

INDIAN CEMENT INDUSTRY – GROWTH STATUS: OPPORTUNITIES AND CHALLENGES

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Dr. S.P. Ghosh
Advisor (Technical)
Cement Manufacturers' Association

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INFRASTRUCTURE GROWTH NEEDS IN A DEVELOPING ECONOMY

Infrastructure Growth is the milestone for Measuring Development Growth of a Country.

Infrastructure in India Demands Creation or Facilitation of Water and Power Supply, Roads, Housing, Railways – to meet the escalating demands of supply chain for food, shelter, communication.

The three main pillars for harnessing rapid infrastructure build-up are Growth in :

- (a) Skilled and Qualified Manpower;
- (b) Steel
- (c) Cement.

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TOP 10 STEEL AND CEMENT PRODUCING COUNTRIES OF THE WORLD

Sl. No.	Steel*				Cement†			
	2004		2008		2004		2007 (Estimated)	
	Country	Prodn. (MLT)	Country	Prodn. (MLT)	Country	Prodn. (MLT)	Country	Prodn. (MLT)
1.	China	280.48	China	502.01	China	933.69	China	1240
2.	Japan	112.71	Japan	118.73	India	131.07	India	158
3.	USA	99.68	USA	91.49	USA	97.43	USA	96.4
4.	Russia	66.68	Russia	68.51	Japan	72.40	Japan	70.0
5.	S. Korea	47.52	India	35.06	S. Korea	55.80	Russia	59.0
6.	Germany	46.37	S. Korea	53.48	Spain	46.60	Spain	59.5
7.	Ukraine	38.71	Germany	45.83	Russia	46.20	S. Korea	51.0
8.	Brazil	32.90	Ukraine	37.10	Italy	46.10	Turkey	49.0
9.	India	32.62	Brazil	33.71	Indonesia	37.90	Italy	45.4
10.	Italy	28.40	Italy	30.47	Thailand	36.70	Brazil	43.8
11.	France	26.71	Turkey	26.41	Brazil	34.40	Thailand	42.5
12.	Turkey	22.47	Spain	19.08	Germany	32.80	Mexico	41.1
	World Total:	1068.69		1329.71		2139		2690

* FIM (Federation of Indian Mineral Industries) News Bulletin, Delhi, February 2009.
† Data of OMA, Cembureau, and Japan Cement Association.

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OPPORTUNITIES

Indian Economy is Vibrant with Recent Annual GDP GROWTH of + 9.5%; Current Global Economic meltdown now pushed it to 7.5% and Further to down to 5.5%. It has NOW revived to 7.5 %

The Growth is Bound to be Speeded Up with Rapid Demand Generation of the growing Population of 1.4 billion.

India is Front-Ranking in a Number of Manufacturing and Agriculture Activities.

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PLANNED INFRASTRUCTURE GROWTH – TASKS AHEAD

- 20 Million Houses for Rural and Urban Population
- 9500 Km Roads for Golden Quadrilateral Connecting Metros (Delhi-Mumbai- Kolkata-Chennai).
- 7300 Km Road for East to West and North to South Highway Corridor.
- 50, 000 MW Additional Power Generation - Both Hydel (25%) and Thermal (70%) to meet 1,00,000 MW additional Power Demand in next 5 years.
- 2,60,000 Villages Connectivity by All-Weather Roads.
- High Density corridors of NH & SH to Ports – 10,000 Km.
- Rural Roads for All Weather Connectivity – 0.74 million Km.
- 45 Modern Ports to dot the 7600 km Coastline.
- 32 SEZs in Coastal and Urban Locations including 5 Coastal.
- 1.05 million Km Road in addition to 3.3 million Km Road under NH & SH for rural connectivity.
- Such Growth will fuel spiraling Demand of Steel and Cement.

