



Valorisation and dissemination
of EAF technology - VALEAF



2nd Workshop: Road map for future EAF technology

VALEAF Project Features

Dr. B. Kleimt, VDEh-Betriebsforschungsinstitut (BFI), Düsseldorf, Germany

VALEAF is a dissemination project on Electric Arc Furnace technology

What is a dissemination project ?

A dissemination project is a way to **valorise** and **diffuse** the most important results obtained in RFCS research with direct benefits for European steel industry.

It intends to be also a basis for establishing a roadmap for future technological developments and research work.





Project partners



Objectives

1. to promote the knowledge and various outputs derived from the European projects in this sector
2. to supply guidelines for the next developments of EAF technologies, to give indications on priorities for research subjects and suggest a clear road map for the technological development in this field

Ways and means

- Collection and analysis of ECSC and RFCS projects of the last 15 years
- Seminars and workshops across Europe
- Construction of a web site to support the dissemination procedure

In the frame of the project a number of public events have been planned

Seminars

To present most relevant results of European research

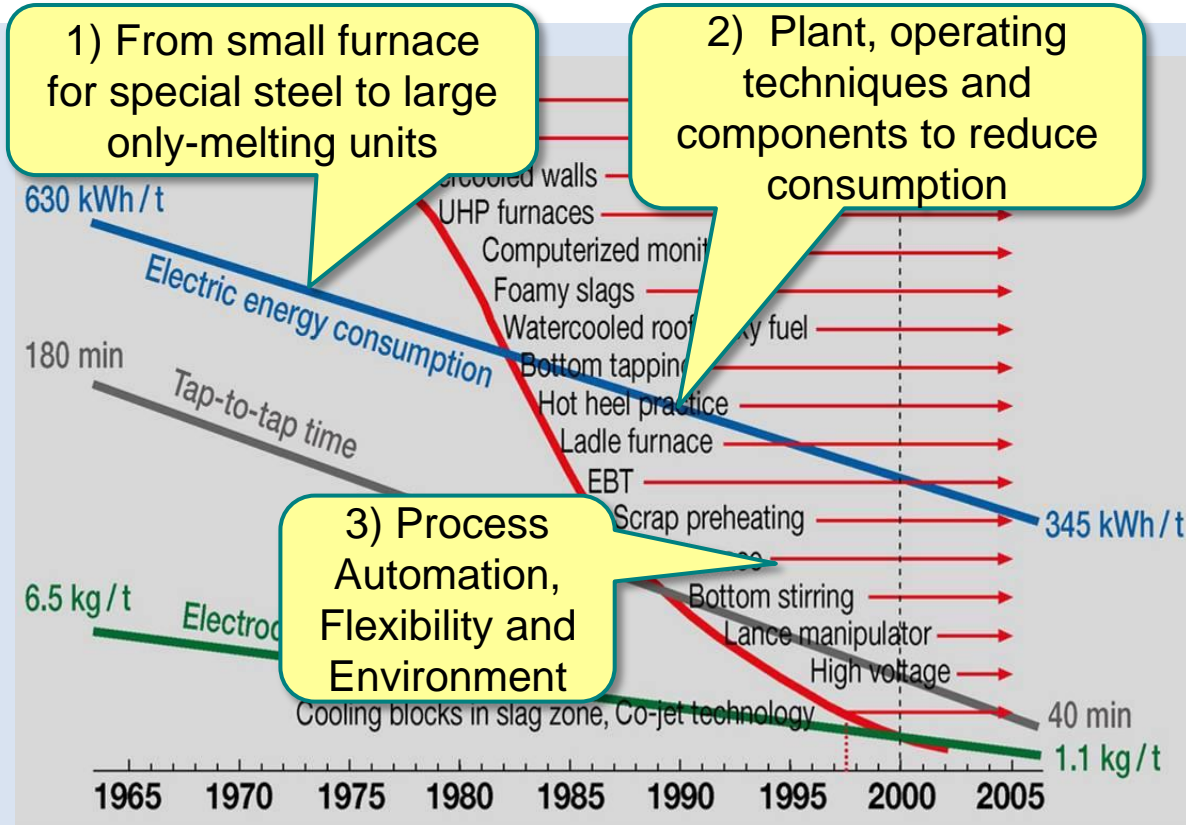
The seminars are communication events to diffuse results and to provide information on specific technological subjects

Workshops

To share and discuss EAF technological issues with stakeholders

The aims of the workshops are:

- to define the actually available project results, their weak and strong points, their potentials
- to define a road map for the future EAF technology
- to individuate barriers and needs for future research activities



- Initially the EAF was a furnace for melting and refining of special steel
- In the second half of the 20th century the evolution was to reduce consumption figures and tap-to-tap time
- In the last decade together with further improvement on consumption and productivity, clear trends have been:
 - higher automation degree
 - charge control and flexibility
 - lower environmental impact

From 1991 up to now, in the context of the research programmes of the **European Coal and Steel Community** and **Research Fund for Coal and Steel** about 70 projects have been dedicated to EAF, 34 of them in the period 2001-2015.

In the various projects all the most important players of European industry were involved (steel industry, engineering companies, suppliers, research centers)

The most relevant technical issues of the EAF process have been faced.

