Cerame-Unie inventory of European research and innovation projects

This document brings together the information on research and innovation funded projects that are of high relevance to the ceramics industry. The document focusses on EU funded projects (Life+, SPIRE,...). Both ongoing projects and recently finalised projects are mentioned.

The following information was compiled with the help of CU members. It is to be considered as a living document and information on additional projects is always welcomed.

The main data provided in this document are:

- the acronym of the project and its full name;
- the project period;
- budget;
- funding programme;
- aim of the project;
- key ceramic partners and the countries involved;
- links to the project webpages.

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SILICOAT - Industrial implementation of processes to render RCS safer in manufacturing processes
**Ongoing projects**

**SPIRE funded projects**

**DREAM: Design for Resource and Energy efficiency in cerAMic kilns**

- **Start year:** 2016
- **End year:** 2019
- **Budget:** 5 076 105 €
- **Funding:** SPIRE

**Aim:** The DREAM project aims to design, develop and demonstrate a radically improved architecture for ceramic industrial furnaces, characterised by optimised energy consumption, reduced emissions, and lower operating costs compared to currently available technological solutions. This will be obtained by substantially enhancing specific furnace parts (control system, refractories, emissions abatement system) and by adding new modules and subsystems (CHP unit, heat pipes) to the current furnace architecture.

**Partners:** 10 partners from 4 countries, including:
- SACMI – Italy (project coordinator)
- RATH GMBH - Germany
- Mirage Granito Ceramico SPA - Italy
- Keraben Grupo SA - Spain

**Link:** [http://cordis.europa.eu/project/rcn/205615_en.html](http://cordis.europa.eu/project/rcn/205615_en.html)

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**DRYficiency - Waste Heat Recovery in Industrial Drying Processes**

- **Start year:** 2016
- **End year:** 2020
- **Budget:** 6 465 899 €
- **Funding:** SPIRE

**Aim:** The overall objective of the DRYficiency project is to lead energy-intensive sectors of the European manufacturing industry to high energy efficiency and a reduction of fossil carbon emissions by means of waste heat recovery to foster competitiveness, improve security of energy supply and guarantee sustainable production in Europe. The project addresses three sectors, namely brick, pet care/feed and food industry. The results are however of major relevance for a number of other energy-intensive industries such as e.g. pulp and paper industry. The key elements of the solution are two high temperature vapour compression heat pumps: a closed loop heat pump for air drying processes and an open loop heat pump for steam drying processes. The DRYficiency solution will be demonstrated under real production conditions in operational industrial drying processes in three leading European manufacturing companies from the pet food, food and brick industries.

**Partners:** 12 partners from 5 countries, including:
ETEKINA – Thermal energy recovery

Start year: 2017   End year: 2021
**Budget:** 5 507 380 €  **Funding:** SPIRE

ETEKINA is an EU funded research project aiming to recover 57-70% of the waste heat stream in energy intensive industries. ETEKINA stands for “heat pipE TECHnologies for INdustrial Applications” and officially started October 2017.

Ten companies and institutes from across Europe have joined forces to improve the energy performance of energy intensive processes. Their solution is based on heat exchanger technology (HPHE) using heat pipes for thermal recovery. As part of the project, three HPHE prototypes will be built and tested for three different production plants in the aluminium, steel and ceramics sectors. The different industrial environments produce different exhaust streams with different waste heat quantity and quality (chemical composition, different particles coming out along with the gases, temperature and pressure of the flue gases, ...), and provide different processes where the recovered heat might be utilized. The challenge: the recovery solution should be adapted increasing the overall efficiency and being cost-effective.

*Partners:* Atlas Concorde, Brunel University London, Econotherm, ESCI, Fagor Ederlan, IK4-Ikerlan, Insertec, Jožef Stefan Institute, SIJ Metal Ravne, Unimore

*Link:* [https://www.etekina.eu/](https://www.etekina.eu/)

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SHAREBOX: Secure Management Platform for Shared Process Resources

