The world is increasingly using cement as an important raw material for building. Unfortunately, cement production is responsible for around 8% of annual global CO₂ emissions.

GEA can make a significant contribution to decarbonizing the cement industry with technology that captures 90% of these carbon emissions.

**Milestone for one of the world’s largest CO₂ emitters**

Global cement production has increased almost fivefold since 1980. And the trend is on the rise.

About 90% of the emissions are created when the cement is fired in the rotary kiln.

60% of CO₂ emissions are produced during the resulting chemical reaction.

10% of CO₂ emissions are generated in upstream and downstream processes such as preparation, transport and packaging.

30% of CO₂ emissions are generated when the furnace is heated to 1,500 °C.

Annual production in billions of tons

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>0.88</td>
</tr>
<tr>
<td>1990</td>
<td>1.16</td>
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<tr>
<td>2000</td>
<td>1.66</td>
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<tr>
<td>2010</td>
<td>3.29</td>
</tr>
<tr>
<td>2022</td>
<td>4.10</td>
</tr>
<tr>
<td>2030</td>
<td>4.83</td>
</tr>
</tbody>
</table>

Cement combines sand and gravel to form concrete.

**From problem to potential: CO₂ as feedstock for industrial use.**

Decarbonization of the cement industry requires new utilization options for CO₂ and the development of a carbon dioxide infrastructure.

**Utilization**

- Carbon capture and usage (CCU)
  - Food/beverages
  - Chemicals (plastics, building materials/pharmaceuticals)
  - Fuel

**Sequestration**

- Carbon capture and storage (CCS)
  - As a solid carbonate in the soil
  - As a solid carbonate in the ocean floor
  - In CO₂ pipelines as a carrier of green hydrogen

**GEA Carbon Capture eliminates 90% of CO₂ emissions from production.**

Proven technical solution can be used quickly and cost-effectively.

**Most emissions are generated during production.**

About 90% of the emissions are created when the cement is fired in the rotary kiln.

Use of waste heat from industrial processes/flue gases for the CO₂ capture process. Minimizes energy requirements for the capture process.

Removal of solids, aerosols, as well as sulphur and nitrogen oxides ensures long-term performance of the capture system.

CO₂ capture is a chemical absorption process using amines. GEA plants enable CO₂ capturing from very different compositions of exhaust gas.

Captured CO₂ replaces fossil carbons by reusing them in products or storing them in long-term storage facilities.

**High demand. Global impact.**

Global cement production has increased almost fivefold since 1980. And the trend is on the rise.

**CO₂ depleted flue gas**

Liquefied CO₂

CO₂-based products