

Cement Production

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 Climate Mitigation Services
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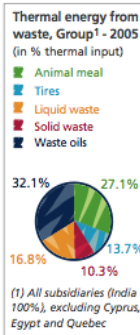
yellow column indicates original reported units

Founded in 1864

Cement production & emissions data

| Year | Cement Prod | | Energy Use | | CO2 emissions | |
|------|-----------------|-------------------|-------------------|-------------------|----------------|-------------------|
| | Clinker ratio | Annual production | Gross consumption | Gross consumption | Emissions rate | Net emissions |
| | Million tons/yr | Million tonnes/yr | Billion Btu | Terajoules | kg CO2/tonne | Million tonnes/yr |

- 17 1950
- 18 1951
- 19 1952
- 20 1953
- 21 1954
- 22 1955
- 23 1956
- 24 1957
- 25 1958
- 26 1959
- 27 1960
- 28 1961
- 29 1962
- 30 1963
- 31 1964
- 32 1965
- 33 1966
- 34 1967
- 35 1968
- 36 1969
- 37 1970
- 38 1971
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- 50 1983
- 51 1984
- 52 1985
- 53 1986
- 54 1987
- 55 1988
- 56 1989
- 57 1990
- 58 1991
- 59 1992
- 60 1993
- 61 1994
- 62 1995
- 63 1996
- 64 1997
- 65 1998
- 66 1999
- 67 2000
- 68 2001
- 69 2002
- 70 2003
- 71 2004
- 72 2005
- 73 2006
- 74 2007
- 75 2008
- 76 2009
- 77 2010



| Cement: environmental performance | | | | | |
|-----------------------------------|------------------------|--------|--------|--------|--------|
| CO ₂ gross emissions | | 1990 | 2006 | 2007 | 2008 |
| Mature markets | | 658 | 700 | 704 | 708 |
| Emerging markets | kg/t _{cement} | 820 | 775 | 762 | 747 |
| Group | | 725 | 737 | 733 | 728 |
| Mature markets | | 22,030 | 21,662 | 21,756 | 20,459 |
| Emerging markets | million t | 16,053 | 23,393 | 24,108 | 23,120 |
| Group | | 38,083 | 45,055 | 45,864 | 43,579 |
| CO ₂ net emissions | | | | | |
| Mature markets | | 635 | 687 | 690 | 695 |
| Emerging markets | kg/t _{cement} | 820 | 774 | 762 | 746 |
| Group | | 704 | 730 | 726 | 742 |
| Mature markets | | 20,938 | 21,261 | 21,337 | 20,068 |
| Emerging markets | million t | 16,053 | 23,393 | 24,108 | 23,101 |
| Group | | 36,991 | 44,654 | 45,445 | 43,168 |

| Cement | | | | |
|--|--------------------------------------|---------|---------|---------|
| | | 2006 | 2007 | 2008 |
| Raw materials | | | | |
| Mature markets | | 43.0 | 45.0 | 42.2 |
| Emerging markets | million t | 45.2 | 45.6 | 46.3 |
| Group | | 88.2 | 90.6 | 88.5 |
| Mature markets | | 5.7% | 7.2% | 7.3% |
| Emerging markets | % _{thermal} | 2.9% | 4.6% | 4.7% |
| Group | | 4.3% | 5.9% | 5.9% |
| Clinker/cement ratio | | | | |
| Mature markets | | 78.4% | 78.3% | 78.2% |
| Emerging markets | % _{cement} | 86.2% | 85.0% | 83.5% |
| Group | | 82.0% | 81.5% | 80.9% |
| Thermal energy consumption | | | | |
| Mature markets | | 4,080 | 4,057 | 4,058 |
| Emerging markets | MJ/t _{cement} | 4,093 | 4,158 | 4,117 |
| Group | | 4,087 | 4,110 | 4,089 |
| Mature markets | | 97,470 | 97,723 | 91,360 |
| Emerging markets | million MJ | 105,219 | 107,610 | 106,881 |
| Group | | 202,688 | 205,333 | 198,240 |
| Mature markets | | 6.7% | 7.7% | 7.8% |
| Emerging markets | % _{thermal} | 0.5% | 0.9% | 1.8% |
| Group | | 4.4% | 4.2% | 4.5% |
| Power consumption and indirect CO₂ | | | | |
| Mature markets | | 129.6 | 129.9 | 131.3 |
| Emerging markets | kWh/t _{cement} | 113.6 | 112.5 | 109.9 |
| Group | | 122.3 | 121.6 | 120.5 |
| Mature markets | | 4,126 | 4,034 | 3,804 |
| Emerging markets | million kWh | 3,281 | 3,327 | 3,351 |
| Group | | 7,407 | 7,361 | 7,155 |
| Group | million t CO ₂ equivalent | | | 3,210 |
| Water consumption | | | | |
| Mature markets | | 0.45 | 0.50 | 0.58 |
| Emerging markets | m ³ /t _{cement} | 0.45 | 0.47 | 0.47 |
| Group | | 0.45 | 0.49 | 0.52 |
| Mature markets | | 15 | 16 | 17 |
| Emerging markets | million m ³ | 12 | 13 | 14 |
| Group | | 27 | 29 | 31 |