**Start year:** 2015   **End year:** 2019 (Duration: 48 months)
**Budget:** 6 000 000 €  **Funding:** SPIRE

**Aim:** SHAREBOX is funded under SPIRE-1-2014- Integrated Process Control. Sharebox will develop a secure platform for the flexible management of shared process resources that will provide plant operations and production managers with the robust and reliable information that they need in real-time in order to effectively and confidently share resources (plant, energy, water, residues, and recycled materials) with other companies in an optimum symbiotic eco-system. Industrial Symbiosis (IS) is the use by one company or sector of by-products, including energy, water, logistics and materials, from another.
Partners: 15 partners from 6 countries, including:
- Ceramic Industry Research Association (ITC-AICE) - Spain
- Keros Cerámica S.L. - Spain
- Kerafrit S.A. (KERAFRIT) - Spain

Links: [http://sharebox-project.eu/](http://sharebox-project.eu/)  
[http://sharebox-project.eu/partners/](http://sharebox-project.eu/partners/)

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**IbD: Intensified by Design® for the intensification of processes involving solids handling**

Start year: 2015  
End year: 2018 (Duration: 36 months)  
*Budget*: 11 billions €  
*Funding*: SPIRE

**Aim**: IbD is funded under SPIRE – 8 – 2015. IbD® will create a holistic platform for facilitating process intensification in processes in which solids are an intrinsic part, the cornerstone of which will be an intensified-by-design® (IbD). Through five IbD®- enabled industrial process intensification case studies, the project will develop and upgrade methods for the handling of solids in continuous production units based, on the one hand, on the intensification of currently existing processes and, on the other hand, through completely new approaches to the processing of solids. The IbD approach is hinged on the use of robust data about a process to ‘redesign’, modify, adapt and alter that process in a continuous, intensified system, and will be the new paradigm in the intensification of processes.

Partners: 22 partners from 8 countries, including:
- Euroatomizado, S.A. (EUROATOM) - Spain
- Ceramic Industry Research Association (ITC-AICE) - Spain
- MBN Nanomaterialia S.p.A.(MBN) - Italy
- Outotec Oyj (OUTOTEC) - Finland

Links: [http://ibd-project.eu/](http://ibd-project.eu/)  
[http://ibd-project.eu/partners/](http://ibd-project.eu/partners/)

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**Smartrec: Developing a standard modularised solution for flexible and adaptive integration of heat recovery and thermal storage capable of recovery and management of waste heat**

Start year: 2016  
End year: 2019  
*Budget*: 4 567 886 €  
*Funding*: SPIRE

**Aim**: Waste heat is a problem common to high temperature processing industries as a significantly underused resource, often due to challenges in economic heat valorisation. Secondary aluminium
recycling and ceramic processing were identified as key examples with economically recoverable waste heat. Several challenges are inherent; these processes are batch-based rather than continuous with corrosive particulate-laden flue gas over a wide temperature range. The Smartrec system meets these challenges by development of a standard, modular solution for integration of heat recovery with thermal storage that valorises medium to high grade waste heat, adaptable to different temperatures and industries. A knowledge-based tool will be developed containing all relevant Smartrec parameters and information to model the system fully and allow users to determine their requirements, potential benefits and integrate Smartrec into their own systems via an open access workshop hosted by the consortium.

**Partners:** 8 partners from 6 countries, including:
- Econotherm (UK) Limited - United Kingdom
- Ceramic Industry Research Association (ITC-AICE) - Spain

**Links:**

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**HARMONI**

**Start year:** TBC  
**End year:** 18 months after start date  
**Budget:** 70 000 €  
**Funding:** TBC

The HARMONI project has recently been approved by the European Commission and the starting date is expected to be October 2017. HARMONI is a CSA project with the aim of proposing solutions to regulatory bottlenecks and standardisation. A.SPIRE will have a role in identifying barriers and relevant SPIRE projects, and providing recommendations to “de bottleneck”. A.SPIRE is Leader of the Communication WP. The German Refractory Institute ECREF will be involved as a partner.

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**Life funded projects**

**HEART - Improved HEAt Recovery in clay roof Tiles and bricks production**

**Start year:** 2013  
**End year:** 2017  
**Budget:** 2 982 466 €  
**Funding:** Life

**Aim:** This project aims to demonstrate that it is possible to significantly reduce the natural gas consumption and the CO2 emissions of existing state-of-the-art clay roof tiles or bricks production unit. TERREAL proposes to improve the current state of the art by applying energy recovery systems from other industries to the clay manufacturing process, and by integrating them in order to operate in a stable and reliable way 24 hours / day and 7 days / week. TERREAL concluded from preliminary studies that the existing state of the art can be improved by transferring technologies from other industries,
and by integrating them into the clay manufacturing process: static exchanger and direct contact exchanger.

