

PLATFORM MEETING

L'esperienza dei Progetti LIFE per la sostenibilità ambientale
dell'industria Ceramica e dei Laterizi



Overview of LIFE projects in the ceramic sector

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Ceramic Industry in EU (I)

Data source and assumptions

- CERAME-UNIE: Annual Report 2015
 - CERAME-UNIE: 2050 Roadmap for ceramic industry (2012)
 - ACIMAC: World Production & Consumption of ceramic tiles (2016)
 - BREF on Ceramics (2008)
-
- Not all data from the same period/year
 - In some cases data only from specific sub-sectors
 - Only to provide a general picture

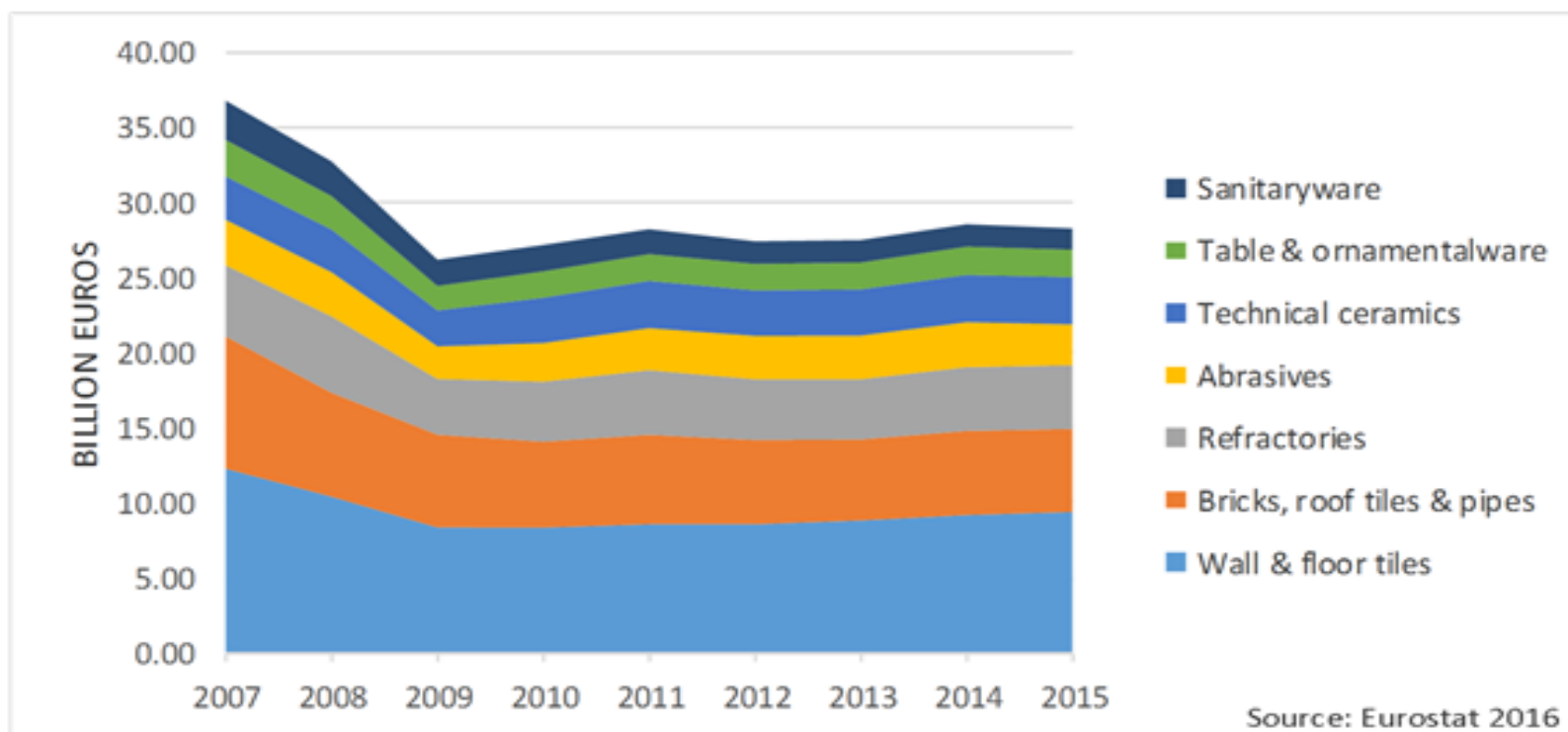
Ceramic Industry in EU (II)

Some numbers

- 8 main sub-sectors
- Yearly production value of about 30 billion €
- About 25% sold outside of the EU
- Net trade surplus of 4.4 billion €
- 200,000 direct jobs in all European regions
- 80% in SME (local jobs)
- High energy intensive sector (up to 30% energy costs)

