTROL SYSTEM

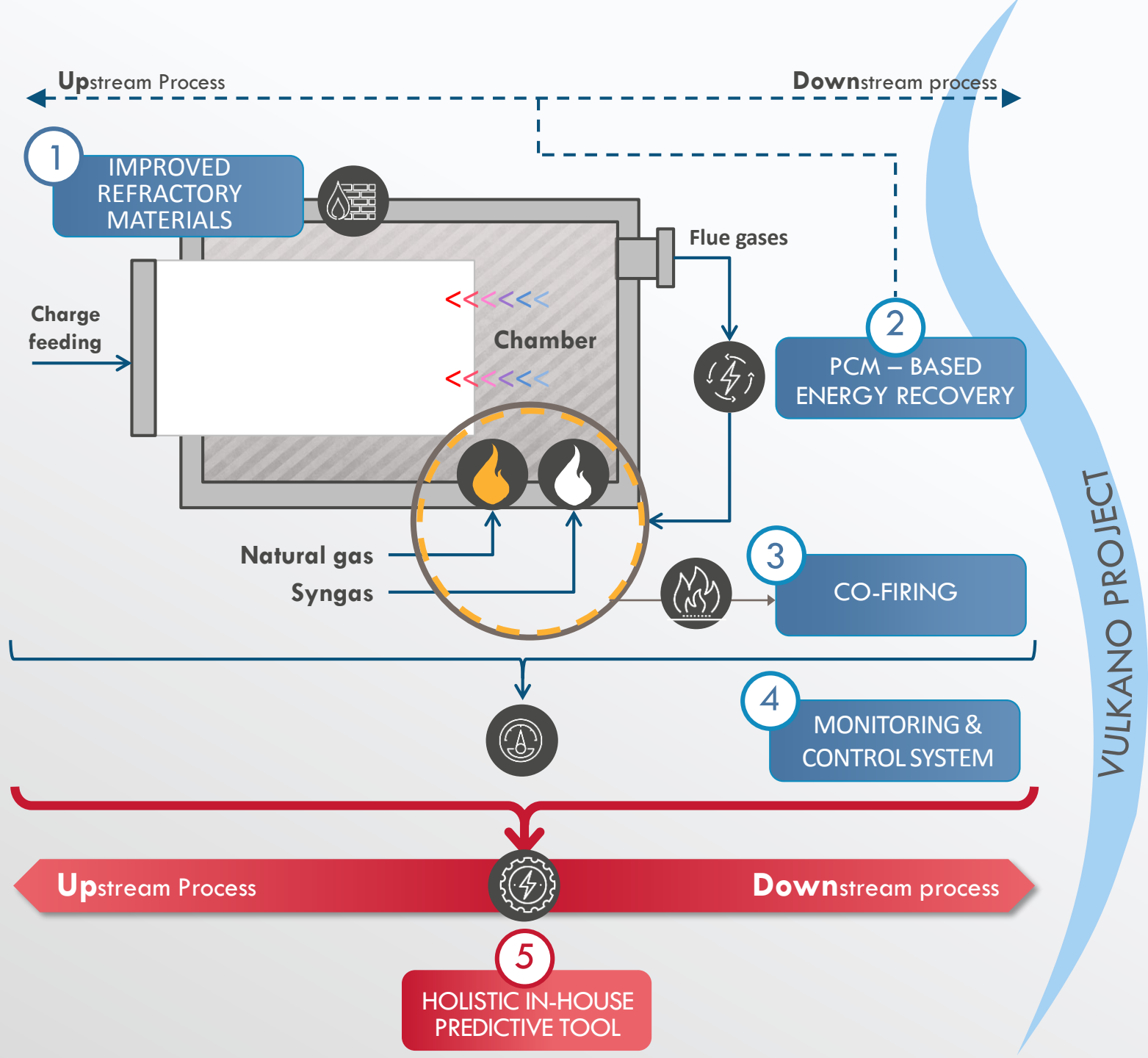
The new and improved control system will directly contribute to achieve a more efficient furnace and consequently important fossil fuel savings.