**Partners:** TERREAL - France

**Links:**

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**LIFE NanoCeramiCO2 - Climate Change Prevention by the inclusion of nanoparticles in clays for the reduction of Ceramic Industry CO2 emissions**

**Start year:** 2014  
**End year:** 2017  
**Budget:** 923 190 €  
**Funding:** Life

**Aim:** The project's main objective was to reduce natural gas consumption and carbon dioxide (CO2) emissions from the firing of ceramic materials in a factory producing bricks and roof tiles. This goal would be achieved through an innovative method that uses calcium carbonate (CaCO3) nanoparticles in raw materials, which enables the firing temperature to be reduced. The project would design and develop a prototype to produce calcium carbonate (CaCO3) nanoparticles and introduce them into the ceramic mass in order to obtain a homogeneous mixture. The project would test the firing of the mixture at semi-industrial and industrial scale.

**Partners:** 2 partners from Spain:
- ERABRICK (CERABRICK GRUPO CERÁMICO, S.A)
- Asociación para la Investigación y Desarrollo Industrial de los Recursos Naturales (AITEMIN)

**Links:**

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**LIFE_FERTILIFE – Agricultural Carbonic Fertilization with Ceramic Industry GEI Emissions**

**Start year:** 2015  
**End year:** 2018  
**Budget:** 1 047 073 €  
**Funding:** Life
**Aim:** LIFE14 CCM/ES/000311 is a project co-funded by European Union within LIFE Program Climate Change Mitigation. In the LIFE_FERTILIFE project, waste gases from the ceramic industry will be used in agriculture as an acidifier in irrigation water. The LIFE_FERTILIFE project aims to develop a prototype in which CO2 emissions from a ceramics factory will be captured and used to carbonate water that will be used to irrigate crops. The project will: 1. Demonstrate the feasibility of “carbonic fertigation” – the injection of carbon into an irrigation system – for citrus crops, and analyse the impact of the continued use of CO2 in the soil and plant irrigation network. 2. Design and implement techniques for proper CO2 dissolution in a drip irrigation system, and monitor the implementation of the system and its deployment on different plots. 3. Assess the impact of carbonic fertigation on root respiration, and thus on total soil organic matter content. 4. Quantify the impact of carbonic fertigation on the use of chelates and other fertilisers. The use of chelates (chemical compounds) in agriculture is necessary to help plants absorb trace elements such as iron from soils with high pH, as in the Mediterranean basin.

**Partners:** 4 partners from Spain, including:
- Asociación Española de Fabricantes de Azulejos y Pavimentos Cerámicos (ASCER)
- Ceramic Industry Research Association (ITC-AICE) - Spain

**Links:** [http://www.fertilife-project.eu/project/members/](http://www.fertilife-project.eu/project/members/)  

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**LIFE FOUNDRYTILE: Valorization of iron foundry sands and dust in the ceramic tile production process**

Start year: 2015 End year: 2018

**Budget:** 1 205 363 € **Funding:** Life

**Aim:** The LIFE FOUNDRYTILE project aims to demonstrate the valorisation of iron foundry sands and dust wastes in the ceramic tile production process, thus contributing to the implementation of Waste Framework Directive (2008/98/EC) and the goals of the Roadmap for a Resource-Efficient Europe. The new applications will have three main benefits: the preservation of natural resources, the increase in foundry waste valorisation and environmental footprint reduction. The innovation character is provided by the utilization of green and chemically bonded foundry dust and sand in tile production replacing natural products, clay (for red clay ceramic products) and sands (for white clay ceramic products). The demonstration character is provided by the pilot and industrial scale tests, to validate the environmental, technical and economic feasibility of foundry by products valorization in ceramic tiles production. The project results will be used to revise Best Available Techniques Reference Documents (BREFs) for both foundry and ceramic sectors (BREF codes SF and CER).