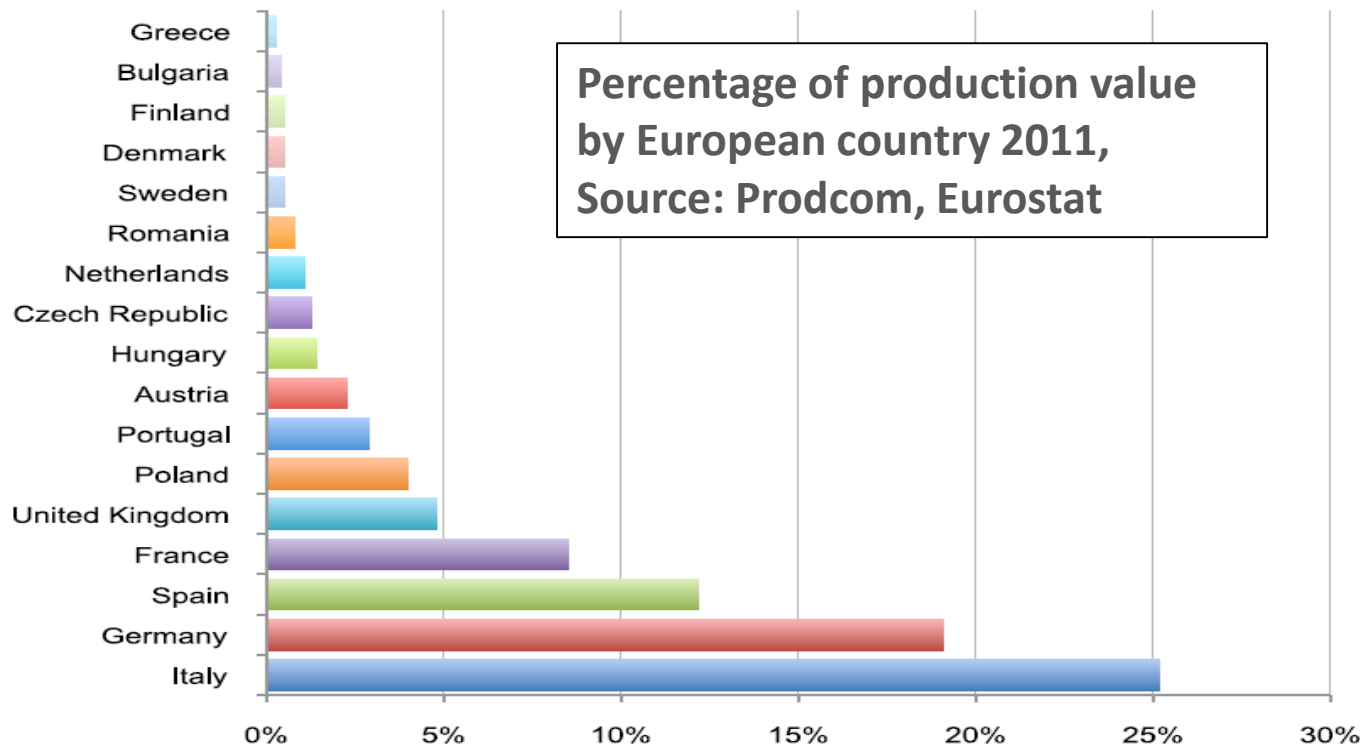
Ceramic Industry in EU (III)

Production value per sub-sector [CERAME-UNIE – Report 2015]



Ceramic Industry in EU (IV)

Production value by EU country [CERAME-UNIE – Roadmap 2050]



Ceramic Industry in EU (V)

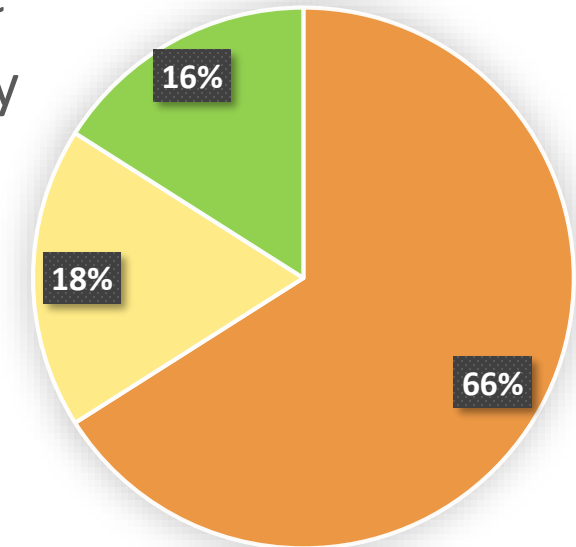
Energy consumption and emissions

- Firing is the most energy consuming phase
- Up to 30% of production costs from energy
- CO₂ emissions mainly from fuel

Share in production costs [wall & roof tiles – Cerame-Unie (2013)]

Energy	25% - 30%
Labour	25% - 30%
Raw materials	30% - 35%
Other production costs	10% - 15%

Emission shares [Roadmap 2050]



■ Fuel ■ Electricity ■ Process emissions

CO₂ emissions 2010:
bricks & roof + refractories + wall & floor
(90% of total ceramic industry emissions)

LIFE & Ceramics (I)

Data source

- Search from the LIFE programme database
 - Main keywords: **Ceramic Industry** & plain text ***“ceramic”***
 - But also: **Building Materials, Industrial Waste**, and others
- Web summaries & project websites
- Other dissemination materials
 - Layman’s report
 - Brochures/leaflets/informative panels
 - Etc.