1) Process control

- New models (deterministic, analytical, statistic, based on innovative neural network and fuzzy logic techniques) for improved energy efficiency, productivity (end point control) and quality (target composition and temperature)
- New sensors and mathematical techniques for continuous offgas composition and temperature measurements and related use of the derived information to guide process operations
- Sensors for monitoring the status of the charge during melting and the status of the electrodes

2) EAF Efficiency and optimisation

- Relationships between energy consumption and productivity
- Control and exploitation of chemical energy
- Techniques (models and sensors) and guidelines for running the EAF in airtight conditions

3) Slag control

- Measurements and model calculations of slag status and use of additives for foam control
- Additives for slag reduction to recover alloy elements from the slag

4) Scrap treatment and control

- Pre-treatment of scrap to improve quality and to reduce energy consumption
- Innovative (ultrasonic, optical, laser based) measurements of physical and chemical properties of scrap to control quality
- Determination of scrap properties based on statistical evaluations
- Cost optimal charge mix calculation
- Mathematical tools to manage flexible scrap charging

5) Environmental Impact

- Measurements and operating practices to reduce NOx emissions
- Pre-treatment of scrap to improve environmental impact

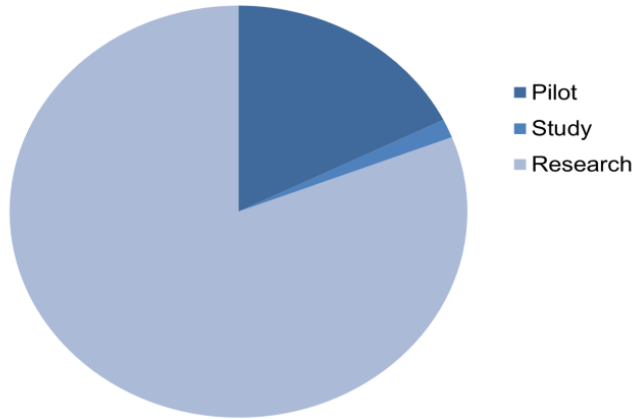
6) Alternative charge

- Techniques and guidelines to use alternative iron sources
- Use of char from biomass replacing coal
- Recycling of by-products

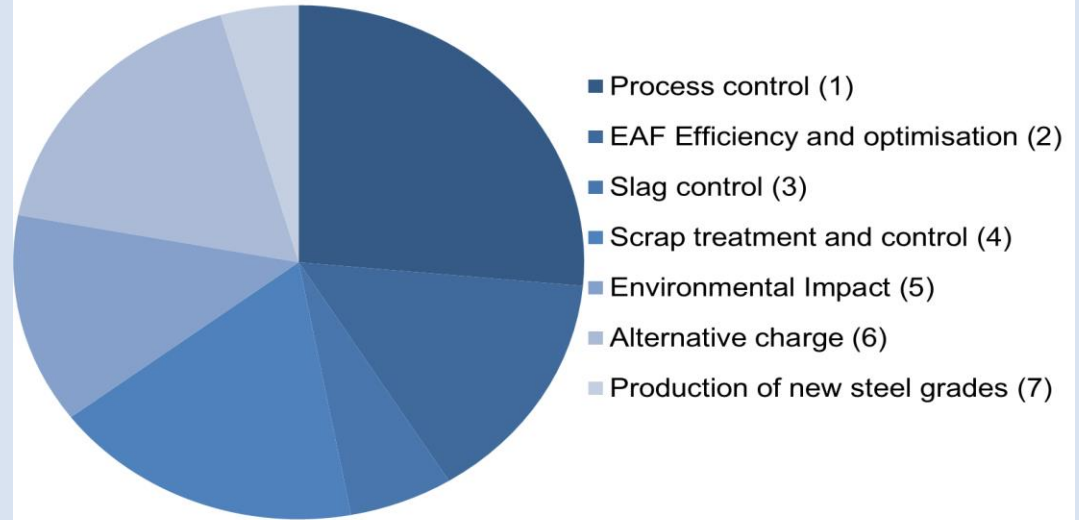
7) Production of new steel grades

- High Mn steel (ultra high strength steel grades)

Type of project



Project topics



Event	When	Where	Subject
Seminar 1	Nov 7, 2014	Uni Tor Vergata Rome	Advanced modelling
Seminar 2	April 9, 2015	Milan	Energy efficiency and environment
Seminar 3	April 23, 2015	RWTH Aachen	Energy and resource efficiency
Seminar 4	June 3-4, 2015	Stockholm	Scrap control
Seminar 5	June 19, 2015	BFI Düsseldorf	Sensor technology
Seminar 6	Sep 24, 2015	Steelsim Bardolino	Model-based control
Workshop 1	March 12, 2015	CSM Dalmine	State of the Art

All presentations can be found on the VALEAF web site:

http://www.c-s-m.it/en/about_us/project_financing/european_projects/valeaf.html

Introduction

10:00 Welcome to Stahl-Zentrum and BFI

10:15 VALEAF Project Features - BFI

Presentation and Discussion of selected EAF topics

10:30 Advanced modelling - CSM

11:15 Coffee break

11:30 Sustainability - RWTH (Energy and resource efficiency, environment)

12:30 Lunch break

13:15 Scrap control – Swerea Mefos

14:00 Sensor technology - BFI

14:45 Model-based process control - BFI

15:30 Final Discussion and Conclusions - BFI

16:00 End of the event

**This is the last event within
the dissemination program:**



Workshop concerning the definition of a Road map for future EAF technology

A fruitful discussion and hints are expected and welcome !

Also further feedback after the event via E-mail !