Source: Planning Commission Report

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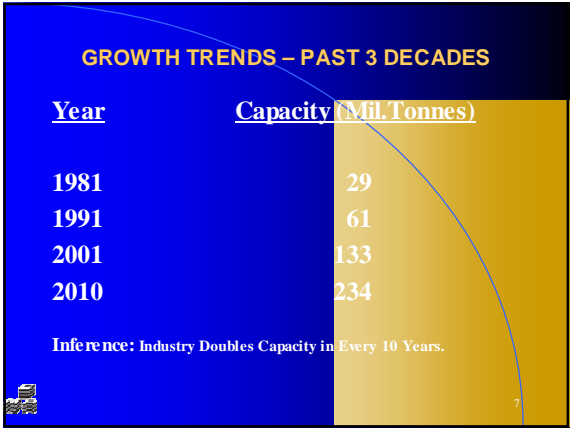
INDIAN CEMENT INDUSTRY – STATUS 2008-09

International Ranking	2 nd
Installed Annual Capacity	217.8 Million Tonnes
Production*	181.4 Million Tonnes
Average Annual Growth Rate (w.r.t last Year)	7.79%
No. of Plants	Large : 100 ; 36 Grinding Units Mini** : 106 ; Rotary : 13 ANK : 193

** AIMCMA – 2006
(All India Mini Cement Manufacturers' Association)

Source: CMA Database.

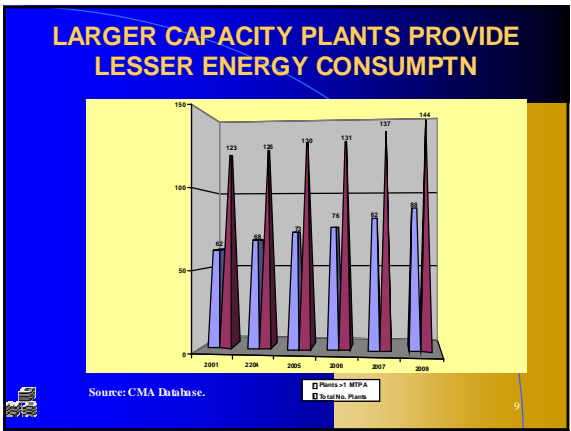
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GROWTH & FORECASTS

Record – Past 50 Years Capacity Mln.t. (Production)		Forecast – 20 Years Ahead (Capacity Mln.t.)	
1955	5.02 (4.60)	2008	209.40 (174.32)
1965	12.00 (10.97)	2010	269.07*
		2012	294* (High Growth)
1975	19.76 (18.00)	2015 ^E	280 ¥ 291 #
1985	41.85 (31.11)	2020 ^E	400 ¥
1995	82.06 (62.08)	2025 ^E	560 ¥ 520 #
2005	160.24 (136.67)	2030 ^E	600 ¥ 540 #
		2050 ^E	646 ¥ 840 #

Source: Basic Data, CMA; *11th Planning Commission Working Group Report - Cement; L - Bilimead; ¥ - Cement International, Vol 5/2005; # - IEA (International Energy Agency)



PLANTS WITH CAPACITY OF ONE MILLION TONNES AND ABOVE

Year	Indian Cement Industry		Large Capacity (> 1 MTPA) Plants		
	Total No. of Plants	Total Capacity (Mn.t.)	No. of Plants	Capacity (Mn.t.)	% of Total Capacity
2001	123	133.55	62	106.90	80.0%
2004	126	144.98	68	119.06	82.1%
2005	130	159.80	73	133.60	83.6%
2006	131	165.46	76	138.72	83.8%
2007	137	190.45	82	146.24	76.8%
2008	144	209.40	88	173.61	82.90%

Source: CMA Database.