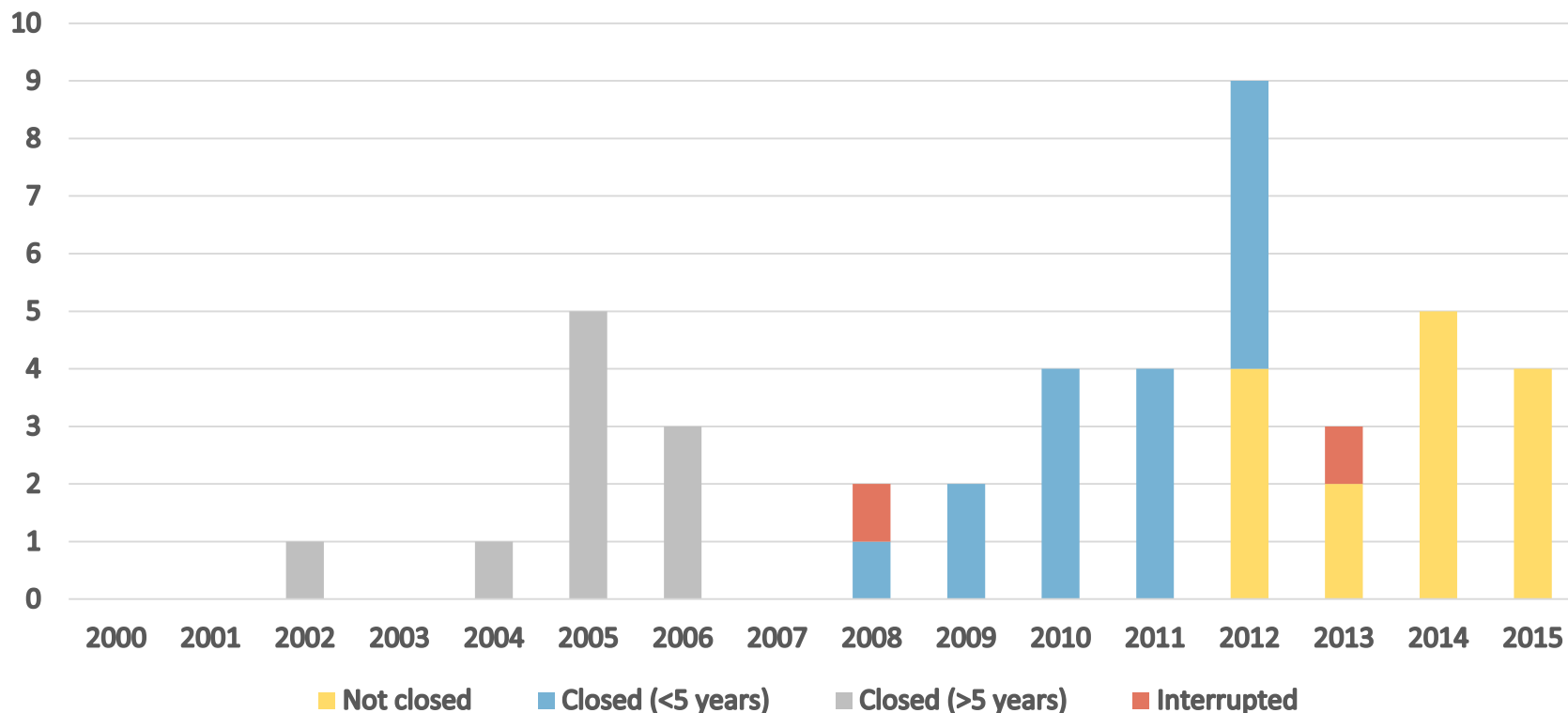
LIFE & Ceramics (II)

Main findings

- In the period 2000-2015: **43 projects** in total
- Mainly from **Italy** and **Spain**
- Mainly from **SME** and **research institutes**
- Mainly related to **Floor & Wall tiles** and **Bricks & Roof tiles**
- Mostly dealing with **recycling, waste** and **energy efficiency**

LIFE & Ceramics (III)

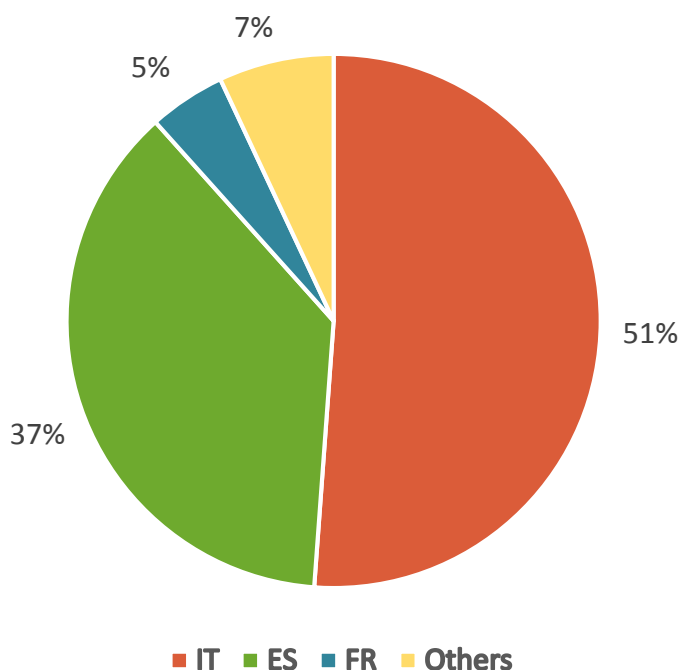
Number of LIFE projects in Ceramics by year (call)



