The cogeneration in the EU ceramic industry

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<table>
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<tr>
<th>TBE</th>
<th>CET</th>
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<th>EuTeCer</th>
<th>Feugrès</th>
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<tbody>
<tr>
<td>Bricks &amp; roof tiles</td>
<td>Wall &amp; floor tiles</td>
<td>Table &amp; ornamental ware</td>
<td>Sanitary ware</td>
<td>Refractories</td>
<td>Technical ceramics</td>
<td>Clay pipes</td>
<td>Abrasives</td>
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Europe’s ceramic industry

- 8 sectors
- € 28 billion
- 25% sold outside of the EU
- 200,000 direct jobs in all European regions

% Production value of ceramic industry by sector in 2011.
(Source: Prodcom, Eurostat)
Europe’s heritage ... and critical for our future
Tiles / Bricks, Refractory and Wall/ Floor tile sectors - representing approximately 90% of total European ceramics sector emissions
Energy mix is 85% gas, 15% electricity
Total: 19 Mton CO$_2$
Some key technologies

<table>
<thead>
<tr>
<th>Technologies</th>
<th>CCS</th>
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<tr>
<td>On-site syngas and biogas</td>
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<td>Low-temperature heat recovery from kiln exhaust</td>
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<td>Heat exchanger in kiln stack</td>
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<td>Clay/raw material preconditioning</td>
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<td>On-site CHP</td>
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<td>Process optimisation</td>
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<td>Energy management</td>
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<td>Raw materials formulation changes for more efficient firing</td>
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<td>New kiln design</td>
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<tr>
<th>Status</th>
<th>Available Today</th>
<th>Pilot Only</th>
<th>Requires Significant Development</th>
<th>Breakthrough Technology</th>
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**ersary**
Emission reduction models

A) Excluding kiln electrification

- € 90 billion capital
- € 40 billion write off and lost production
- Unprofitable running costs

B) Including kiln electrification

Solution for “process emissions” from clay not available yet
Our 2050 emission reduction models

65% reduction if …

- “Syngas/Biogas” technology developed to replace fossil fuels, retrofitted, and sustainable, affordable feedstocks secured
- Financial support for breakthrough R&D and implementation
- Stable regulatory framework for industry to compete with non-European manufacturers

78% reduction …

- Remaining 50% of kilns electrified - 95% decarbonisation of electricity
- Completely uneconomic
The relevance of energy in the ceramic industry

- Energy-intensive industry
- Energy represents up to 30% of production costs
- Heat consumption much higher than electricity consumption (up to 10 times)
- CHP as BAT “on the basis of useful heat demand, within energy regulatory schemes which are economically viable”
The cogeneration in the EU ceramic industry (I)

- Around 250 CHP plants
- Installed capacity: ± 700MW
- Micro and small CHP plants (< 1MW) but also larger plants (up to 15 MW)
- Average installed capacity: ± 3MW
- Generated electricity: ± 3,000 GWh/year
The cogeneration in the EU ceramic industry (II)

- Main investments in CHP in the ‘80s and ‘90s, mostly in Southern Europe (Italy, Spain, Portugal)
  - Sufficient demand of heat due to the size of the ceramic installations
  - Independent and large spray driers (Spain)
  - National schemes with feed-in tariffs
  - Evolution of fuel and electricity prices
- Natural gas fuelled turbines or engines
- CHP used mainly in wall & floor tile and brick & roof tile sectors
CHP installation in a spray dried powder plant

- Direct use of exhaust gases from CHP plants
- Inlet temperature: ± 500°
CHP installation in a brick dryer

- Direct use of exhaust gases from CHP
- Inlet temperature: ± 100°
Benefits of cogeneration in the ceramic industry

• CHP covers around 25% of internal electricity needs of ceramic installations using CHP
• Global fuel consumption savings (around 30%)
• Reduction of CO₂ emissions
  • ± 0.7 M tons CO₂ saved in the Spanish wall & floor tile and brick & roof tile sectors
• Lower distribution costs
• Reduction of network losses
• Security of supply
• Contribution to industrial productivity
The cogeneration in the EU ceramic industry

COGENERATION is a key technology that allows simultaneously security of supply, economic and environmental sustainability.

Promotion of cogeneration is crucial as long as it considers technical and economic feasibility.
Main concerns

• Stability and predictability of the legal framework (national and EU schemes)
• Heterogeneous treatment of CHP across Member States
• Harmonised efficiency value for low-temperature drying applications (inlet temperature < 250°)
• Treatment of CHP electricity under EU ETS
• Priority dispatch and access to the grid
• Uncertainty of pay back plans due to the high volatility of gas and electricity prices
Treatment of CHP under EU ETS

- Need to purchase allowances for emissions related to the production of electricity, even though it comes from CHP plants.
- The Spanish ceramic tile sector will have a shortage in allocation for installations with CHP plants.
- The estimated quantity of allowances that the sector will have to buy in the market for the period 2013-2020, is nearly 7 million ton CO$_2$.
- Depending on the price of the CO$_2$ along the period, direct cost of buying the allowances can be estimated between 35 – 140 million Euros.
National energy schemes

• A new energy taxation mechanism has established in Spain introducing *inter alia* a tax on natural gas usage and on electricity production. The new tax will create an additional direct energy cost of €15 million per year for the ceramic tile industry, and indirect costs derived from the increase of electricity prices.

• Furthermore, in this scheme the tax on gas used for cogeneration (€0.65 / GJ) is higher than natural gas for industrial use (0.15 € / GJ), and also a electricity tax on sale of electricity from cogeneration (7% of the purchase price) is applied.

• In the UK, the most significant impact on competitiveness is related to the Climate Change Levy and the carbon floor price.
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