New Designs of Ecological Furnaces

Informe

Información del proyecto

EDEFU

Identificador del acuerdo de subvención: 246335

Sitio web del proyecto

Proyecto cerrado

Fecha de inicio
1 Junio 2010

Fecha de finalización
31 Mayo 2014

Financiado con arreglo a
Specific Programme "Cooperation": Nanosciences, Nanotechnologies, Materials and new Production Technologies

Coste total
€ 13 118 250,71

Aportación de la UE
€ 8 400 000,00

Coordinado por
FUNDACION TECNALIA RESEARCH & INNOVATION
Spain

Este proyecto figura en...

Final Report Summary - EDEFU (New Designs of Ecological Furnaces)

Executive Summary:
The overall objective of the proposed project is to develop New Ecological Furnaces Designs addressing the needs of the Energy Intensive Industries such as foundries, glass, ceramics and cement. These designs have been developed with the double aim to increase the furnace's energy efficiency and cost efficiency.
The EDEFU project has proposed an integrated approach to overall optimisation of the furnace operating conditions and process management along with highly innovative breakthrough in heating technologies and insulation designs, significantly contributing to a reduction in the energy waste and the environmental footprint while increasing the competitiveness of such designed systems.

The EDEFU goals are:
• Develop integrated hybrid heating systems.
• 20% energy efficiency increase.
• Set up new insulation designs.
• Develop new energy and waste recovery systems.
• Validate developed concepts on industrial level.
• Reduction of emissions of CO2 and other greenhouse gases higher than 20%.
• Feedstock savings higher than 20%.
• Operating cost reduction of at least 10% and productivity increase of at least 10%.

As described in present Final Report, all main objectives of the project have been achieved.

Project Context and Objectives:
Non ferrous metals, cement, ceramics and glass industries require high consumption of natural resources and energy, they also produce huge amount of waste and emissions. The processes involved in these Energy Intensive Industries (EII) share a common step where raw materialsare heated in industrial furnaces to obtain a subsequently treated product.Traditional furnaces were initially designed and manufactured to be heated by coal or coke and the concept evolution has driven the newest furnaces to mostly be heated by gas or electricity resources such as:

electrical arc, induction, reverberatory and crucible furnaces . However, these furnaces are still very high resources and energy demanding:
EDEFU targeted sectors

Aluminium
Cement
Glass
Ceramic (tiles
& refractory)
Production
In the non ferrous metals, glass, cement and ceramic industries, furnaces represent capital intensive investments (payback times from 2*3 years for ceram
ics/aluminium to 20 years for glass/cement) and are at the core of the process. Most of the energy consumed by these furnaces is used to heat the raw material s up to the corresponding melting points (from ~700°C for an aluminium furnace to ~1600°C for a glass furnace). From this energy used during the heating process, up to 50% (for aluminium & glass furnaces) is lost via heat transfers and fuel waste.
The cost of energy (electricity, gas) in Europe is higher than in other competing industries (US, China) and the European EII face the competition of merging and developing countries that are able to produce goods with more competitive prices. Therefore, to remain competitive in producing metals, glass, cement and ceramics while complying with stringent environmental regulations (CO_2 abatement, particles releases...) new furnaces developments are required.

Objectives of EDEFU PROJECT
The overall objective of the proposed project is to develop New Ecological Furnaces Designs addressing the needs of the Energy Intensive Industries
such as non ferrous metals, glass, ceramics and cement.
These designs will be developed with the double aim to increase the (i) furnace's energy efficiency and (ii) cost efficiency.
Moreover, addressing the four Industrial Sectors targeted, following specific objectives in terms of energy efficiency and environmental efficiency have been proposed:
Non ferrous industry (Aluminium melting):
According to the BAT Value for the melting consumption for aluminium, EDEFU will target a consumption in the new furnaces developed below 0,45 Kwh/kg for me lting aluminium ingots. In the following table are summarized the values of the different kind of existing furnaces in the industry.
Rest of Energy Intensive Industries involved in the projects (Glass, Cement & Ceramic)
In this case, for every sector the BAT Value has be en set as the objective for the consumption of the Edefu furnace in every case.

Project Results:
Overview of the progress of the work in line with the structure of Annex I to the Grant Agreement

New Heating Systems (WP3).

• Successful development of innovative heating technologies for different sectors.

• Successful hybridizing of heating technologies. Target of EDEFU.