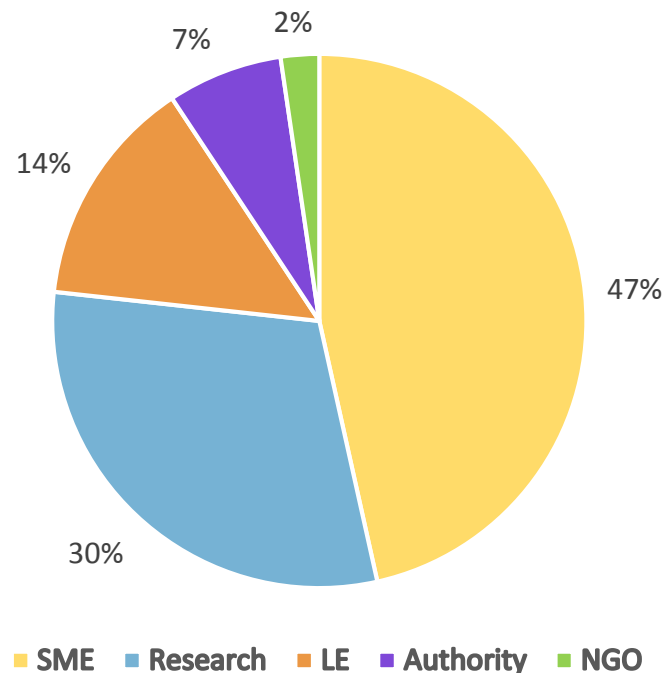
LIFE & Ceramics (IV)

Projects by nationality and type of the Coordinating Beneficiary

Nationality

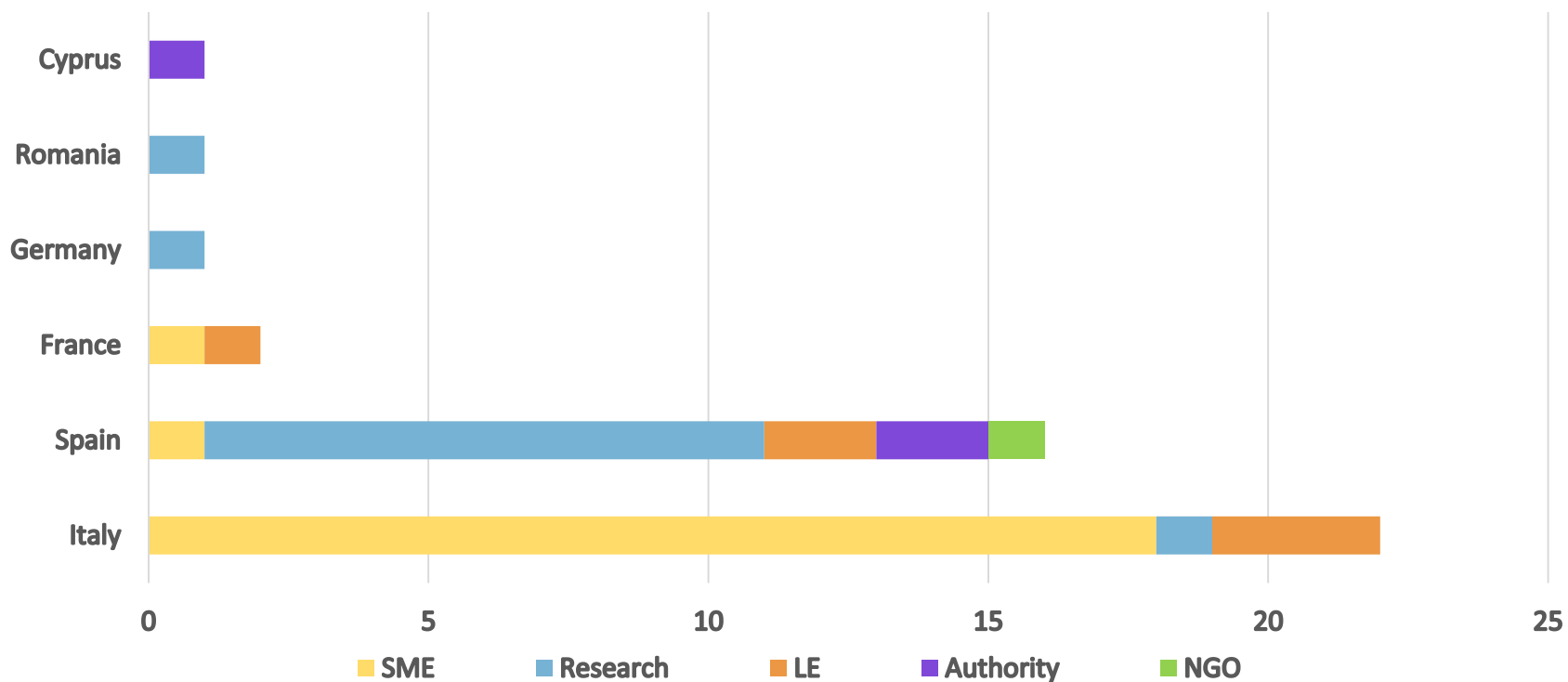


Type



LIFE & Ceramics (V)