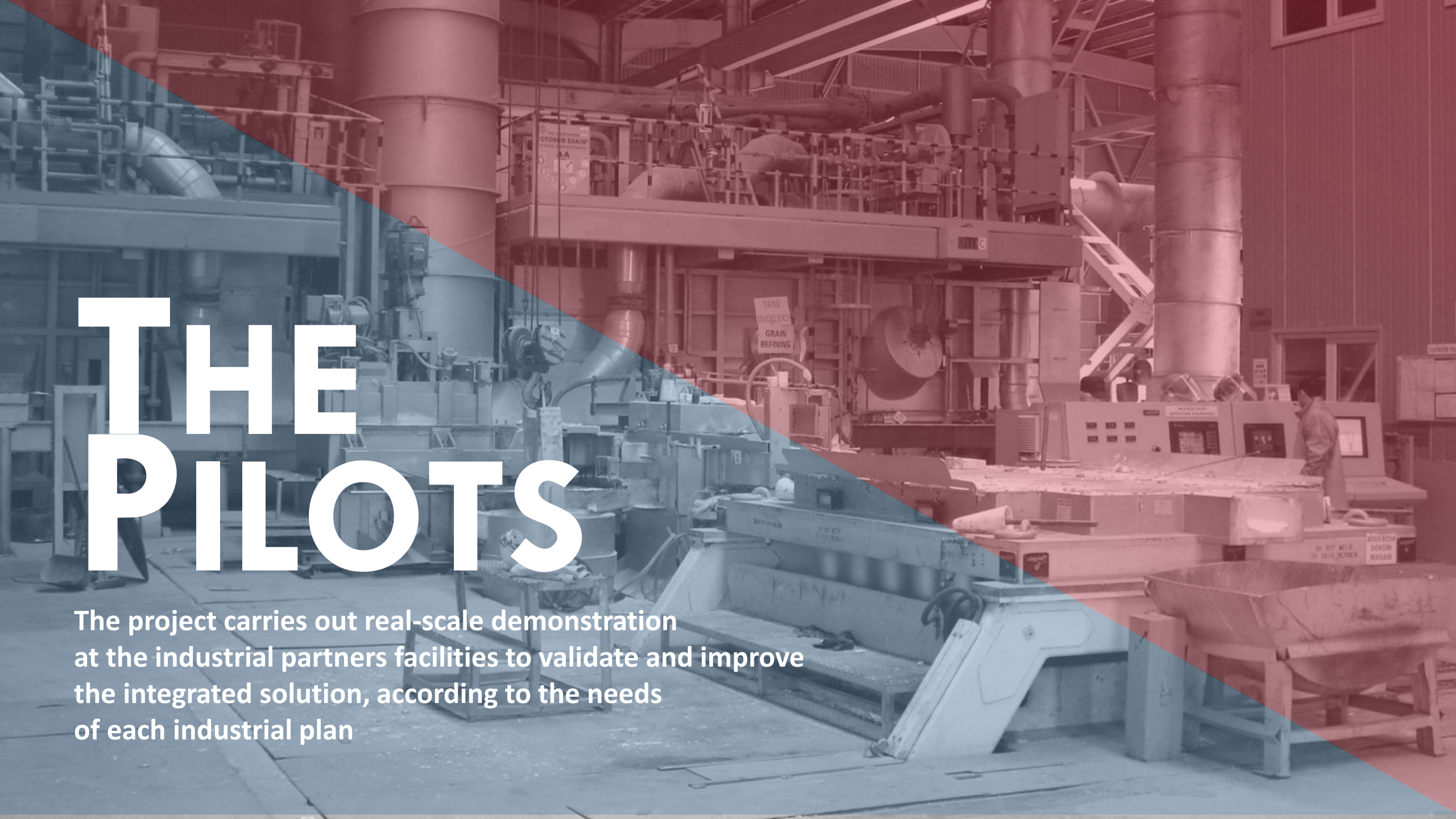


THE PROCESS

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.





THE PILOTS

The project carries out real-scale demonstration at the industrial partners facilities to validate and improve the integrated solution, according to the needs of each industrial plan

THE PILOTS – TEST IN REAL CONDITIONS

STEEL SECTOR



Location:	Slovenia
Project partner:	VALJI
Energy consumption:	135 Nm ³ /hour (Natural Gas)
Type of burners:	3 x 450 kw
Operating temperature:	100 – 400 °C

Solutions to be implemented:



Improved
Refractory
Materials



PCM-Based
Energy
Recovery



Co-firing
Second
Energy Source



Integrated
Control
System



Holistic
In-House
Predictive Tool

THE PILOTS – TEST IN REAL CONDITIONS

CERAMIC SECTOR



Location:	Spain
Project partner:	Torrecid
Energy consumption:	1.952 kWh
Type of burners:	2 type of burners. Main burner gas-air or gas-oxygen, the other one oxygen-gas
Operating temperature:	1500 – 1580 °C
Solutions to be implemented:	



Improved
Refractory
Materials



PCM-Based
Energy
Recovery



Co-firing
Second
Energy Source



Integrated
Control
System



Holistic
In-House
Predictive Tool

THE PILOTS – REPLICABILITY VALIDATION

ALUMINIUM SECTOR



Location:	Turkey
Project partner:	ASAS
Energy consumption:	190 Nm ³ /h (Preheating) / 20,3Nm ³ /h (melting)
Type of burners:	Preheating: 3 burners Melting: 2 North American TwinBed II
Operating temperature:	450 to 500°C for preheating 700 to 720°C for melting
Solutions to be evaluated:	



Improved
Refractory
Materials



PCM-Based
Energy
Recovery



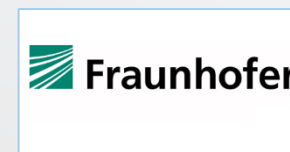
Co-firing
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www.vulkano-h2020.eu