PROGRESSIVE REDUCTION IN ENERGY CONSUMPTION BY INDIAN CEMENT INDUSTRY

	Year				
	1950-60	1970	1980	1990	Post 2000
Predominant Technology/ Process	Wet 96%	Semi-Dry	Dry-4 Stage Preheater (PH) Precaliner (PC) 85%	Dry 5/6 Stage Vertical Roller Mill (VRM) & Pre-Grinders - Advanced Coolers	Double-Stream PH, Pyrostep Coolers, High Pressure Grinding Rolls, Advanced Kin Control System, IT based Plant Operation
Capacity (Tonnes/Day)	300 – 600	600 – 1200	2400 – 3000	3300 – 6000	4500 – 10000
Heat Consumption (K.Cal/Kg. Clinker)	1300 – 1600	900 – 1000	800 – 900	650 – 750	650 – 750
Power Consumption (Kwh/Tonne Cement)	115 – 130	110 – 125	105 – 115	95 – 105	80 – 110

Source: NCB and CMA Database.

QUANTUM JUMP IN FLY ASH BASED PPC PRODUCTION (FROM 2000 TO 2007)

Year	OPC	PPC	PSC	Others	Total	%age PPC Growth w.r.t.199-00
1999-2000	52.75 (66.6%)	21.3 (22.6%)	9.39 (9.97%)	0.72	94.21	
2001-2002	57.68 (56.3)	32.3 (31.5%)	11.89 (11.6%)	0.53	102.40	9%
2003-2004	53.51 (45.5%)	52.13 (44.4%)	11.26 (9.58%)	0.60	117.50	21.8%
2005-2006	55.84 (39.4%)	74.01 (52.2%)	11.37 (8.0%)	0.59	141.81	29.6%
2006-2007	48.64 (31.2%)	93.52 (60.7%)	12.89 (8.25%)	0.65	155.60	37.5%
	42.84 (25.46%)	111.21 (66.07%)	13.57 (8.06%)	0.04	168.32	44%
Production Increase in 5 Years	-22.5%	340%	36.75%	-9.7%	65.16%	

Source: CMA Database.

CEMENT INDUSTRY & WASTE MANAGEMENT

- Indian Cement Industry is major user of flyash. Out of 130 mn.t. fly ash generated annually, only 40 mn.t. are recycled and cement industry consumed nearly 34 mn.t. (85%) fly ash in 2008.
- Cement industry consumes the entire quantity of granulated BF Slag – around 8 mn.t. in 2008.
- The industry also consumes 90% fluoro and phospho-gypsum waste from fertilizer industry exceeding 3 mn.t.
- 2 cement majors have set up a Waste Recycling Company with planned investment of Rs.800 million, to recycle varied wastes to the tune of 0.8 to 1.0 mn.t. per annum (India produces 8 to 9 mn.t. hazardous and around 100 mn.t. non-hazardous wastes per year)

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OUTSTANDING ENERGY CONSERVATION PERFORMANCE OF INDIAN CEMENT INDUSTRY

KEY PERFORMANCE INDICATORS 2007-08					
Item	Target for Xth Plan* (2001-02 to 2006-07)	Performance			Target for 11th Plan # (2007-08 to 2011-12)
		2005-06	2006-07	2007-08	
Average Energy Consumption					
Thermal Energy K.Cal/Kg Clinker	730	725	723	720	700
Electrical Energy Kwh/t. Cement	95	95	92	92	75
Best Energy Consumption					
Thermal Energy K.Cal/Kg Clinker	-	607	-	663 (650)	-
Electrical Energy Kwh/t. Cement	-	68	-	63 (65)	-
Capacity Utilization	85%	-	-	95%	-
Quality – ISO 9000	-	-	-	-	115 Plants
Environment – ISO 14001	-	-	-	-	85 Plants
OHSAS – 18000	-	-	-	-	25 Plants
Emission Compliance	-	-	-	-	All Plants

* Report of the Working Group on Cement Industry – X Five Year Plan (2002-03 to 2006-07)
Report of the Working Group on Cement Industry – XI Five Year Plan (2007-08 to 2011-12)

Figures in () benchmark Japanese Cement Industry

Source: CMA Database.