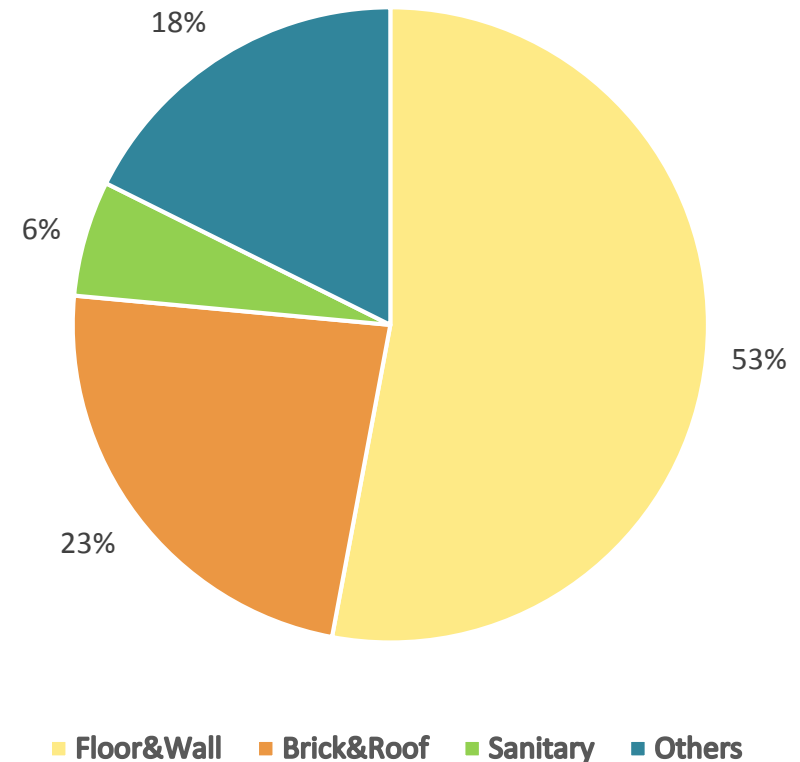
Projects by nationality and type of the Coordinating Beneficiary



LIFE & Ceramics (VI)

Projects by ceramic sub-sector

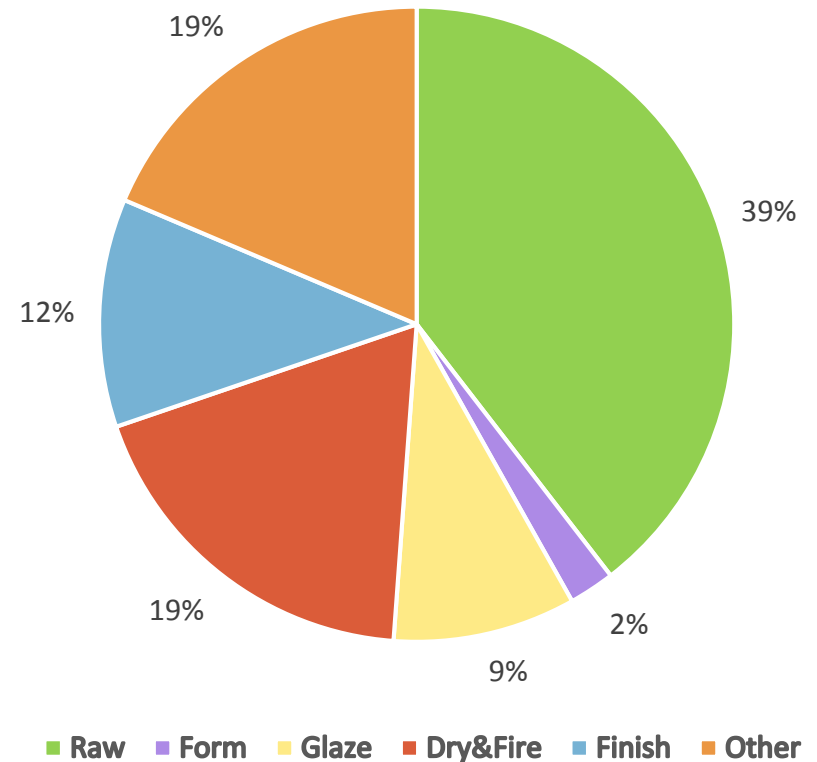
- Floor & wall tiles
- Bricks & roof tiles
- Sanitaryware
- Others
 - Tableware
 - Generic (e.g. exhaust gases)
 - Special (e.g. heating elements)
 - Etc.



LIFE & Ceramics (VII)