**Partners:** 5 partners from Spain, including:
- Asociación Española de Fabricantes de Azulejos y Pavimentos Cerámicos (ASCER)
Ceramic Industry Research Association (ITC-AICE) - Spain

Links: http://foundrytile.eu/project/members/

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**SILIFE – Production of Quartz Powders with Reduced Crystalline Silica Toxicity**

Start year: 2015  |  End year: 2019
Budget: 1 666 059 €  |  Funding: Life

*Aim:* Prolonged inhalation of crystalline silica particles can cause lung inflammation and the lung disease known as silicosis. It is used in many manufacturing industries such as the cement, ceramics, steel, glass, mineral wool, aggregates, mortar and concrete sectors. Although it is not possible to substitute crystalline silica in many of the sectors where it is used, it is possible to nullify its toxicity by treating it with certain substances. The main objective of the SILIFE project is to produce commercial quartz powders that have very little or zero RCS toxicity. This new coating technology would be replicable in any industry that uses separate dry quartz powders as raw materials. Specifically, the project aims to design a pilot plant for the treatment of commercial quartz powders that has the capacity to treat 500 000 kg of quartz per year and demonstrate that the treated powders exhibit much less toxicity than the untreated quartz.

*Partners:* 10 partners from 3 countries, including:
- Esmalglass - Itaca – Spain
- Centro Ceramico (CC) – Italy

Links: http://www.silife-project.eu/

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**LIFE CERSUDS - Ceramic Sustainable Urban Drainage System**

Start year: 2016  |  End year: 2019
Budget: 1 817 972 €  |  Funding under: Life
**Aim:** The main objective of LIFE CERSUDS is to improve the resilience of cities to climate change and promote the use of green infrastructure in their urban planning as a means of managing surface water flooding. It aims to achieve this through the development and implementation of a demonstration low-carbon SUDS. The system will consist of an innovative permeable surface with a very low environmental impact, based on the use of tiles with low commercial value.

**Partners:** 6 partners from 3 countries:
- Trencadis de Sempre S.L - Spain
- CHM Obras e Infraestructuras S.A. - Spain
- Centro Tecnológico da Cerâmica e do Vidro - Portugal

**Link:**

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### Life HEROTILE Project

**Start year:** 2015  
**End year:** 2019  
**Budget:** 2,476,158 €  
**Funding:** Life

**Aim:** In order to help the EU construction sector (refurbishment and new constructions) to achieve its energy efficiency targets and related CO₂ emissions and to facilitate the global market uptake of an eco-innovative EU product able to help reaching these objectives, LIFE HEROTILE Project will develop:
- two new types of roof tiles (Marseillaise and Portuguese tiles) with a shape characterized by a higher air permeability through the overlap of the tiles, and then a better energy performance by passive disposal of the solar radiation through under-tile ventilation;
- a practical and simplified free-license software for architects and technicians – SENSAPIRO Software ENergy SAvings Pitched Roofs - that, as developed on the basis of experimental data, it will be able to predict the energy performance of the same building in changing only the roof configuration.

**Partners:** 6 partners from 3 countries, including:
- Italian National Association of Clay Bricks and Roofing Tiles Producers (ANDIL) – Italy
- Braas Monier Building Group – Germany
- Terreal – France

**Link:** [http://www.lifeherotile.eu/objectives/](http://www.lifeherotile.eu/objectives/)

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### ECONOMICK

**Start year:** 2016  
**End year:** 2019
The ECONOMICK project is about helping the European ceramic sector to reduce its environmental impact and improve its competitiveness by developing an innovative intermittent kiln that consumes about 45% less energy compared to those that are currently available. The innovative shuttle kiln that is being developed will have applications in the firing of sanitary ware, tableware and refractories. As well as energy savings, ECONOMIK is expected to result in reduced CO₂ and NOx emissions and reduced raw material consumption. ECONOMIK kilns are also expected to reduce operating costs and improve production flexibility.

**Partners:** The three company partners are: SETEC group, Life Cycle Engineering and Kerasan.

**Link:** [http://www.economick.eu](http://www.economick.eu)  

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### Horizon 2020 funded projects

**REMEB (Recycled Membrane Bioreactor)**  
**Start year:** 2015  
**End year:** 2018  
**Budget:** 2 361 622 €  
**Funding:** Horizon 2020

The REMEB project brings together 11 partners from seven different countries. The main objective of the REMEB project is the implementation and validation of a low cost recycled ceramic membrane bioreactor (MBR) for water reuse in municipal and industrial wastewater treatment plants.