New refractory materials (WP4).

• Development of nano-reinforced refractories and of CNT reinforced refractories.
• Conclusions on laser sintering of new refractories.

Recovery Systems (WP5).

• Developments in design of new recovery systems integration.
• Developments in new furnace cleaning system based on the laser technology and the use of new storage temperature materials with Phase Change Materials.

Furnace Model and Design (WP6).

• Developing and simulating conditions of the melting and holding operations processes.
• Thermal simulation of the holding operation for the aluminium industry.
• Biomass heating systems in cement kilns.

Demonstrator and Prototypes (WP7).

• Construction and set-up of aluminium industrial furnace demonstrator.
• Construction and set-up of glass and ceramic furnace prototypes.
• Theoretical and techno-economic assessment of cement furnace prototype based on biomass gasification using plasma heating.

Furnace Validations (WP8)
• Industrial and scientific validation of the demonstrators and prototypes.

According to the Work Plan accepted in the Dow, following table summarizes the evolution carried out in different technologies in EDEFU project.

Main Conclusions related to Heating Systems.

After full techno-economic assessment of the involved technologies, their high potential applicability at aluminium, glass, ceramic and cement sector’s furnaces has been demonstrated. There are influencing benefits related to CO2 trading system and new production opportunities and improvements for developed processes and furnaces.

Developed heating systems and hybridization of these technologies at furnace demonstrator and prototypes fulfil the objectives of the EDEFU project. In the same way the aim of the project is the substitution of fossil fuels increasing the application of energy efficiency heating technologies and get a reduction of fossil CO2 emissions. In this way, all heating technologies developed in EDEFU project allow the use of renewable energy sources for selected energy intensive industry sectors.

Main Conclusions related to Insulating Systems and Refractory Developments.

A new refractory castable has been developed that fulfills the WP4 target (Thermal conductivity<1W/mK) and that can be applied in Aluminium furnaces. This refractory has been validated in the final melting prototype (TRL7) confirming its improved insulation properties and heat storage capacity comparing to a commercial grade. The economic viability of the material has also been validated since the extracost of adding nano particles keeps the price of the material still in the market price range. This product will be industrially manufactured by KELSEN to enter the market.

Main Conclusions and Highlights of Most Significant Results related to Recovery Systems.

The analysis covered systems producing heat in the form of saturated steam for processes, or hot water, and systems producing electricity using microturbines (small steam turbines). It also considered PCM systems, mainly heat storage systems for producing continuous saturated steam from a highly variable flue gas flow.

Main Conclusions and Highlights of Most Significant Results Related to Furnace Model Design.

The summary of the results of the model design tasks carried out at EDEFU are described below:

• Developing and simulating conditions of the melting and holding operations processes.
• Thermal simulation of the holding operation for the aluminium industry.
• Biomass heating systems in cement kilns.
• Design and manufacturing prototype for glass industry.
• Design and manufacturing MW-radiant test prototype furnace.
• Design and manufacturing initial prototype of holding furnace for aluminium industry.
• Results analysis between aluminium holding prototype and simulations.
• Design of the melting/holding furnace for aluminium industry.

Main Conclusions and Highlights of Most Significant Results for Prototypes Construction and Validation.

The main output of the project is a real scale demonstrator furnace for Aluminium. In addition, a small scale glass, ceramic and cement furnace prototypes have been set-up with the aim to be as representative as possible of the thermo-physical phenomena occurring in a real scale one.

So the prototypes validation of developed furnace construction methodology is based on:

• An Aluminum melting and holding demonstrator manufactured by TECNALIA, CERAPRO and KROWN. Two separate units in industrial scale. One unit for melting Aluminum with innovative HPTP (High Power Thermal Plasma) plasma technology and one unit with and revolutionary heating system for warm holding operation. Both units have been installed and tested in FAG aluminium foundry for industrial validation.

• A glass melting prototype using innovative microwave technology for small scale glass melting is built

and tested at SAIREM with VIDRALA support.

• A commercial development furnace (CARBOLITE) using innovative microwave technology to support the firing process and shorten the cycle time by shorting the down cooling phase has been tested at C-TECH with JIESIA support.

• Techno-economic feasibility assessment of plasma heating biomass gasification for cement production based on small scale plasma torch prototype site at TECNALIA with CEMEX and VDZ support.