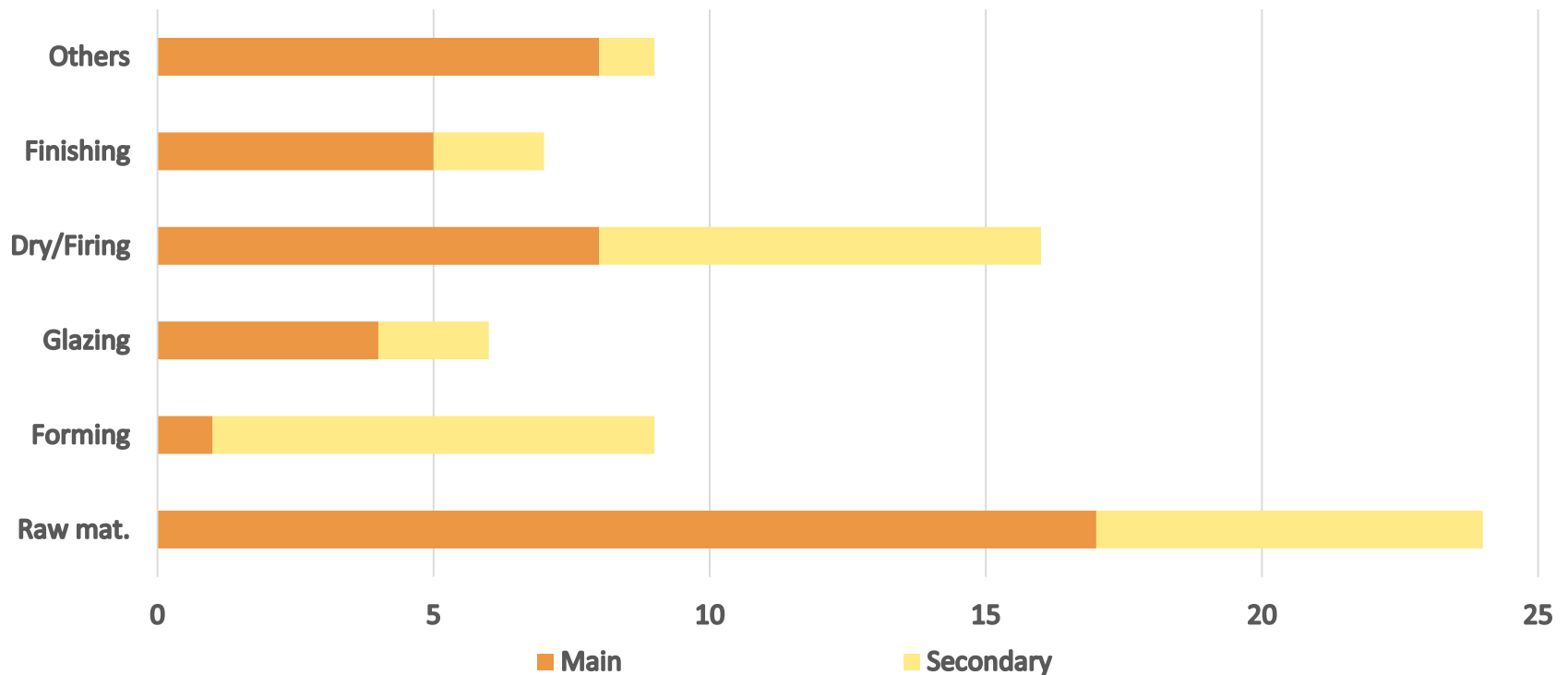
Projects by process stage targeted (main)

- Raw material preparation
- Forming
- Drying
- Glazing
- Firing
- Finishing operations
- Others
 - Tile design; exhaust gas treatment
 - Etc.



LIFE & Ceramics (VIII)

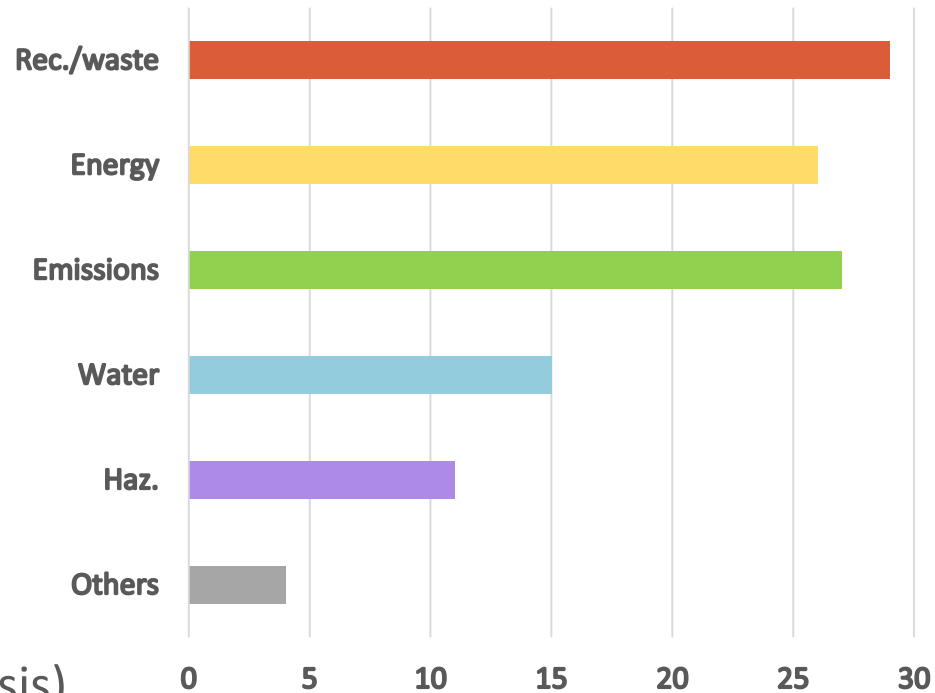
Projects by process stage targeted (main & secondary)



LIFE & Ceramics (IX)

Main environmental issues addressed

- Recycling / waste reduction
- Energy consumption
- Emissions
- Water consumption
- Hazardous materials
- Others
 - Noise reduction; flooding
 - Drugs degradation (photo-catalysis)
 - Etc.