Currently available MBRs using inorganic membranes tend to have high running and maintenance costs. The REMEB project proposes to develop a new type of MBR which will significantly decrease the cost of MBR technology. REMEB will use by-products from agro-industrial wastes (e.g. olive stones, hazelnut shells) and ceramic waste (chamotte) to develop the MBRs.

The REMEB project has partners in three countries: Spain, Italy and Turkey. The first stage of the project is taking place in Spain using chamotte, olive stones and waste from marble shaping and polishing. The membrane will then be replicated in Turkey and Italy using recycled materials and wastes that are available locally.

Validation of the technology will take place at a wastewater treatment plant in Aledo in the Murcia region of Spain, with the aim of using the water for irrigation purposes in this water scarce area.

**Partners:** FACSA, ITC-UJI, IMECA Process, ATLANTIS Consulting, BIOWATER, the Valencia Region Council of Chambers of Commerce, IPROMA, Centro Ceramico, SAM in Turkey, Antonio Ariño, University in Colombia and the Wastewater Management Entity of Murcia region and ESAMUR.

**Links:** [http://www.remeb-h2020.com](http://www.remeb-h2020.com)
The CLEANTECHBLOCK2 project is a project that is led by Gråsten Brickworks in Denmark to pursue an innovative building component that will create a systemic change with the construction market and recycling market in Europe. The project follows on from where the project CleanTechblock left off, and aims to finalise the technical development that started under CleanTechBlock. The intention is to then commercialise this product which is a patented multifunctional sandwich-block based on the combination of two clay brick shells and foamed recycled glass. It is hoped that this new building product will meet the market preferences for more environmentally friendly products, as well as make a positive contribution to the energy efficiency of buildings, while reducing the demand for raw materials.

The CleanTechBlock has demonstrated value for money and reduced labour time in the construction phase, on top of reduced transportation costs. As well as this, the sandwich-blocks offer an overall increase in the living areas of 3-5%, while also demonstrating compelling insulation properties.

CLEANTECHBLOCK2 is expected to result in an expected sales turnover of €67M and profits of €15M, 6 years after commercialization. The product is expected to be sold for both residential and non-residential construction and the primary target markets will be Denmark, Sweden and Germany.

The CLEANTECHBLOCK2 project will help the EU to achieve its energy and environmental policy objectives.

Partner: Graaten Teglvaerk A/S

Other funding programmes

**Cell3ditor**

Start year: 2016

**Budget:** 2 191 133 €

End year: 2019 (Duration: 42 months)

**Funding:** Fuel Cells and Hydrogen Joint Undertaking

**Aim:** A Solid Oxide Fuel Cell (SOFC) is a ceramic-based multilayer device that involves expensive and time-consuming multi-step manufacturing processes including tape casting, screen printing, firing, shaping and several high-temperature thermal treatments. The main goal of the Cell3Ditor project is the development of a 3D printing technology for the industrial production of SOFC stacks by covering research and innovation in all the stages of the industrial value chain. All-ceramic joint-free SOFC stacks with embedded fluidics and current collection will be fabricated in a two-step process (single-step printing and sintering) to reduce in energy, materials and assembly costs while simplifying the design for manufacturing and time to market. Compared to traditional ceramic processing, the Cell3Ditor manufacturing process presents a significantly shorter time to market (from years to months) and a cost reduction estimated in 63% with an initial investment below one third of an equivalent conventional manufacturing plant (production of 1000 units per year).
**Partners:** 8 partners from 6 countries, including:
- 3DCeram - France
- SAAN Energi AB - Sweden
- Francisco Albero, S.A. - Spain

**Links:** [http://www.cell3ditor.eu/about/](http://www.cell3ditor.eu/about/)

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**CRAM - towards a raw materials strategy for the European ceramic industry**

Start year: 2016  
End year: 2019 (Duration: 42 months)

**Budget:** -  
**Funding:** Strategic implementation plan

**Aim:** CRAM is aimed at providing data and information toward an industrial strategy for ceramic raw materials in Europe. A dual approach, by fostering an interplay between the knowledge on mineral/waste potential and that on ceramic technology, is needed to go beyond running EU projects in this field. It can help drawing some of the innovation paths in the next decade. Expected results: 1) identification of critical situations in raw materials supply (CRMs list from the ceramic industry viewpoint); 2) study of the ceramic raw materials flow in Europe; 3) technological classification of ceramic raw materials to support geological mapping and exploration; 4) industry-oriented definition of feasible alternatives (primary and secondary raw materials) to current key resources; 5) roadmap to new ceramic products and processes in function of the medium- to long-term availability of raw materials.