Potential Impact:
The EDEFU project has addressed the need for greater energy efficiency in Energy Intensive Industries in a multi-faceted way, by developing innovative heating systems, refractory and gradient materials, and heat recovery systems, and integrating these improvements into new furnace designs.
These designs have been applied to four furnace categories: aluminium, ceramics, glass and cement.
The results developed in the project can be exploited at two levels:
• As complete, innovative furnaces offering improved efficiency and performance
• Individually or in a modular way, since implementing a new component (e.g. the refractory material developped) does not always mean that a new design is required.

The individual applicability of results lowers the risk of the exploitation of results and creates additional opportunities.
Apart of the use of the results in an integrated way, as part of the innovative furnace, they can in most cases be also exploited individually or in a modular way. Changing the heating system or the refractory material does not always mean that a new design is required. This individual applicability lowers the risk of the project and creates additional opportunities.
Furthermore, the applicability of the results goes beyond the furnaces developed in the project, as the technologies can be used in other operations such as high-pressure die casting, gravity casting or continuous casting. They can be also used for recycling, and other industries. Individual results can also take the form of services, such as the assessment services carried out by CIRCE.
According to the activities defined for the project, and the demonstrators that have been validated, the degree of maturity of each of the four furnaces has been different at the end of the project:

1) Aluminium furnace:
The demonstrator of the aluminium furnace has been the largest scale prototype of the project, as it is a real scale furnace, integrating most of the EDEFU developments (new heating sources, insulation designs, and energy consumption optimisation systems)
This Demonstrator has been working for several months, during which the technologies have been validated. However, the prototype will require at least one year after demonstration for final testing and implementation. Therefore, the consortium has to gauge the commitment of the partners that has been involved in the task, for future collaboration, and to negotiate the conditions of future collaboration in the context of no EC funding. The interest of the end user, INDALCASTING, is clear, as they intend to implement this technology in all its furnaces if the furnace meets their requirements. Tests and trials carried out in the project show an estimated energy efficiency improvement for the furnace prototype of about 20-30% for holding process and over 30-40% for the melting of aluminium. The developed furnace

prototype has been designed to compete and replace a process of gas fired melting tower with transfer to an electric resistance heating holding furnace.
Taking average electricity and natural gas costs for the industry at different European countries from “www.energy.eu” we obtain following values:
• Average cost of electricity for industrial use: €0.095 €/kWh.
• Average cost of natural gas for industrial use: 0,048 €/kWh.

At holding process the energy efficiency can directly transfer to economic improvement, because in both processes the energy source is electricity. However, developed melting technology is more energy efficient, but the economic cost of the energy is at the moment about 7 €/t higher in the developed technology. Nevertheless, developed furnace prototype has a more efficient lay-out which allows reducing temperatures and minimizes transfer heat losses, so it is expected that the prototype will demonstrate that the whole melting and holding process is more energy efficient without increasing the energy cost for the industry. Preliminary trials show that prototype saves 50 Kg of CO2 per ton of aluminium. 10,000 ton/year production foundry will miminize the GHG emissions in about 500 t of CO2 /year.
On the other hand TECNALIA has recently created a new technology based company to exploit the plasma technology ILT Plasma Technologies will improve foundry quality, energy performance and productivity of the facilities through an innovative heating system.
The activity of ILT Plasma Technologies will focus on the manufacturing, adaptation, commercialization and implementation of plasma facilities in the foundry sector, with an estimated global potential market of 1,600 million euros. It is a Company which is born with the potential of becoming a leading international SME in a determined market niche and rooted in the local industrial fabric which foresees an annual turnover of 2.4 million in its fourth year.
ILT Plasma Technologies will develop, manufacture and commercialize equipment based on the, PLASMAPOUR® Technology: High Power Thermal Plasma technology for foundry processes (a process based on a technology developed and protected by the Industry and transport Division of TECNALIA). This means the confirmation and consolidation of the benefits of the 15 years of industrial developments and the future expectations within the scope of the plasma technologies.
It is also remarkable the role TECNALIA Ventures has developed to get the agreements with the industrial partners: INSERTEC and LORAMENDI for the constitution of ILT Plasma Technologies, and to accelerate its incubation process.