Some examples (I)

Recycling from glass/ceramic/stone

- [LIFE14 ENV/IT/801 - LIFE ECO TILES:](#)
ECO innovative methodologies for the valorisation of construction and urban waste into high grade TILES
- [LIFE12 ENV/ES/230 - LIFE CERAM:](#)
Zero waste in ceramic tile manufacture
- [LIFE12 ENV/IT/1095 - LIFE SANITSER:](#)
Sanitaryware production: use of waste glass for saving energy and resources
- [LIFE11 ENV/CY/859 - QuaResE:](#)
Quarry Resource Efficiency Demonstration Project



Some examples (II)

Recycling from other sectors

- [LIFE15 ENV/ES/530 - LIFE LEACHLESS:](#)
Low energy treatment technology for leachate valorisation
- [LIFE14 ENV/ES/252 - LIFE FOUNDRYTILE:](#)
Valorization of iron foundry sands and dust in the ceramic tile production process
- [LIFE10 ENV/RO/729 - EcoWASTES:](#)
New building materials by eco-sustainable recycling of industrial wastes
- [LIFE08 ENV/E/148 - ECO-VITRUM-TRC:](#)
Integral management model of cathode rays glass: closing the circle of recovery, recycling and reuse of WEEE'S

Photo: LIFE14 ENV/ES/000252



Photo: LIFE08 ENV/E/000148



Some examples (III)

Energy consumption

- [LIFE15 CCM/IT/104 - LIFE ECONOMICK:](#)
Energy consumption and CO2 and NOx emissions
Minimised in an Intermittent Ceramic Kiln
- [LIFE12 ENV/FR/142 - LIFE HEART:](#)
improved HEAt Recovery in clay roof Tiles an bricks
production
- [LIFE11 ENV/ES/560 - CERAMGLASS:](#)
Environmentally Friendly Processing of Ceramics and
Glass
- [LIFE09 ENV/ES/435 - LASERFIRING:](#)
Climate Change Adaptation of the Structural Ceramics
Industry by Decreasing the Firing Temperature Using
Laser Technology

Photo: LIFE15 CCM/IT/000104



Photo: LIFE11 ENV/ES/000560

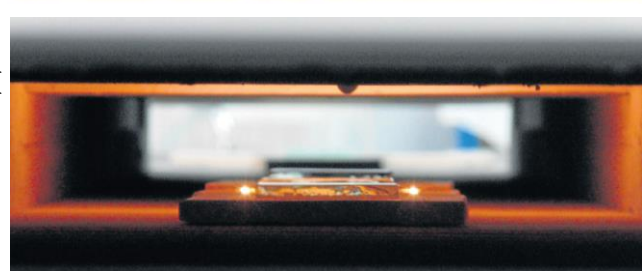
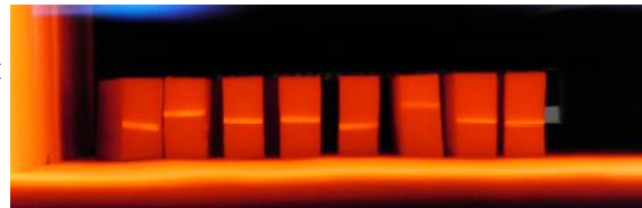


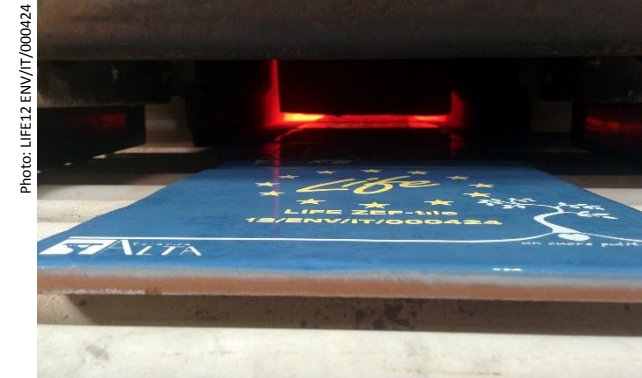
Photo: LIFE09 ENV/E/000435



Some examples (IV)

Emissions

- [LIFE14 CCA/IT/939 - LIFE HEROTILE:](#)
High Energy savings in building cooling by ROof TILES shape optimization toward a better above sheathing ventilation
- [LIFE12 ENV/IT/424 - LIFE ZEF-tile:](#)
Zero Emission Firing strategies for ceramic tiles by oxy-fuel burners and CO2 sequestration with recycling of byproducts
- [LIFE09 ENV/IT/108 - EnerGeo:](#)
Insulating high strength-controlled porosity geopolymer floor tiles for the mitigation of global warming



Some examples (V)

Water consumption

- [LIFE12 ENV/ES/598 - LIFE ENVIP :](#)
New environmentally friendly forming technique of ceramic sanitary wares by isostatic pressing.
- [LIFE11 ENV/IT/110 - W-LAP :](#)
Waste eliminating and water-free new revolutionary technology for surface treatment of marbles, stones and tiles
- [LIFE06 ENV/IT/254 - UME:](#)
Ultrasound micro-cut ecosustainable
- [LIFE02 ENV/IT/052 - Microfinishing:](#)
A new dry process of microfinishing of gres porcelain and natural stone surfaces, which will substitute the stage of smoothing/polishing (...)

