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
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]

![Graph showing production value per sub-sector over years](source: Eurostat 2016)
Ceramic Industry in EU (IV)

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

Percentage of production value by European country 2011, Source: Prodcom, Eurostat
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

<table>
<thead>
<tr>
<th>Share in production costs</th>
<th>[Roadmap 2050]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>25% - 30%</td>
</tr>
<tr>
<td>Labour</td>
<td>25% - 30%</td>
</tr>
<tr>
<td>Raw materials</td>
<td>30% - 35%</td>
</tr>
<tr>
<td>Other production costs</td>
<td>10% - 15%</td>
</tr>
</tbody>
</table>

CO₂ emissions 2010: bricks & roof + refractories + wall & floor (90% of total ceramic industry emissions)
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.
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**
- IT: 51%
- ES: 37%
- FR: 7%
- Others: 5%

**Type**
- SME: 47%
- Research: 30%
- LE: 14%
- Authority: 7%
- NGO: 2%
LIFE & Ceramics (V)

Projects by nationality and type of the Coordinating Beneficiary

- **Cyprus**
- **Romania**
- **Germany**
- **France**
- **Spain**
- **Italy**

Legend:
- SME
- Research
- LE
- Authority
- NGO

Total:
- 22 projects
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.

![Pie chart showing distribution of projects by process stage]
LIFE & Ceramics (VIII)

Projects by process stage targeted (main & secondary)

- Others
- Finishing
- Dry/Firing
- Glazing
- Forming
- Raw mat.

Legend:
- 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
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
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 (…)

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.
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 CO$_2$)
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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