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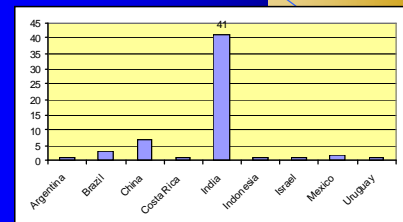
SIGNIFICANT GHG EMISSION REDUCTION

Year	Cement Production (Million Tonnes)	GHG Emission (Million Tonnes)	Ratio GHG:Cement
1990	44.87	53.84	1.20
1995	67.08	76.65	1.14
2000	102.20	98.98	0.98
2005	142.67	130.82	0.92

Source: CMA's Project Report to MoEF NATCOM Project.
* Reduction Calculated based on clinker substitution only.

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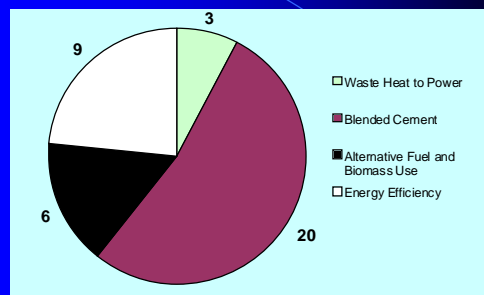
CLEAN DEVELOPMENT MECHANISM [CDM] REGISTERED CEMENT BASED PROJECTS – COUNTRY-WISE



Source: Zenith Consultancy, Switzerland, June 2007

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Number of CDM Projects from Cement Industry in India, by Type



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ENGINES OF FUTURE GROWTH

- Low Per Capita cement consumption - 130 kg
- Long Haulage from Cement Production Clusters to Consumption Regions -Long Haulage (>645Km) of Cement to Consumers; Needs Rapid Transport System
- Av. Distance of Transport - 595 km by rail and 678 Km by road
- NE and NW Regions Traditionally Deficit
- Scope of Increased Recycling of Industrial Wastes -Flyash and Slag with Cost Benefit

FUTURE GROWTH TRENDS - TOWARDS SUSTAINABILITY

- MORE STAND ALONE GRINDING UNITS NEAR METROPOLIS- HAULAGE ECONOMY
- JUMBO CAPACITY PLANTS OF + 5000 TO +10,000 TPD CAPACITY
- COAST BASED PLANTS FOR EXPORT
- RAPID SWITCH OVER FROM OPC TO PPC AND PSC

Contd...

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FUTURE GRFOWTH TRENDS – TOWARDS SUSTAINABLE GROWTH

- Merger and Acquisition of Smaller Capacities
- Use of Larger Volume Waste Derived Fuels
- GHG Emission Reduction
- Ready Mix Concrete and Bulk Supply to Gain Eminence for Cost Reduction
- More Cement Concrete Roads

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WISH LIST OF CEMENT INDUSTRY- TOWARDS SUSTAINABLE GROWTH

- Easy Indigenus Availability of Primary Fuel – Coal.
- Industrial Wastes – Fly Ash and Blast Furnace Slag – Should be Available Free under “Polluter Pays Principle” .
- Bulk Supply and Ready Mix Concrete to Gain Popularity through all round Publicity.
- Rail Transport (presently 40%) to increase its share for Lower Cost Transport of Cement, Fly Ash.
- Scope for Hassle-Free Recycling of Hazardous Combustibles
- More Concrete Roads in Infrastructure Development for Sustainability

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TECHNOLOGY UPGRADATION NEEDS TOWARDS SUSTAINABLE GROWTH

- In- pit Crushing and Conveying
- Pipe Conveying of Raw Materials , Cement etc.
- Neurofuzzy Expert System for Opern. Control
- Waste-Heat based Cogeneration of Power
- Bulk Transport of Cement
- Palletising and Shrink Wrapping for Packing/ Despatch