2) Glass:
The use of microwave technology represents a breakthrough innovation in the glass furnace industry. The challenges ahead are commensurate to the degree of innovation. The prototype developed during the project has been a small scale prototype of the glass melting furnace. Given the large dimensions of a real glass furnace, a small scale prototype makes possible to represent of the thermo-physical phenomena occurring in a real scale one, while lowering the risks. The glass oven design has two sections. First the melting of prime material (glass pellets) and the second fining process that means glass quality purification. These calculations as well as primary tests (in a laboratory microwave oven) were carried out by Tecnalia, and Sairem Ibérica, with the important collaboration as advisor and prime material supplier from Vidrala (End user). This calculation and design was approved in several meetings between Tecnalia, Vidrala and Sairem Iberica. The maturity of this result has been lower, as there are several aspects that need to be taken into account:

• The technology will need to be scaled up, which may raise unexpected challenges
• A complete set of process parameters will need to be defined, not only at technical but also at operational level.
At least 2-3 years of development will be needed after the end of the project. VIDRALA has the intention of implementing the furnaces across the group if the electricity cost is favorable. This would take place in a gradual fashion, taking into account that furnaces are replaced after the end of their lifetime (implementation may take 10 years).

3) Ceramics:
The key issue in the project has been to find the right dimensions and parameters of the furnace, which can be competitive against the incumbent technology. The consortium has been working out a way to test the technology with a single design, therefore optimizing the resources available. For the energy efficient processing of ceramics, a design for a MW-assisted furnace is required. In the EDEFU project the target ceramic is fine bone china. The Manufacturing end-user in the project has been UAB “KAUNO JIESIA” based in Lithuania.
The target aim of the ceramics section of the EDEFU project has been to demonstrate the use of MW-assisted firing to accelerate the firing of the fine bone china ceramic parts, using less time and energy in the process.

4) Cement
The development here has been of exploratory nature, and the outcome of the project will be a yes/no, in terms of knowing if the process if viable for implementation in cement kilns. After full assessment of the technology and the design of the prototype furnace for biomass gasification using HPTP plasma torch as heating device the potential of the technology has been demonstrated. CO2 emissions can be reduced by average 10 % as good gasification performance of the process is energy efficient, but based on the assumed increase of the electricity demand an economic benefit is not given. As well as the high investment ratio of the prototype, the fact that final product cost is increased makes that NPV (Net Present Value) is always negative, higher than the investment indeed. The IRR (Internal Rate of Return) and the NPV values makes the investment completely rejectable by end user’s financial departments at the moment.
The sensitivity analysis of the input cost values show that is not expected any change that benefits the investment in short-medium term assessment. There are influencing benefits related to CO2 trading system and the availability of new
high quality alternative fuels (obtained from low quality ones), but as is described in the sections before, the investment costs, and, above all, the high increase in direct costs associated to the final product make the project un approachable at the moment.
Main Conclusions and Highlights of Most Significant Results for Prototypes Construction and Validation.

A key issue in the project is the techno-economic impact, or how the technical specifications of the furnace influence the cost profile of the furnace, both in terms of acquisition and operation/lifecycle.
The main output of the project is a real scale demonstrator furnace for Aluminium. In addition, a small scale glass, ceramic and cement furnace prototypes have been set-up with the aim to be as representative as possible of the thermo-physical phenomena occurring in a real scale one.
After full techno-economic assessment of the involved technologies and the design of the prototype

furnaces for glass, ceramic and aluminium foundry industries, the potential of the developed technologies and furnaces have been demonstrated. There are influencing benefits related to CO2 trading system and new production opportunities and improvements for developed processes and furnaces.
For ceramic industry, the potential energy costs and CO2 savings for a typical biscuit firing are potentially considerable by using a MW assisted process. While 50% is estimated to be the maximum potential energy saving, the potential reduction of the cycle time per batch offers additional savings as a single furnace may be used more efficiently. These estimates will be further validated using the Carbolite 20L prototype in order to provide more accurate data for the potential energy savings for the ceramics processes.
For aluminium foundry process CO2 emissions can be reduced by average above 20% as good performance furnace is energy efficient, but based on the assumed increase of the electricity demand and so, economic benefit has to be demonstrated with the operation of the prototype in industrial conditions. More efficient melting process, lower transfer temperatures and minimized heat losses should make the process more energy efficient without sensible increase in the energy costs, or reducing these costs indeed.
Preliminary analysis of IRR (Internal Rate of Return) and the NPV values can make the investment interesting for end user's financial departments. The sensitivity analysis of the input cost values show that is not expected any change in short-medium term assessment.
The furnace prototype development is fulfilling main objectives in its entirety according to the experimental results obtained in the trials carried out for hybridizing heating technologies in the design of innovative furnaces. Industrial end users have big expectation on developed technologies.