**Partners:** ISTEC-CNR Faenza (coordinator), Centro Ceramico Bologna, University of Modena & Reggio Emilia (Italy); University of Patras (Greece); Laboratório Nacional de Energia e Geologia, University of Aveiro (Portugal); AICE-ITC, Fundacion Innovarcilla, Instituto de Ciencias de la Construcción Eduardo Torroja, Instituto Geologico Minero de España, Malpesa, University of Granada, University of Jaén, University of Sevilla (Spain); SAM, Ceramic Research Center Eskişehir (Turkey)

**EUCERMAT: EUropean CERamic MATerials**

Start year: 2015  
End year: 2018 (Duration: 36 months)  
**Budget:** 359 897 €  
**Funding:** Erasmus+ Programme

**Aim:** EUCERMAT is co-funded by the Erasmus + programme. The project aims at changing the image of ceramics in Europe. The development and implementation of innovative practices to promote ceramic sciences to the community, civil society, high school students and teachers, parents, educators in general, ceramic industry staff, is thus a huge issue. The activities of the project aim to create a new methodology based on a relevant functioning of the knowledge triangle in the domain of ceramic material. Thus, the joint work of the partnership is seeking to create a common space where the interaction between research, education and innovation is optimised. To achieve these objectives the project is setting up various activities closely connected.

**Partners:** 13 partners from 8 countries, including:  
- Refractory Solutions Insertec SL – Spain  
- Porcelains of Costa Verde SA. – Portugal  
- European Ceramic Society (ECerS) – Belgium

**Links:**  
http://www.unilim.fr/eucermat/  

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**WINCER - Waste synergy in the production of INnovative CERamic tiles**

Start year: 2015  
End year: 2017  
**Budget:** 1 489 312 €  
**Funding:** Eco-innovation Initiative of the European Union

The WINCER project aims to develop innovative ceramic tiles made from over 70% recycled materials from urban and industrial wastes in substitution of natural raw materials. The project aims to recover soda lime glass cullet waste that is not currently being reused or recycled as glassware. This is expected to result in improved environmental performance by reducing the use of raw materials and reducing the maximum sintering temperature. These two changes are associated with reduced energy consumption and associated greenhouse gas emissions.

The tiles are expected to have similar or improved mechanical properties to traditional tiles.

**Partners:** Centro Ceramico, Minerali Industriali, Marazzi

**Links:** http://www.wincer-project.eu
Completed projects

Life funded projects

LIFE CERAM - Zero waste in ceramic tile manufacture

Start year: 2013  End year: 2016
Budget: 799 502 €  Funding: Life

*Aim:* LIFE12 ENV/ES/230-LIFE CERAM is a project co-funded by the European Commission. The project's main objective is to achieve zero-waste in the manufacture of ceramic tiles. To achieve this, it aims to develop a new ceramic tile product made out of ceramic manufacturing residues. The main objectives of the project are:

- Developing a new type of ceramic tile for outdoor application (urban paving) that can incorporate in the body and glaze high content of ceramic waste. Other energy-intensive process wastes (from power plants or glass manufacturing) will also be considered.
- Designing a highly sustainable body preparation process for manufacturing the above ceramic tiles, based on dry milling technologies, capable of recycling all type of ceramic wastes.

*Partners:* 5 partners from Spain, including:

- Ceramic Industry Research Association (ITC-AICE) - Spain
- Asociación Española de Fabricantes de Azulejos y Pavimentos Cerámicos (ASCER)
- Keros Cerámica, S. A.