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R & D THRUST NEEDS –TOWARDS SUSTAINABLE GROWTH

- Co-processing Hazardous Combustible Wastes
- Fly ash Quality Upgradation for Enhanced Use
- Development of Nanotechnology based Cements & Binders
- Improving Energy-Efficiency in Size Reduction Operations
- Lower Cost Technologies for Waste Heat based Cogeneration
- Development or Adaptation of Low NO_x and Low SO₂ Technologies
- Development of Algal Farms for CO₂ Absorption from Cement Manufacture

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BARRIERS IN SUSTAINABLE GROWTH TARGET FULFILMENT – WASTE/ INDUSTRIAL BYPRODUCT USE

- “Polluter Pays” Principle not Observed.
- Escalating Costs of Sourcing Fly Ash and Slag.
- Road (not Rail) Transport for Long Distances Escalates Landed Cost for Consumers.
- Bagged Supply of Cement adds Cost and Handling Charges and more Transit Loss.
- Ready Mix Concrete, hardly < 8% of Total Concrete Produced, yet to gain Popularity.

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BARRIERS IN SUSTAINABLE TARGET FULFILMENT – FUEL SECURITY

- Scarce availability of Indigenous Primary Fuel to meet demand of Fast Growing Capacity.
- Escalating Costs of Imported Coal and Shipping Tariff.
- Regulatory Bottlenecks in Inter-State Transport of Hazardous Combustibles for Use as Alternate Fuel.

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BARRIERS IN SUSTAINABLE GROWTH TARGET FULFILMENT – REGULATORY / STANDARDS

- Rigidity of Standards mostly Specification Oriented and not Performance Oriented (as in EU Countries) restricts addition of Performance Improvers/Activating Agents etc.
- Limitations of Use of Alternate and Hazardous Fuels needing Clearance on Case to Case Basis in Absence of Specific Guidelines.
- Limitations of Specifications Restricts Use of Petroleum Coke and other Fuel Substitutes.

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DESIRED POLICY MEASURES FOR SUSTAINABLE GROWTH-TARIFF

- Very High Taxes and Levies (30% of Sale Price and 80% of Cost of Production), e.g. Compared to China (19%) or Malaysia (0%) Deserves Rationalisation
- Abolition of Import Duty on Coal and Petcoke
- Permitting Duty-free Import of Shredded Tires by End Users for Use as Alternate Fuel
- Lower Rate of Royalty for Low Grade (High Silica or Magnesia) Limestone for Resource Conservation

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DESIRED POLICY MEASURES FOR SUSTAINABLE GROWTH – INFRASTRUCTURE AND INPUTS

- Overstretched Infrastructure for Coal and Power Supply, Rail Transportation Causing Delays Need be Enhanced
- Need Ensuring 80% Coal Requirement for the Industry Through Linkages
- Encouraging Captive Power Plants by Industry with Ensured Coal Linkage
- Target of 60% Transport of Cement and Clinker by Rail Need be Fulfilled
- Transport of Fly ash for Long Distance only by Rail
- To Encourage Transportation of Bulk Cement over Long Distance by Rail

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DESIRED POLICY MEASURES FOR SUSTAINABLE GROWTH – ENVIRONMENTAL

- Dwindling Limestone Availability in Mainland Calls for Relaxation in Coastal Areas of Clearances under Coastal Regulation Zones
- Environmental Clearances for New Plants or Expansion - Procedures Need be Time bound, Streamlined and Expeditious
- Eco-Friendly Mining need be Permitted to Exploit Limestone Deposits in Cement Deficit and Eco-Sensitive Regions

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DESIRED POLICY MEASURES FOR SUSTAINABLE GROWTH – PROMOTIONAL

- Allotment of Coal Blocks to Cement Industry on Priority to help keep the Pace of Growth of the Industry with Ensured Fuel Security
- Encouragement of Coal Mining for Captive Use by Industry Sectors
- Promoting Lignite based Cement Plants
- Promoting Use of Slag or Fly ash based Cements for Long Term Durability of Constructions and Environmental Sustainability

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