The exploitable interest of the partners were defined on a more accurate way and assessing priorities regarding the marketability and their dissemination. This drove to the following results:
• OPIS (One Pc Insert Solution) ceramic container based on SiC ceramic for Al holding furnaces (CERAPRO + IFAM) Design and manufacturing of a new improved warm holding furnace with low mas construction and higher power output. (Patent requested
• ILT firm to develop plasma technologies for the foundry industry started in April 2014 (TECNALIA) http://www.iltplasma.com/ Patent requested
• Innovative alumina dense refractory castable w/ improved insulation properties. (KELSEN) Industrial manufacture ready for Market. Commercial name: KELAL ZR. Starting trials in potential customers. (Know –how of KELSEN, no patent).
• CEMENT: Biomass gasification via plasma in combination with a cement plant seems technical feasible Further reseacrh adn investment is required.
• GLASS: MW–melting process (SAIREM) Industry interest; futher industrial validation is demanded to take it to the market. (patent requested).

• Economic analysis of implementing recovery systems
o Makes sense with long enough operation time (> 3000 h/year)
- Long ROI (> 5 years) but :
- Energy costs will continue to rise !
- Power from Waste Heat recovery is usually less expensive than Solar energy
- Can be compulsory in the future (e.g. ORC in cement units)
• PROCESS INTEGRATION AND EXERGY ANALYSIS (CIRCE)

A general methodology to analyze which is the best solution to recovery heat by means of integration of several technologies (optimization tool)
• ENERGY, ECONOMIC AND ENVIRONMENTAL ANALYSIS (CIRCE)
o Industrial processes to environmental value stream mapping
o Product manufacturing to Environmental Product Declaration (EDP) / Eco labelling

DISSEMINATION ACTIVITIES
Dissemination activities have been tailored in such a way to reach the audiences most efficiently through appropriately selected dissemination channels and dissemination tools.
Dissemination within the EDEFU partners (Internal Dissemination)
Partners´ organizations have been important for dissemination for two reasons. First they are potential users of EDEFU project results themselves and at second they represent “influencers” because of their huge impact on the associated industrial sectors.
Particularly EDEFU consortium partners comprise important market players in various segments and this constitutes a natural channel for the dissemination of the project and its result to other potential users. In this respect, the dissemination activities have relied on the effort and the possibility of each partner in exploiting opportunities to present project and its result. Therefore, it is important to communicate information about EDEFU project and its results to partners’ management, consultants and people responsible for their marketing and sales. Additionally it is necessary to encourage them to share this information further to their customers and business partners.
Dissemination beyond the EDEFU partners (External Dissemination)

In order to structure the external dissemination activities in the dissemination plan and to be able to analyze the impact of dissemination on a comparable basis a more accurate division of the target audience was developed in the following Table 1:
Table 1 Segmentation of EDEFU external audience
Type of audience Motivations
Academic and research community
This group targets all research communities interested in the EDEFU project’s developments, results and innovation, which can be beneficiary for their own research activities.

Non ferrous metals
• Furnaces International. ISSN 1740-6501 Foundry. Trade Journal International. ISSN 1758-9789
• Fonderie. Fondeur d'aujourd'hui. ISSN: 0249-3136
• Modern Casting. A publication of the American Foundry Society. ISSN: 0026-7562
• Casting; plant and technology. ISSN: 0935-7262

Glass and ceramics
• Journal of the European Ceramic Society. ISSN: 0955-2219
• Ceramic Engineering and Science Proceedings. ISSN: 0196-6219
• Journal of Manufacturing Processes ISSN: 1526-6125
•
Cement
• Cement and concrete composite. ISSN: 0958-9465