LIFE ENVIP - New environmentally friendly forming technique of ceramic sanitary wares by isostatic pressing

Start year: 2013  End year: 2015
Budget: 1 791 078 €  Funding: Life

*Aim:* The LIFE ENVIP project aims to demonstrate an innovative application of a relatively new technology for reducing resource consumption in the manufacture of ceramic bathroom products. It thus hopes to contribute to a reduction of the environmental impact of the ceramic bathroom-ware sector. The project plans to construct a pre-industrial-scale prototype facility for forming ceramic bathroom products by isostatic pressing of atomised paste using fluid pressure – from a liquid or gas -
to modify materials. It will validate different ceramic paste compositions for the isostatic pressing process and identify the optimal conditions for the industrial forming process of bathroom products of different shapes and sizes, meeting required quality levels and technical specifications.

**Partners:** Roca Sanitario SA - Spain

**Links:**

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**LIFE SANITSER - Sanitaryware production: use of waste glass for saving energy and resources**

Start year: 2013 End year: 2017

*Budget*: 2 298 282 € *Funding*: Life

The objective of this project was to revise the production process in the ceramic sanitaryware sector by introducing glass cullet waste from urban waste disposal in ceramic blends for producing sanitaryware. Results are expected soon.

**Partners:** Minerali Industriali, Gemica, Setec and Life Cycle Engineering.

**Links:** http://www.sanitser.eu/en

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**FP6 funded projects**

**SILICERAM - Studies aiming at assisting legislation and encouraging continual improvement strategies in the field of respirable crystalline silica**

Start year: 2004 End year: 2007

*Budget*: 2 216 306 € *Funding*: FP6-SME

**Aim:** The overall aim of this project is to provide legislators with useful data for defining RCS in air limits. Setting a single low limit to encourage continual improvement, but allowing concessions based on proven reduced risks associated with certain RCS forms is seen as a possible way forward. The project was focused on different industries of the ceramic sector: tiles, tableware, sanitary ware, refractory, bricks and roofing tiles. The project team showed that the probability of crystalline silica penetrating into the lung depends on the size of the particle. Large particles are exhaled anyway. Mathematical modelling revealed that only a fraction of the particle size distribution at a certain exposure level of RCS actually reaches the inner lung. The results will enable a revision of the exposures experienced by workers. Together with the toxicity data developed for different forms of RCS,
concessions can then be proposed according to the types of material used and the manufacturing conditions.

**Partners:** 38 partners from 7 countries, including:

- British Ceramic Confederation - UK
- Confederation des Industries Ceramique de France - France
- Associacao Portuguesa da Industria de Ceramica – Portugal
- Arbeitsgemeinschaft Keramische industrie e.v. – Germany
- Bundesverband der Deutschen Ziegelindustrie – Germany
- Porvasal S.A. - Spain
- Refractarios Alfran S.A. – Spain
- Ceramic Industry Research Association (ITC-AICE) - Spain
- Centro Ceramico - Italy

**Links:**
- [http://www.keramverbaende.de/ez/medien/docs/siliceram_75dpi.pdf](http://www.keramverbaende.de/ez/medien/docs/siliceram_75dpi.pdf)

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**NOVACOAT - Replacement of conventional glaze on tiles and other high temperature processed materials with novel hybrid coating**

Start year: -  End year: -

**Budget:** -  **Funding:** FP6-SME

The NOVACOAT project investigated hybrid inorganic-organic low temperature coating technology for wall tile manufacturing.

The NOVACOAT consortium developed a nanocomposite coating as an alternative to the glaze layer in wall tile manufacturing. Various hybrid compositions were developed during the project and were tested for commercial suitability for use in bathrooms and kitchens. Durability was identified as a problem of the hybrid coatings as they did not achieve the desirable high chemical (alkali, acid) and abrasion resistance required.