Italcementi Group Sust Dev Rpt 2008, pp. 20-21.

| Clinker factor | Cement sales | Thermal mix | Thermal efficiency | Net emissions rate | Net emissions | Gross emissions | |
|---------------------|----------------|-------------------|--------------------|--|--------------------------------|--------------------------------|------------|
| % clinker in cement | million tonnes | percent alt fuels | MJ/tonne clinker | kg CO ₂ /t cementitious product | million tonnes CO ₂ | million tonnes CO ₂ | |
| 79% | | 2.0% | 4,276 | 722 | 36.99 | 38.1 | |
| | | | | | 36.64 | interpolated | |
| | | | | | 36.29 | interpolated | |
| | | | | | 35.94 | interpolated | |
| | | | | | 35.59 | interpolated | |
| | | | | | 35.24 | interpolated | |
| | | | | | 34.89 | int 29.17 | |
| | | | | | 34.54 | interpolated | |
| | | | | | 34.19 | interpolated | |
| | | | | | 33.84 | interpolated | |
| | | | | | 33.49 | interpolated | |
| | | 6.1% | 3,932 | | 33.14 | interpolated | |
| | | 6.5% | 3,952 | | 32.79 | CSR 2003 | |
| | | 6.6% | 3,913 | 733 | 33.09 | CSR 2005 | |
| 79.6% | | 6.0% | 4,042 | 740 | 34.96 | CSR 2005 | |
| 80.2% | | 5.5% | 4,011 | 730 | 40.30 | CSR 2005 | |
| 81.8% | | 4.4% | 4,087 | | 44.65 | CS | |
| 82.0% | | 4.2% | 4,110 | | 45.45 | CS | |
| 81.5% | 65 | 4.5% | 4,089 | | 43.17 | CS | |
| 80.9% | 63 | | | 717 | 36.30 | CS | |
| | 56 | | | 723 | 36.70 | CS | |
| | 55 | | | | | | |
| Total | | 2 | - | 0 | 32,136 | 2,925 | 768 |

CSR Rpt 2005, page 28.

Emissions / Production

Tonnes CO₂/tonne

Cell: K11

Comment: Rick Heede:

Emissions from cement fabrication are of two main types: Calcining 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.

Cell: E12

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, Battelle, 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.

Cell: H12

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.

Cell: K12

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 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.

** World Business Council for Sustainable Development Cement Sustainability Initiative (2009) Cement Industry Energy and CO2 Performance: 'Getting the Numbers Right', wbcscement.org, 44 pp. See GNR Indicator 326, reproduced at the "Cement industry data" worksheet in this portfolio.

Cell: K57

Comment: Rick Heede:

Italcementi CSR Rpt 2008 reports 36.99 Mt CO2 in 1990 under its 2008 boundary and plant ownership.

Cell: M63

Comment: Rick Heede:

The 2008 CSR Rpt shows 36.99 Mt CO2 for its then-boundary, but reported as 29.17 Mt CO2 for 1990 in the 2003 CSR Rpt.

Cell: J70

Comment: Rick Heede:

CSR Rpt 2005, group emission rates; for EU-plants, 653 kgCO2/tonne (730 for Group) in 2005, 668 vs 740 in 2004, 661 vs 733 in 2003, and 657 vs 722 in 1990.

Cell: K70

Comment: Rick Heede:

Italcementi CSR Rpt 2005, page 27. 2005 boundary for 2005, 2004 boundary for 2003 and 2004

Cell: G72

Comment: Rick Heede:

94.5 percent conventional fuel, 5.5 percent alt fuel (of which 1.5 % biomass).

Cell: K73

Comment: Rick Heede:

Italcementi CSR Rpt 2008

Cell: E75

Comment: Rick Heede:

Italcementi Group AnnRpt 2008, page 34: "Cement and clinker (million tonnes)"; 2007: 3.1 percent higher.

Cell: E76

Comment: Rick Heede:

2010 AR pdf pg 20

Cell: J76

Comment: Rick Heede:

2010 CSR pdf pg 5

Cell: K76

Comment: Rick Heede:

2010CSR pdf pg39