• Cement and concrete research. ISSN 0008-8846

In the section 4 of this document is included a list of oncoming events wich maybe of the interest of the partners. In addition the partners are asked to suggest and address other events not mentioned.
In the section 2 of this document may be found a list of the already presented publications, together with a suggested list of sectorial publications.
Partners are asked to suggest any other within the template of the annex I
Industrial sector, Professional Associations and Technolgy platforms A major objective of EDEFU is to address and trigger the active involvement of industrial and user communities. EDEFU is of utmost relevance for organizations in various industry verticals. EDEFU has already attracted stakeholders from various industrial sectors:
– CEMBUREAU- European Cement association
– FEVE: The Euroepan Container Glass Federation
– CERAME.UNIE: European Ceramic Industries
– EUROMETAUX- European Association of Non Ferrous Metals
– EII Alliance
– European Lime Association
– Standing Committee of the European Glass Industries
– European Association of Metals, Euromines,
– European Cement Association,
– Committee de Liaison des Industries de Ferro-Alliages
– Liaison Office of the European Ceramic Industries

In addition the involvement of these stakeholders enhances the marketability and explotaition of the results of the project
Partners are asked to suggest any other within the template of the annex I
EU projects working in similar domain The participation of project partners in other relevant projects offers the opportunity for establishment of quick links among parties through common participants.
Media and public community the EDEFU website will be used as an effective communication tool for the general audience.
The service of the EC service Cordis WIRE https://cordis.europa.eu/wire/index.cfm will be used to spread news and events.
In the section 6 is described the use of social media

The Dissemination Manager is the central contact point for external communication. The contact details to be currently mentioned are:
José Luis Vadillo
jlvadillo@fcirce.es
Mobile.: +34 672 33 40 85
The following results are suitable for dissemination by articles, papers and abstracts.
• Plasma heating systmes for aluminium TECNALIA, CIRCE; GIS, INDAL
• Plasma and / or biomass gassification heating for Cement: TECNALIA, CIRCE, CEMEX, VdZ
• MW and Induction heating systems for glass: TECNALIA, SAIREM, VIDRALA
• Radiant heating systems for ceramics: CARBOLITE, C-TECH.

• High performance resistance: CERA-PRO
• Composites and nano fibres for refractories: KELSEN, KELSEN, CIRCE, TECNALIA, ICMCB, MS5
• Laser Treatment for refractories: LZH, KELSEN
• Characterizarion and definiton of nano –estructured materials: KELSEN, CIRCE, TECNALIA, ICMCB, MS5
• PCM for energy recovery: BERTIN, TECNALIA, CIRCE
• Waste heat and energy recovery: CIRCE, BERTIN.
• Aluminium furnace design GIS, TECNALIA, CERA-PRO
• Glass furnace design: TECNALIA, SAIREM, VIDRALA
• Ceramic furnace design: CARBOLITE, C-TECH
• Energy and enviromental studies and characterization: CIRCE.

Leaflet
One of the main actions carried out for EDEFU's dissemination will be the elaboration of a leaflet containing data about the project.
As EDEFU addresses several industrial sectors, five leaflets have been created:
1. General leaflet: Data about the project: Funding, description, objectives, consortium composition etc.
2. General leaflet + specific information and results about the cement sector
3. General leaflet + specific information and results about the glass sector
4. General leaflet + specific information and results about the aluminium sector
5. General leaflet + specific information and results about the ceramic sector

The specific data about each one of the sectors has been requested to the main partners working at them, as they will have an easier access to that short of information. This has bene done according the following structure:
Cement sector: CEMEX + VDZ.
Glass sector: VIDRALA + SAIREM
Aluminium sector: INDALCASTING + GIS
Ceramic sector: KAUNO + CERAPRO + C-tech

Web and news
Following address of the EDEFU website have been created and used during the project lifetime for disseminating the main information about the project and the partners contact details:

www.edefu.eu

The project website additionally include:

• Other news they consider relevant for the project's consortium:
• Upcoming relevant events related to the project's topic
• Relevant stakeholders suitable to become part of the newsletter audience.
Social Network
The growing use of social networks is leading companies to include these means into their communication channels, adapting their strategies of communication to the changes of social behaviour. Therefore, one of

the dissemination actions proposed by this plan is the use of social networks, specifically Twitter. Twitter allows users to post comments of 140 characters maximum and to include pictures, links, videos etc. The selection of this social network has been made by several reasons according to its characteristics:
• Free of charge: this characteristic is shared with the rest of social networks, but it is important to remark that this is a powerful free-of-cost tool that can be use for dissemination actions
• Highly dynamic: It's easy to post, to share other's comments and to know what other people are talking about
• Public domain: Differing from Facebook or Linkedin, a Twitter account is not necessary to see what is happening within the social network.
• Availability: Some centres of the project already own this social network. The following chart represents a preliminary analysis of the institutions that operate the social network and their username. In addition, some researches own an account themselves and can post information about the project as well, multiplying the dissemination effect.