Photo: LIFE12 ENV/ES/000598

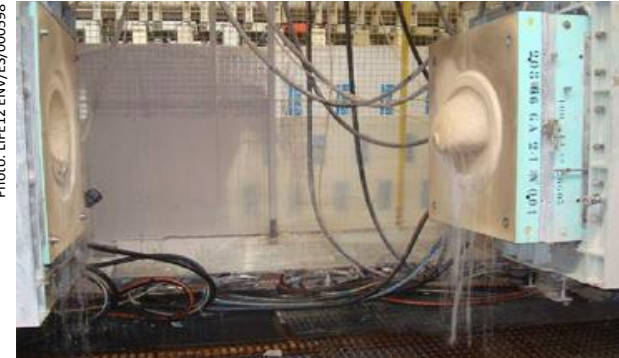


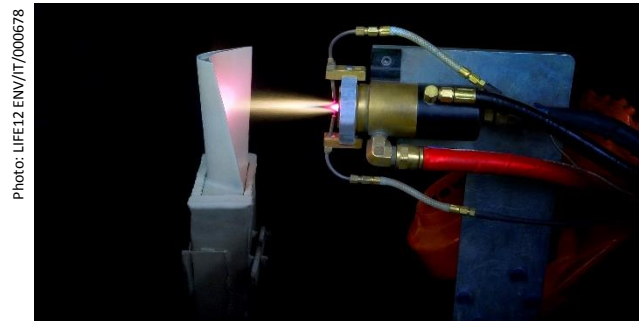
Photo: LIFE02 ENV/IT/000052



Some examples (VI)

Hazardous materials

- [LIFE14 ENV/ES/238 - SILIFE:](#)
Production of quartz powders with reduced crystalline silica toxicity
- [LIFE12 ENV/IT/678 - LIFE ReTSW-SINT:](#)
Recycling of thermal spray waste in sintered products
- [LIFE10 ENV/IT/427 - Lead-Coloured Lead-Free:](#)
Replacement of toxic lead compounds by new non-toxic substitutes as brilliant aid agent in polychromatic glazes
- [LIFE06 ENV/E/001 - ReLiStoP:](#)
Resin-free Liquid-Stone Process elimination of synthetic polluting resins and toxic solvents used in the production of decorative elements (...)



Some examples (VII)

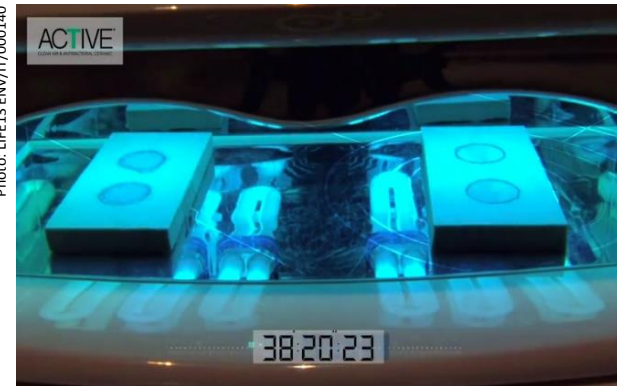
Other applications

- [LIFE15 CCA/ES/091 - LIFE CERSUDS:](#)
Ceramic Sustainable Urban Drainage System
- [LIFE14 CCM/ES/311 - LIFE FERTILIFE:](#)
Agricultural carbonic fertilization with ceramic industry GEI emissions
- [LIFE13 ENV/IT/140 - LIFE+ DIGITALIFE:](#)
A novel manufacturing process for photocatalytically activate ceramic tiles by digital printing.

Photo: LIFE15 CCA/ES/000091



Photo: LIFE13 ENV/IT/000140



Main environmental benefits (I)

Recycling

- Mainly from **ceramic and glass waste** (ceramic tiles)
- Up to **90% of recycled material** in ceramic products
 - Depending on the type of product (tiles, bricks, expanded clay, etc.)
 - On the quality of waste (internal scraps, unsorted / sorted / “pure”, etc.)
 - On the target market (urban paving, construction, interior design, etc.)
- Usually affecting all the processing stages
 - New forming/drying/firing conditions

Main environmental benefits (II)

Energy efficiency

- Mainly related to
 - Different or new firing/cutting/polishing techniques
 - **Lower firing temperatures** (usually due to change in raw materials)
 - Heat recovery
- Reduction in energy consumption ranging from **10% to 40%**
 - Usually related to the specific process targeted (not the whole production)
- With benefits related also to **reduced emissions** (mainly CO₂)

Main environmental benefits (III)


Water consumption

- Mainly related to
 - Different or new forming/cutting/polishing techniques
 - Reuse of waste water or sludge
- Reduction in water consumption ranging from **20% to 100%**
 - Usually related to the specific process targeted (not the whole production)

Some final remarks

Main gaps and possible improvements

- Composition requirements on recycled materials is often missing
 - Acceptable level of impurities
 - Availability, reliability and stability of supply
 - Effects on the quality of the final product
- Lack of detailed cost/benefit and market analysis
- New products actually entered the market after the project?
 - Lack of information on this aspect in project and company websites
 - Not clearly identifiable in the product lists of the beneficiaries
- Possibility to provide data for the BREF-CER update (2018)



GRAZIE PER L'ATTENZIONE

Per ulteriori informazioni:



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