In spite of not achieving these durability criteria, the project offered valuable opportunities to explore the design possibilities of hybrid coatings. A range of novel visual effects were demonstrated which cannot be obtained via high temperature firing, such as holograms, fluorescents, and a broader colour palette more generally.
**FP7 funded projects**

**INSYSME – INnovative SYStems for earthquake resistant Masonry Enclosures in R.C. buildings**

*Start year: 2013*  
*End year: 2016*  
*Budget: 2 697 131 €*  
*Funding: FP7*

**Aim:** The project aims at developing innovative systems for masonry enclosures, to be used for façades, envelopes and internal partitions of reinforced concrete framed buildings, to derive sound concepts for their analysis and to develop reliable, simple and efficient methods for their design in the everyday engineering practice. The final result and the impact of the project will be the effective integration of the new materials, techniques and methodologies in the construction practice, for increasing safety and quality of life. At the same time, the development of new masonry enclosure systems will increase, in a period of great crisis, the competitiveness of SMEs and Industry involved in the construction and clay masonry unit-manufacturing sector. The pre-normative research issues that will be tackled through the definition of performance requirements and design methods will increase the impact of Associations in the code evolution process, and will favour development of skills for designers and service providers.

**Partners:** 16 partners from 7 countries, including:
- Tiles and bricks Europe AISBL – Belgium
- Associacao portuguesa da industria de ceramica – Portugal
- Centro tecnologico da ceramica e do vidro - Portugal
- Arbeitsgemeinschaft mauerziegel imbundesverband der deutschen ziegelindustrie - Germany
- Associazione nazionale degli industriali dei laterizi - Italy

**Links:**  
[http://www.insysme.eu/](http://www.insysme.eu/)

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**ReStaR - Review and improvement of testing Standards for Refractory products**

*Start year: 2013*  
*End year: 2015*  
*Budget: 1 615 446 €*  
*Funding: FP7*

**Aim:** The central objective of this project is to increase the competitiveness of the European SME refractory producers. This will be archived by generating up-to-date EN testing standards as a save guidance for the producers. An extensive investigation of the current EN testing methods, designs of experiments and interlaboratory tests, more specifically collaborative tests, involving the major European refractory testing laboratories will be the key approach to attain this objective. For a successful review of the EN testing standards and an effective dissemination of the results, a strong and broad-based cooperation between transnational partners is planned. For this purpose, the European SME-AG for the refractory industry is involved and brings together the most active European
testing laboratories and SMEs to conduct a large scale and in-depth study of EN testing standards. On the basis of the expertise and results gained during the experimental investigations of the ReStaR project, drafts for revised testing standards and recommendations for the investigated EN testing standards were worked out.

**Partners:** 12 partners from 7 countries, including:
- Forschungsgemeinschaft Feuerfest e.V. – Germany
- Cerame-Unie – Belgium
- Fundacion ITMA - Spain
- Icar techniques and research materials refractory SA – France
- Institute of ceramics and building materials – Poland
- Centre de recherches de l’industrie Belge de la céramique – Belgium
- Lucideon Limited - UK
- RHI AG – Austria
- Calderys France - France
- Refractaria SA – Spain
- Settlements haasser refractory products SARL - France

[https://www.restar.eu/](https://www.restar.eu/)

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**SILICOAT - Industrial implementation of processes to render RCS safer in manufacturing processes**

Start year: 2011  
End year: 2014  
**Budget:** 1 552 203 €  
**Funding:** FP7-SME

**Aim:** The main objective of the present project is the industrial implementation of these treatments in the ceramic manufacturing processes, thus transforming the quartz-containing raw materials into intrinsically safe products. The characteristics of the ceramic companies and their manufacturing processes made them especially suitable candidates. Furthermore, the experience gained in these industries will help in developing general-purpose treatments. SILICOAT project has contributed a technically and economically feasible treatment to render the quartz used in the traditional ceramic industries intrinsically safe. In contrast with traditional measures of corrective nature, the SILICOAT treatment enables the RCS exposure risk to be addressed from its origin: the substance itself.

**Partners:** 11 partners from 4 countries:
- Ceramic Industry Research Association (ITC-AICE) - Spain
- Associacao Portuguesa da Industria de Ceramic – Portugal
- Ceramica Flaminia Spa - Spain

**Links:** [http://cordis.europa.eu/project/rcn/100961_en.html](http://cordis.europa.eu/project/rcn/100961_en.html)

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The European ceramic industry covers a wide range of products including abrasives, bricks & roof tiles, clay pipes, wall & floor tiles, refractories, sanitaryware, table- & ornamentalware, technical ceramics, expanded clay and porcelain enamel. The EU industry generates over 200,000 direct jobs and a production value of €25 billion.

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