Company Availability Twitter account Company Availability Twitter account
BERTIN TECHNOLOGIES V @BertinTechnolog TECNALIA v @TECNALIA
CARBOLITE X CIRCE V @fcirce
LZH V @LZH_Hannover FRAUNHOFER V @FraunhoferSIT several accounts
CEMEX V @CEMEX CNRS V @CNRS
several accounts
JIESIA X INDAL CASTING X
C-TECH V @CTechInnovation VIDRALA V @Vidrala_Group
VDZ X MARION X
GRUPO CALCINOR X CERAPRO X
SAIREM X GIS X
In the following table may be found the tracking of the dissemination activities and the responsible partner. Most of them have addressed the results coming in the last part of the project, thus are not yet published in proceedings or reviews.

Table 1 publications

Organisation of a technical/ industrial workshop
At 22th May 2014 was held the Technical workshop of the project EDEFU. The Workshop was designed attending to the industrial results and to pave the way for exploitation of the results. The event was organized by CIRCE and TECNLIA.
These were the contents of the workshop:
SECTORIAL results
• Aluminium sector: Hybridation Heating technologies and improved nano-castabel refractories (KROWN, FAG, KELSEN)
• Biomass gasification in the cement clinker production. (CEMEX, VDZ)
• ceramic sector: MW-Assisted Processing for ceramics (C-TECH , JIESIA)
• glass sector MW production for specific series (SAIREM, VIDRALA)
Multisectorial results:
• OPIS Heating system (IFAM, CERAPRO)

• Plasma Technologies: Process integration and exergy analysis in intensive industry (TECNALIA)
• Environment, economic and energy assessment methodology for intensive industries. (CIRCE)
• Heat recovery technologies (CIRCE, BERTIN)

The attendance of the workshop was focused on the European industrial associations and sectorial platforms at European level.
Below is shown the list of the guest stakeholders, Who were sent the information and the results of the project.
• CEMBUREAU- European Cement association.
• FEVE: The Euroepan Container Glass Federation
• CERAME.UNIE: European Ceramic Industries
• EUROMETAUX- European Association of Non Ferrous Metals
• European Lime Association
• Glass alliance
• European Association of Metals, Euromines
• European Association of Metals, Euromines
• European Steel Technology Platform
• European Cooper Institute
• SPIRE
• European Factories of the Future Research Association
• European Engineerign Industries Asscocation
• European industrial insulation Foundation
• CEN
• European Aluminium association
• Europenan Foundry association
• The European Foundry equipment suppliers association
• European Technology platform for advanced materials and technologies
• Manufuture
• European Industrial Miinerals association
• Association of manufacturing glass for construction
• Association of manufacturing glass for construction
• European Steel association
• European Expanded clay association
• Energy Efficiency in Industrial Processes
• Association of European ferro-alloy producers.
• International federation of industrial energy consumers
• European Construction Technology Platform (ECTP)
• EUREC
• Glass for Europe
• AGC company

Below are presented the media press used to spread the results of the project:

• ENERGY POST www.energypost.eu

• PLATTS http://www.platts.com/
• ENDS EUROPE http://www.endseurope.com/
• Revolve magazine http://www.revolve-magazine.com/home/
• European Voice http://www.europeanvoice.com
• The Parlamient magazine https://www.theparliamentmagazine.eu
• CORDIS WIRE:

Figure 3 EDEFU workshop event in CORDIS WIRE
The web-site developed and managed by TECNALIA has been updated regularly with news and information about the performance of the projetc

List of Websites:

Following address of the EDEFU website were more information about the project and the partners contact details can be looked up:

• www.edefu.eu
Coordinator: Ane Irazustabarrena
e-mail: ane.irazustabarrena@tecnalia.com
Scientific Responsible: David Eguizabal Landart
e-mail: david.eguizabal@tecnalia.com
Disseimation manager: Jose Luis Vadillo
e-mail: jlvadillo@fcirce.es

Documentos relacionados

final1-final-publishable-summary.pdf

Última actualización: 25 Mayo 2015

Permalink: https://cordis.europa.eu/project/id/246335/reporting/es