Cement Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Cement Prod</th>
<th>Energy Use</th>
<th>CO2 emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clinker ratio</td>
<td>Annual production</td>
<td>Gross consumption</td>
</tr>
<tr>
<td></td>
<td>% in clinker</td>
<td>Million tons/yr</td>
<td>Million tonnes/yr</td>
</tr>
<tr>
<td>1950</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1951</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1952</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1953</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1954</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1956</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1957</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1958</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1959</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1977</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total** 3,116 - - - 1,233

---

Cement.xls

---


---


Cemex CSR Rpt 2010 page 74.
Comment: Rick Heede:
   Emissions from cement fabrication are of two main types: Calci- 
ing process of calcium carbonate into clinker liberates carbon dioxide, and emissions from the energy used in the manufacturing process. Typically not included in the emissions estimates are transportation energy, the burning of wastes, or plant construction.

Comment: Rick Heede: 
   The industry calcination factor ranges from 525 to 900 kg CO2 per tonne of clinker (net), but of course varies from company to company, and will tend to decrease over time as process efficiencies improve. WBCSD (2002) "Toward a Sustainable Cement Industry: Key Performance Indicators." by Joseph Fiksel, Battlefe, for WBCSD. "Each tonne of Ordinary Portland Cement generates ~900 kg of net CO2 emissions ... and consumes roughly 3,000 MJ of total electrical and thermal energy," p. 8.

Comment: Rick Heede:
   Most cement companies will aggregate emissions from energy use with emissions from cement fabrication. This column is provided for companies that provide both data.

Comment: Rick Heede: 
   Average CO2 emissions intensity have declined 16.5 percent from 1990 to 2009 -- from 758 net kg CO2 per tonne of cementitious product in 1990 to 633 kg CO2/t in 2009, according to WBCSD data.** This project estimates process emissions from calcining limestone and thus excludes emissions from fuel and electricity inputs inputs to cement manufacturing. The emission rates and net total company emissions both include process and energy-related emission; a subsequent worksheet (SumCement.xls) estimates process emissions of CO2.


Comment: Rick Heede: 
   Cemex CSR Rpt 2005, shows "total CO2 emissions, million tonnes, net," for 1990: 42.21 MtCO2 net.

Comment: Rick Heede: 
   Cemex CSR Rpt 2003, chart on production capacity (production not shown), for 1993-2003.

Comment: Rick Heede: 
   Cemex EHS Rpt 1997 contains no emission or production data. Fluff piece.

Comment: Rick Heede: 

Comment: Rick Heede: 

Comment: Rick Heede: 
   Cemex CSR Rpt 2008, page 6, reports cement production capacity of 96 Mt; actual prodn not reported.

Comment: Rick Heede:

Comment: Rick Heede: 
   Cemex2010_20F.pdf. Text page 87 (pdf pg 95): "On a consolidated basis, our cement sales volumes increased approximately 1%, from 65.1 million tons in 2009 to 65.6 million tons in 2010, and our ready-mix concrete sales volumes decreased approximately 5%, from 54 million cubic meters in 2009 to 51 million cubic meters in 2010." CEMEX capacity is ~96 million tonnes per year.

Comment: Rick Heede: 
   Cemex 2010 Sust Report pg 10

Comment: Rick Heede: 
   CEMEX SustRpt 2010 page 34.

Comment: Rick Heede: 

Comment: Rick Heede: 

Comment: Rick Heede: 

Comment: Rick Heede: 
   Cemex Sustainability report 2015.
Cell: K82
Comment: Rick Heede:

Cell: K85
Comment: Rick Heede: