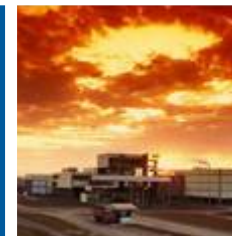




Strategic Management of Climate Changes at Votorantim Cimentos





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**International Workshop on carbon markets in emerging economies
(Sao Paulo, Nov 22)**





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Agenda

- ❑ Brazilian Cement Industry and Climate Changes
- ❑ Cement Sustainability Initiative
- ❑ CO2 Policy and Votorantim Cimentos reduction targets
- ❑ Carbon Emission Inventory for Votorantim Cimentos
- ❑ CDM Projects at Votorantim Cimentos
- ❑ Prizes
- ❑ Final Considerations
- ❑ Company contact data





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□ Brazilian Cement Industry and Climate Changes





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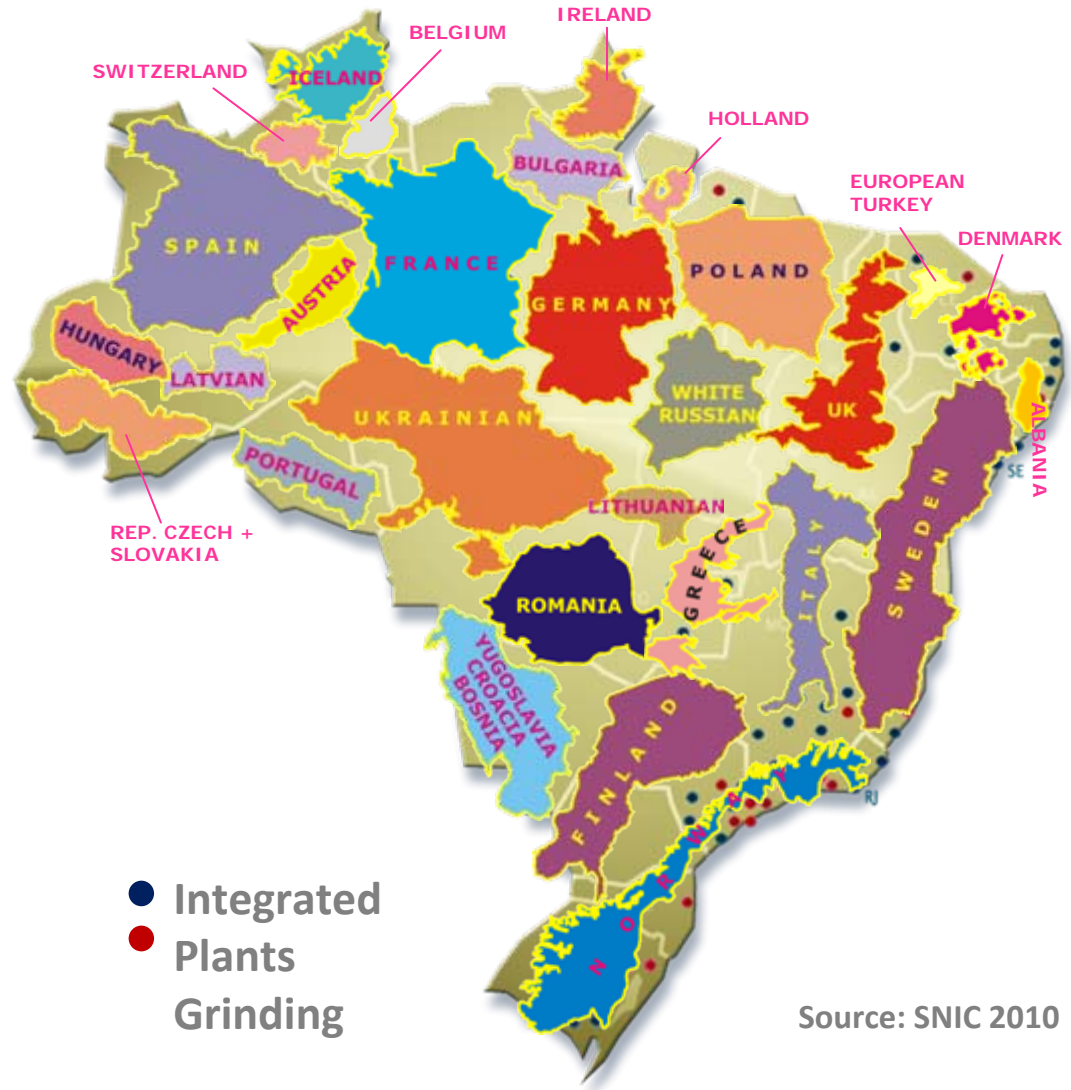
Brazilian Cement Industry

26 companies, controlled
by
12 industrial groups

71 plants

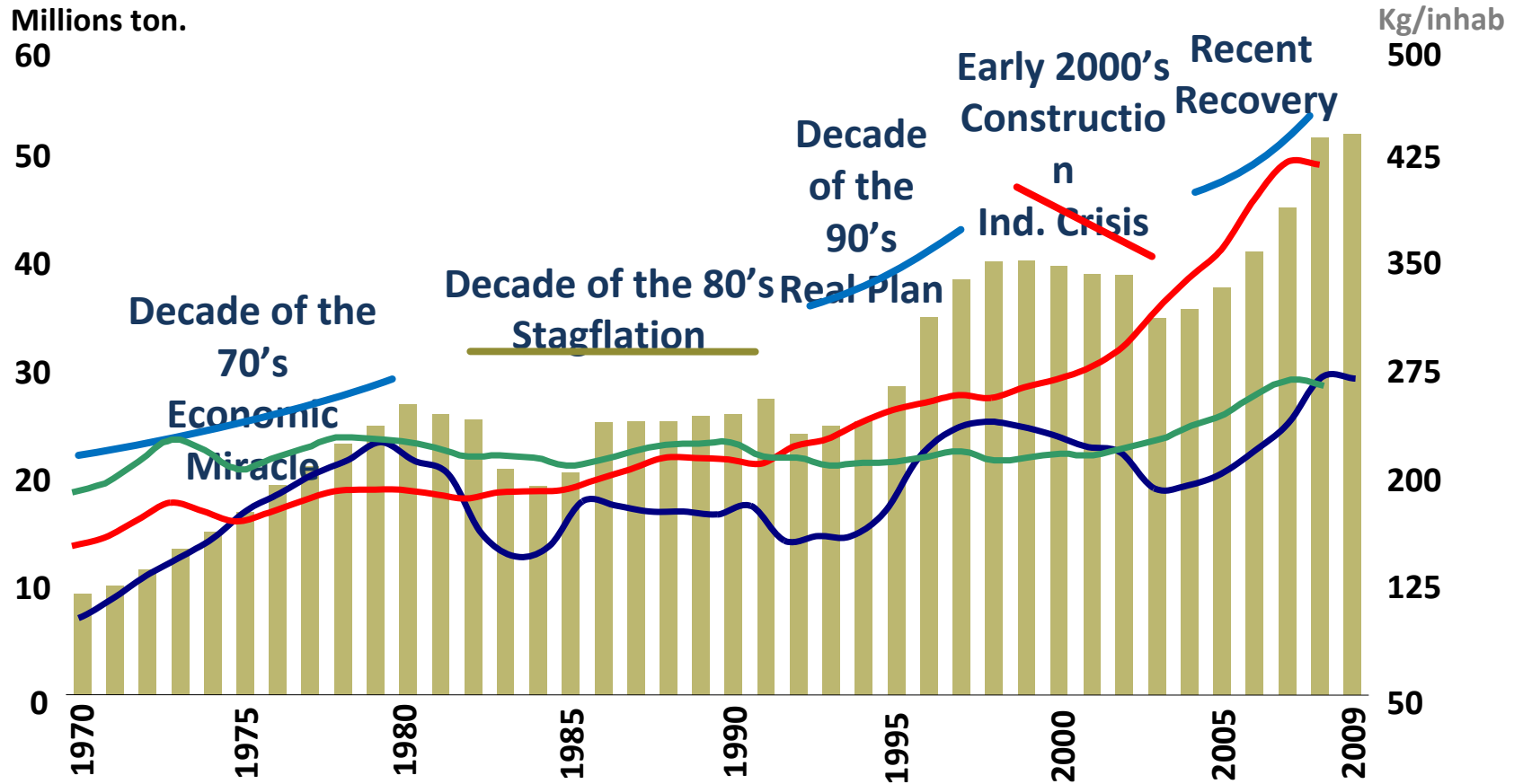
- 47 integrated
- 24 grinding stations

Capacity: 67 M tons/year



Source: SNIC 2010

Apparent Consumption of Cement in Brazil



— Brazil apparent consumption

— Brazil per capita consumption

Source: SNIC 2010

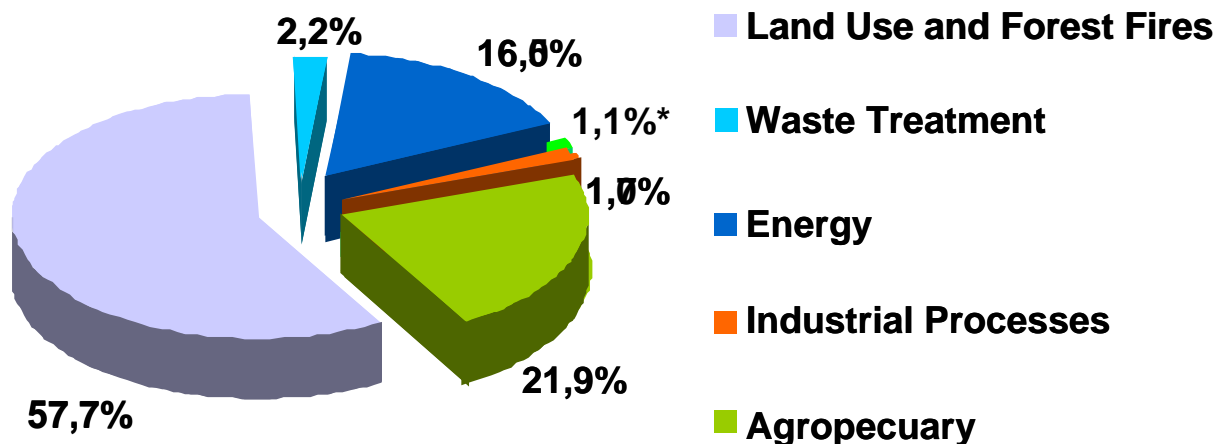
— World per capita consumption

— World per capita consumption (excl. China)

2nd Brazilian GHG Inventory

The Brazilian 2nd GHG Inventory was made in 2010, for the period between 1990-2005

PARTICIPATION - 2005



Brazil (2005): 2,2 Bi ton CO₂

(*) Cement Emissions: 1,1%

□ Cement Sustainability Initiative



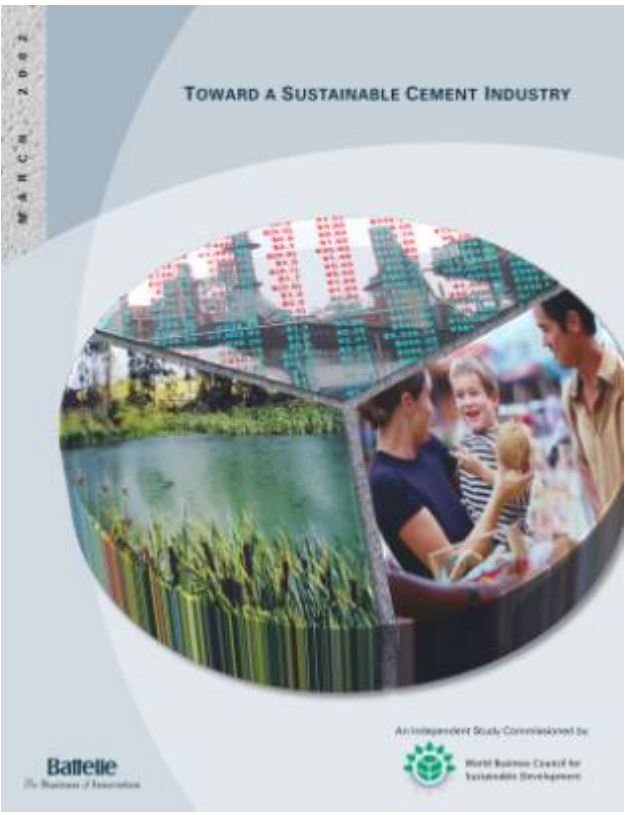
Cement Sustainability Initiative

- ❑ In 1999, ten of the world's largest cement companies, including Votorantim Cimentos, created a group to promote the sustainable development of the cement industry, the Cement Sustainability Initiative (CSI), which was done in partnership with the World Business Council for Sustainable Development (WBCSD).
- ❑ Three years later, the group launched the na agenda with targets and commitments to compasate for and mitigate its impact on the environment.
- ❑ Liason Delegate: Edvaldo Araujo Rabelo
- ❑ Council Member: Walter Schalka

3 Stages: 2000 – present

Independent Study

1999 - 2002



Planning

2002



Action

2002 - 2020

Individual Implementation



Joint Projects

+

Communication and Report

Summary of the Agenda for Action

Joint projects to develop :

- guidelines,
- best practices,
- reporting and monitoring systems

Individual company actions

- commit to SD
- implement guidelines
- publish emissions
- Set targets and report progress

In six key areas

- Climate protection

New:

- Concrete recycling
- Sustainable construction

- Materials use

- Employee health and safety

- Emissions reduction

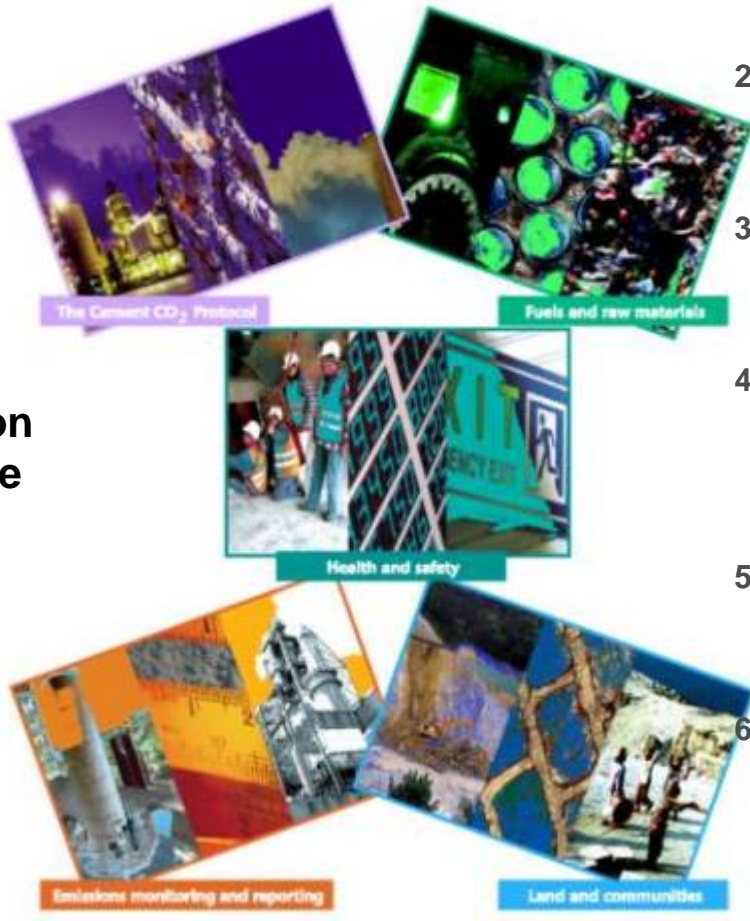
- Local impacts on land and communities

- Communications and progress reporting

Defining Good Practice

Cement Sustainability Initiative (CSI)

Our Guidelines



Available on
CSI website

1. Updated and improved **CO₂ accounting and reporting**
2. Guidelines for the **responsible use of fuels and materials** in cement kilns.
3. Developed a consistent set of **safety metrics**.
4. Developed a collection of good practice examples for **Health and Safety management**.
5. Protocol for **emissions monitoring and reporting**
6. Guidelines for **environmental and social impact assessment** for the cement sector.

Pro-active approach of CO₂ management

Joint Work

- CO₂ Protocol – common monitoring and report
- Best practices for the responsible use of fuels and raw materials
- CO₂ data collection
- Sectoral Approach for the management of CO₂ emissions
- New CDM methodology

Inside a cement kiln, where temperatures reach more than 1400°C (2550°F).

Individual Company

Actions

- Apply the monitoring system
- Define reduction targets
- Publish progress made
- Third party assurance

Used plastic insulation to be used as an alternative fuel.



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□ CO2 Policy and Votorantim Cimentos reduction targets



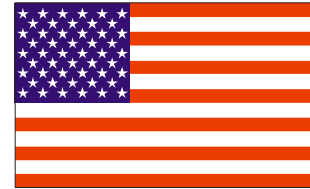
VC CO2 Policy and Reduction targets

Our CO2 emission reduction strategy includes :

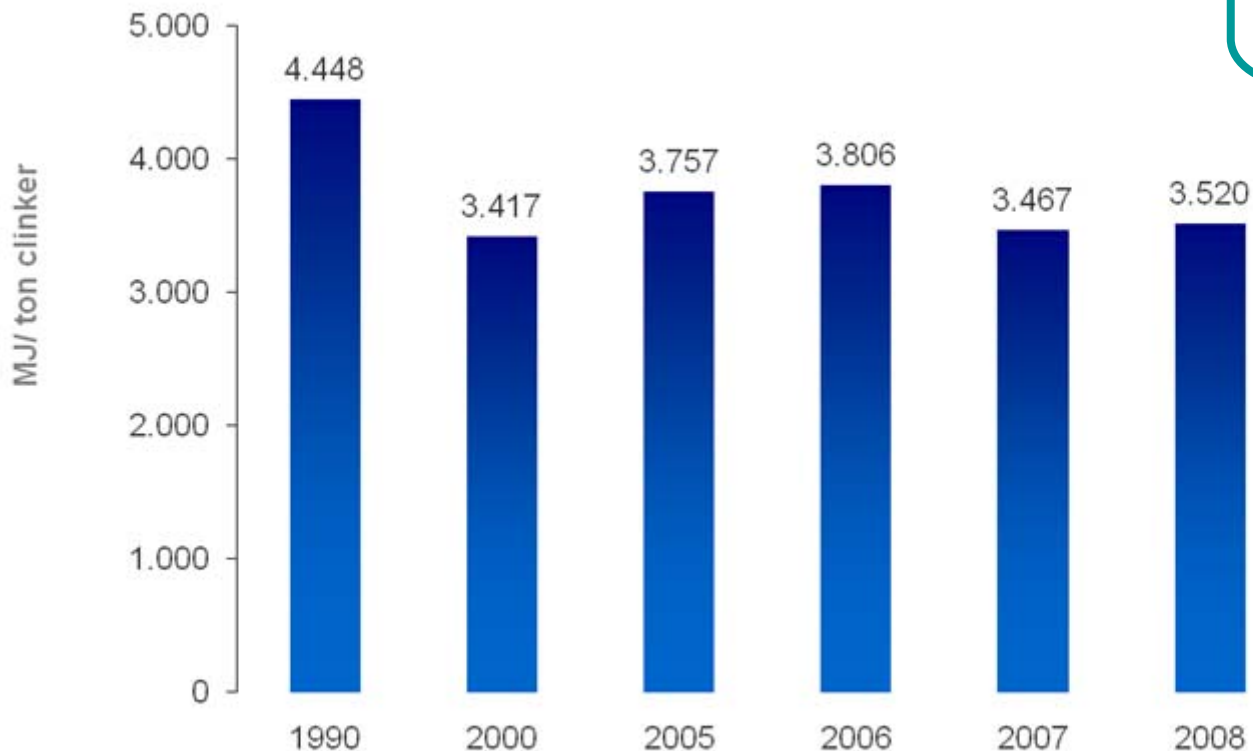
1. **Energy Efficiency:** Invest in technologies that improve thermal efficiency and prioritize use of more energy efficient kilns.
 - ✓ Expansion
 - ✓ Waste Heat Recovery – not yet implemented
 - ✓ Optimize the efficiency of the existent small hydroelectric plants
 - ✓ New small hydroelectric plants
2. **Alternative Fuels:** Optimize our energy matrix, using more biomass and industrial waste with lower emission factors (kg CO2/Kcal).
3. **Blending Materials:** Investment in research and development in order to be able to increase cimenticious (reducing use of clinker) without changing and even improving the performance of our product.
4. **Carbon Capture and Storage - not yet ready**

Energy Efficiency: History of Technical Evolution in Votorantim Cimentos

- ❑ 1970 – Installation of the first 4 stage kiln in Brazil (2000 ton/day Santa Helena)
- ❑ 1975 – Installation of the biggest kiln in Brazil (3500 ton/day Santa Helena)
- ❑ One of the first Brazilian companies to ban wet kilns and now does not have any wet kilns in its operations (Brazil, USA and Canada)
- ❑ Expansion (2008-2013) – new plants already highly energy efficient. Deployment of existing state-of-the-art technologies in new cement plants.
- ❑ Retrofit- retrofit of energy-efficiency equipment where economically viable (e.g. Santa Helena plant)



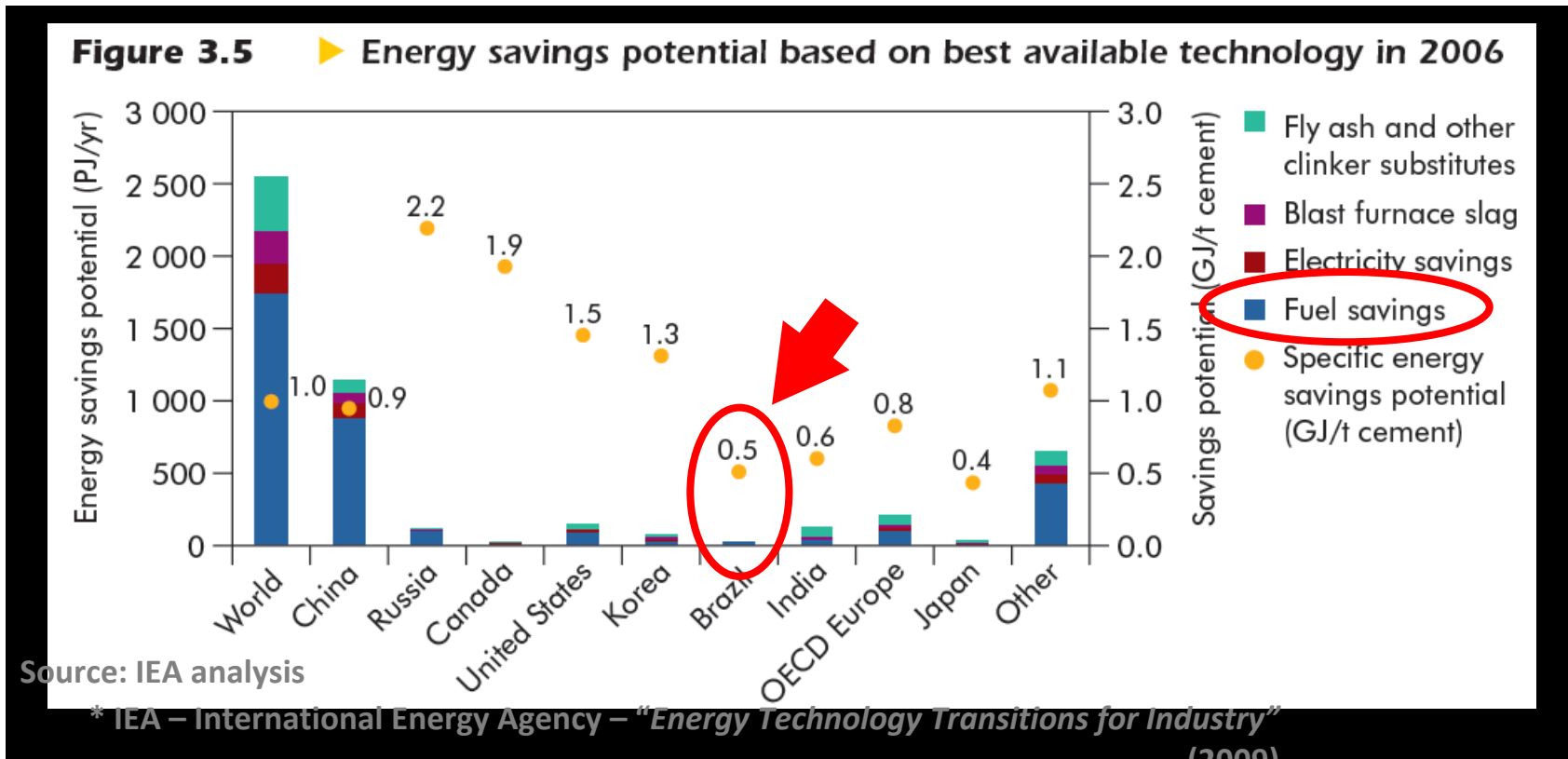
Energy Efficiency - Specific heat consumption in clinker production (VC Global- Brazil, USA and Canada)



Reduction of 21% in thermal consumption!!!

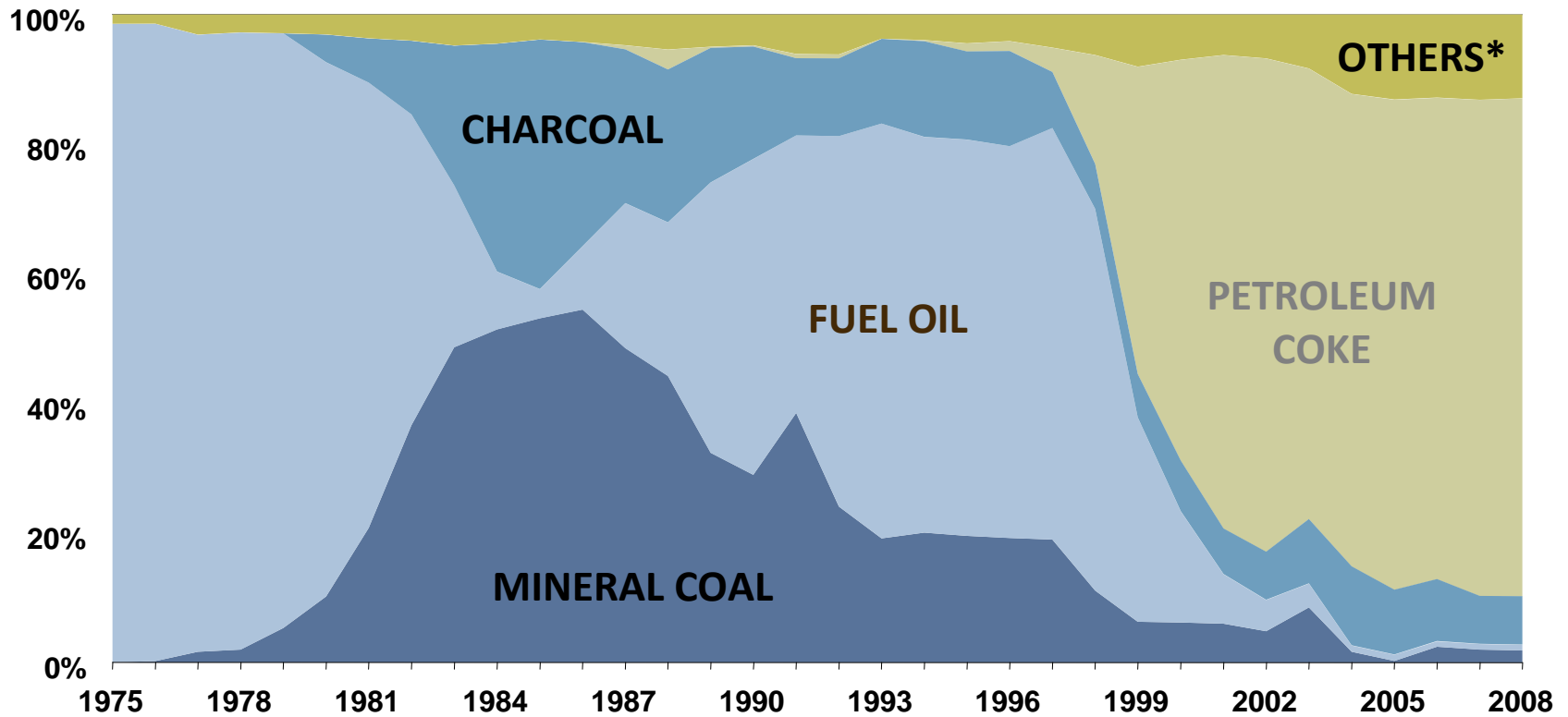
Energy Efficiency

According to the International Energy Agency*, the cement industry in Brazil, due to the state of excellence it has already achieved, presents one of the lowest potentials for reduction in consumption of energy per ton of cement when compared to the other large world producers.



Alternative Fuels

Structure of Fuel Consumption in the Cement Industry



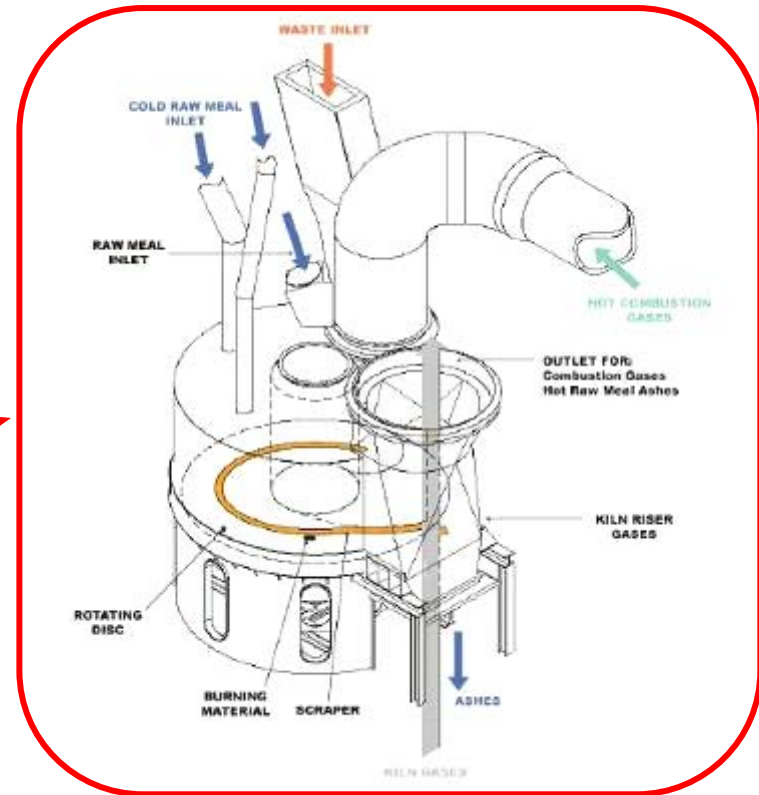
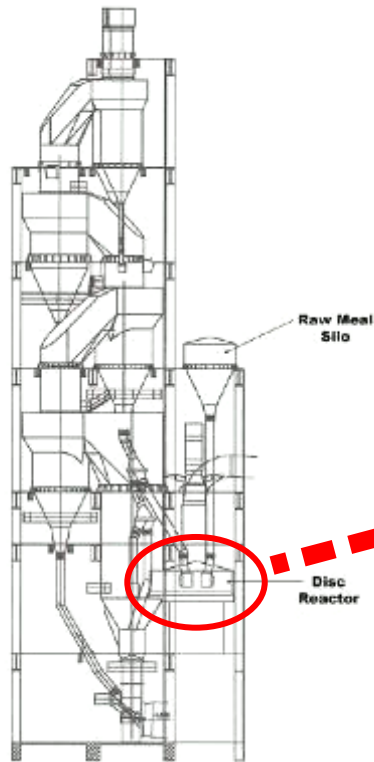
* Biomass, wastes, etc.

Source: National Energy Balance Sheet - 2009



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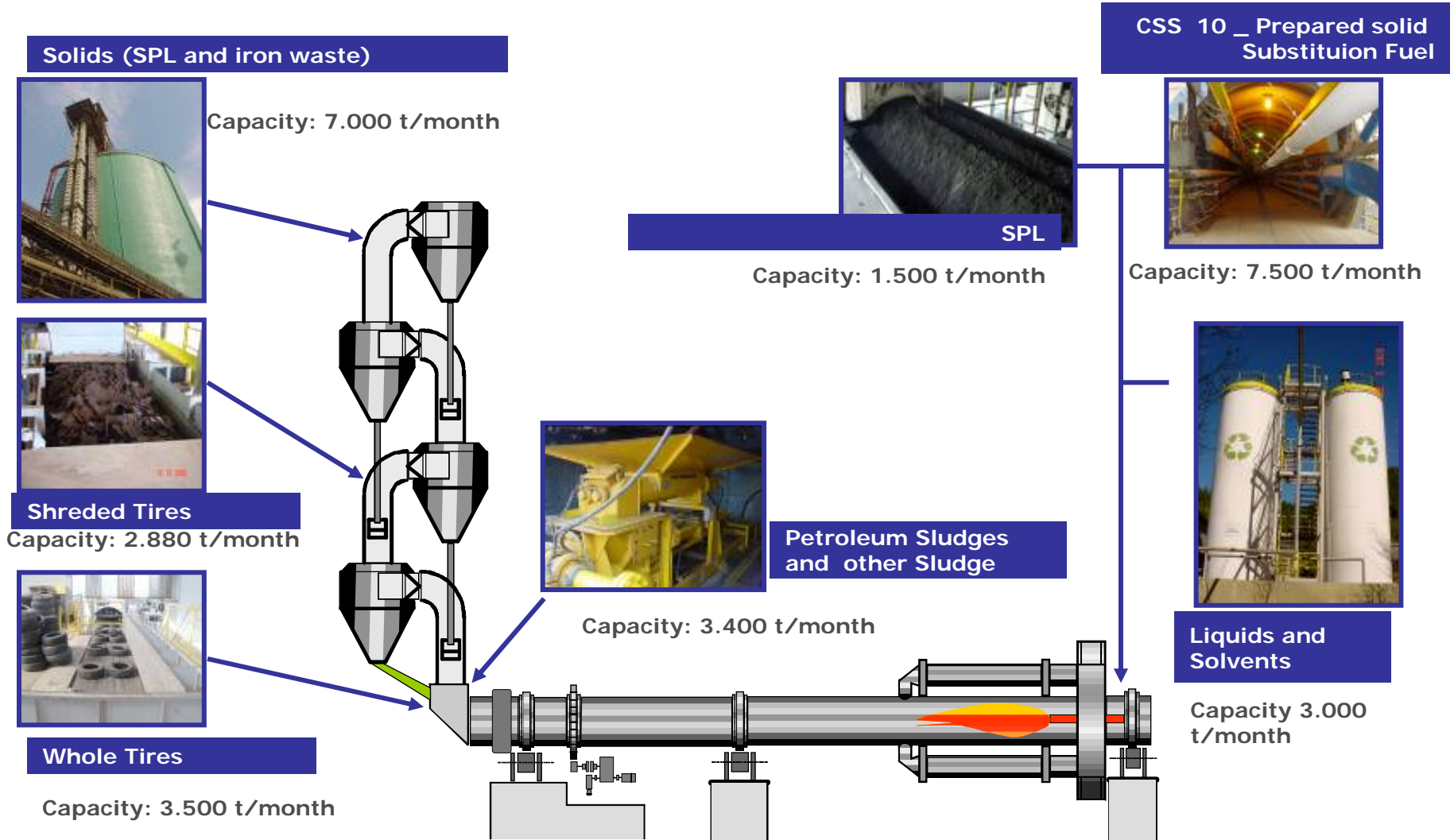
Alternative Fuels- Examples from Votorantim Cimentos- Hot disc





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Alternative Fuels- Use of waste fuel in Rio Branco





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Alternative Fuels - Use of waste fuels in Itaú de Minas



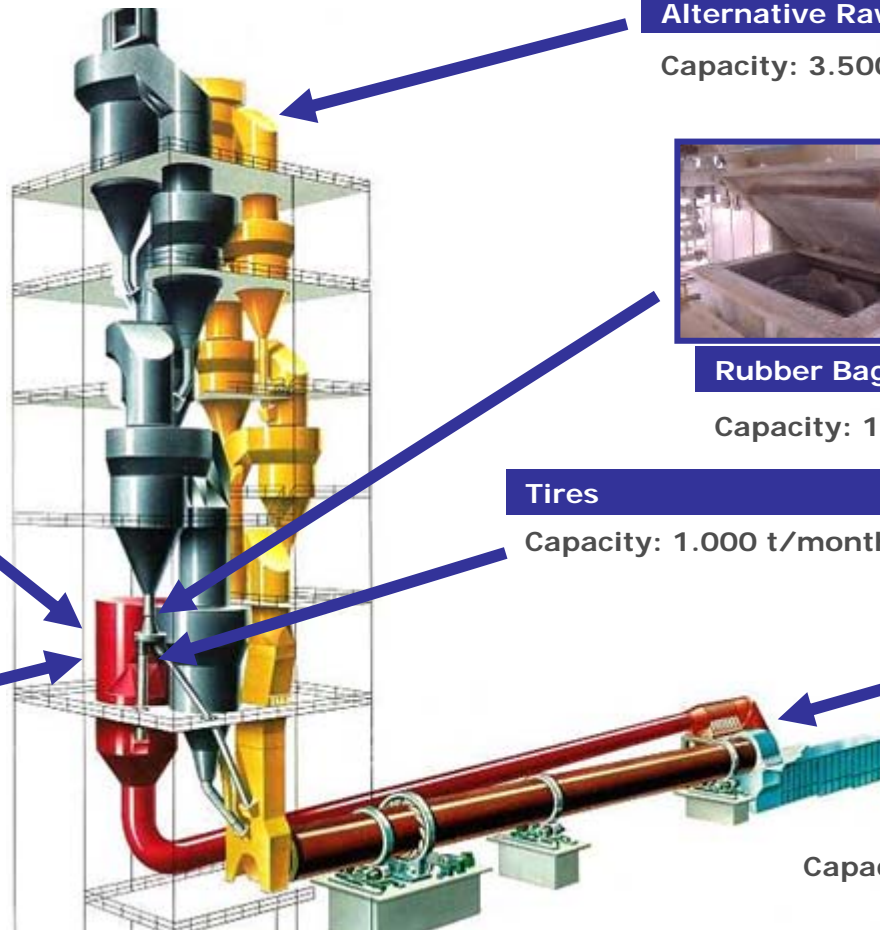
**Petroleum Sludge and
other Sludge s**

Capacity: 3.000 t/month



CSS 40

Capacity: 2.880 t/month



Alternative Raw Material

Capacity: 3.500 t/month



Rubber Bags

Capacity: 100 t/month

Tires

Capacity: 1.000 t/month



SPL

Capacity: 1.000 t/month



Alternative Fuels – Consolidated VC Brazil

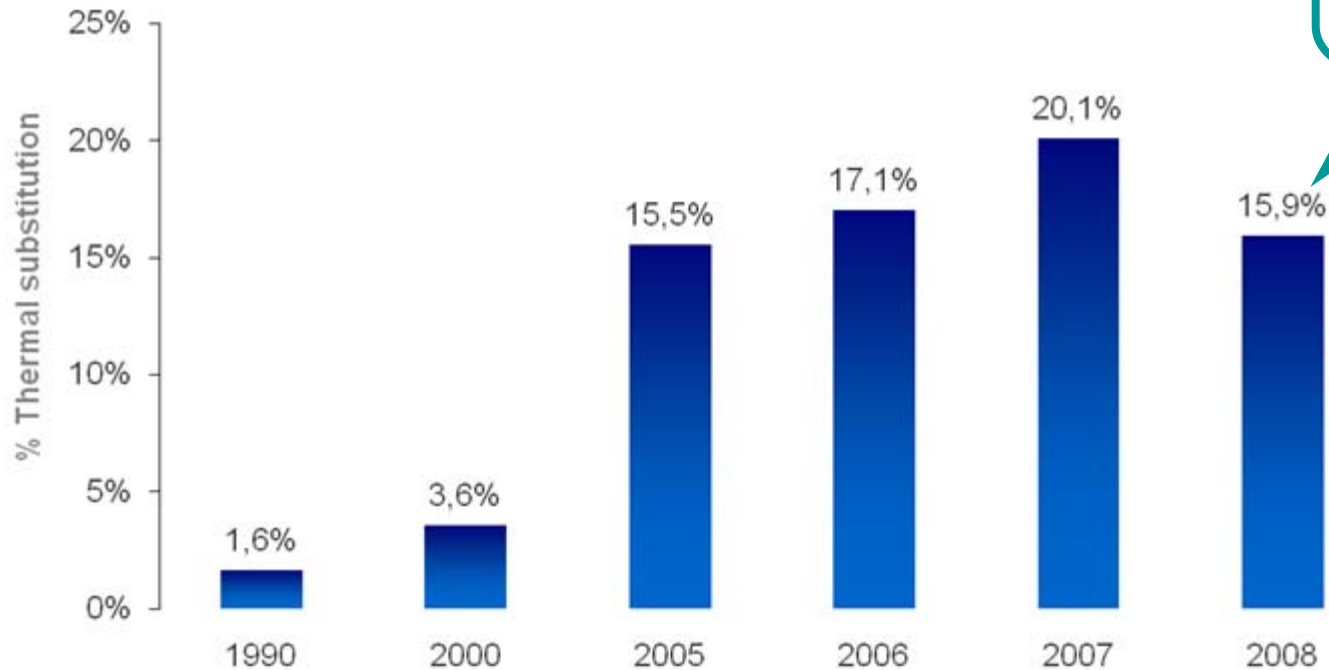


- ❑ Use of alternative fuels in all plants.
- ❑ Go from current 350,000 t/year to 1,000,000 in 3 years.

- ❑ Some figures from Brazil 2009:
 - ❑ 950,000 t/year (without biomass)- VC aprox. 40%
 - ❑ Alternative raw material: 29%
 - ❑ Alternative fuel: 52%
 - ❑ Tyres: 19%- VC aprox. 80%



Alternative Fuels - Rate of thermal energy substitution for waste and biomass (VC Global- Brazil, USA and Canada)



Increase of 88% in substitution for alternative fuels!!

Blending Materials

In accordance to Brazilian Standards*, the use of slag and fly ashes in the production of different types of cement is one of the main alternatives for reducing emissions from this industry

Common Portland Cement (since 1926)

CP I-S: 1 - 5% additions

Blast Furnace Cement (since 1952)

CP III: 35 - 70% slag

Pozzolanic Cement (since 1969)

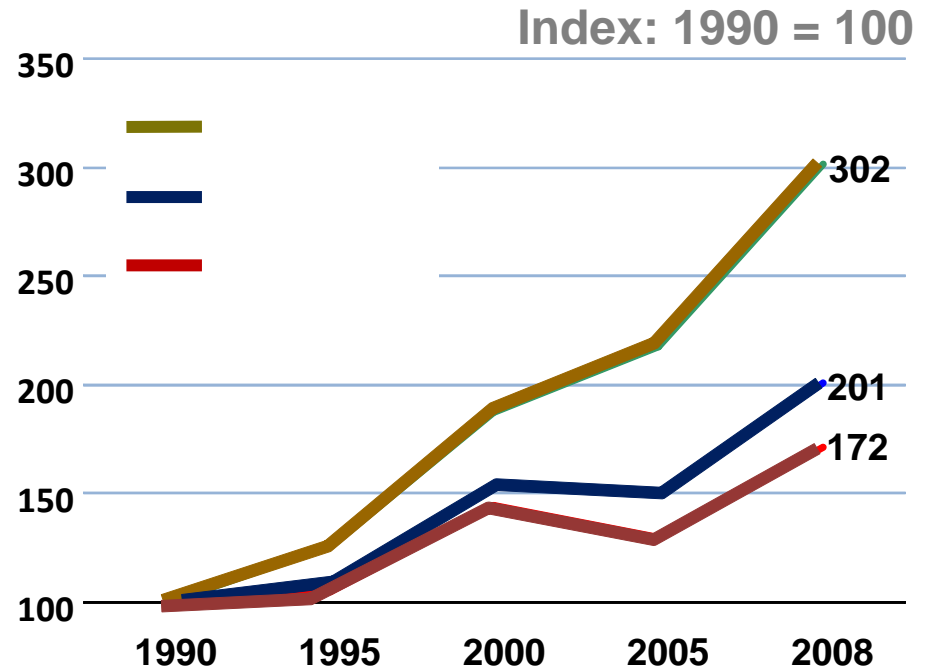
CP IV: 15 - 50% pozzolan

Compound Cement (since 1991)

CP II-E: 6 - 34% slag

CP II-Z: 6 - 14% pozzolan

CP II-F: 6 - 10% limestone



* Additions incorporated into the clinker during the cement manufacturing process

Blending Material - Regional Differences

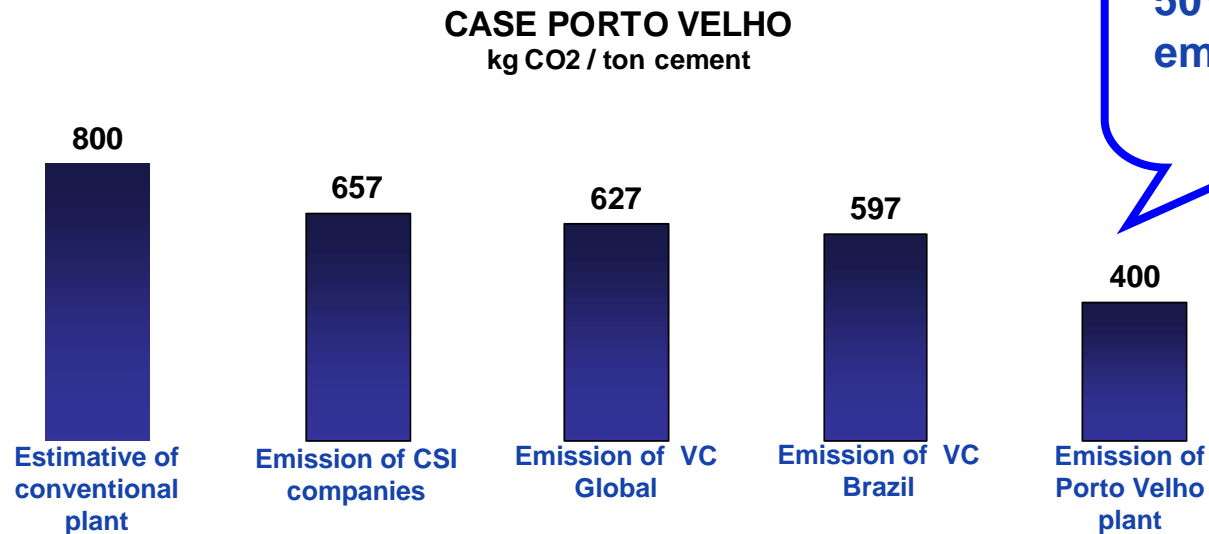
	SOUTH	SOUTH EAST	MIDDLE WEST	NORTH NORTHEAST
Fly Ash	✓ ✓			
Blast Furnace Slag		✓ ✓		
Artificial Pozzolans			✓	✓
Natural Pozzolans				✓



Blending Materials - Case Porto Velho

Significant CO2 Reduction

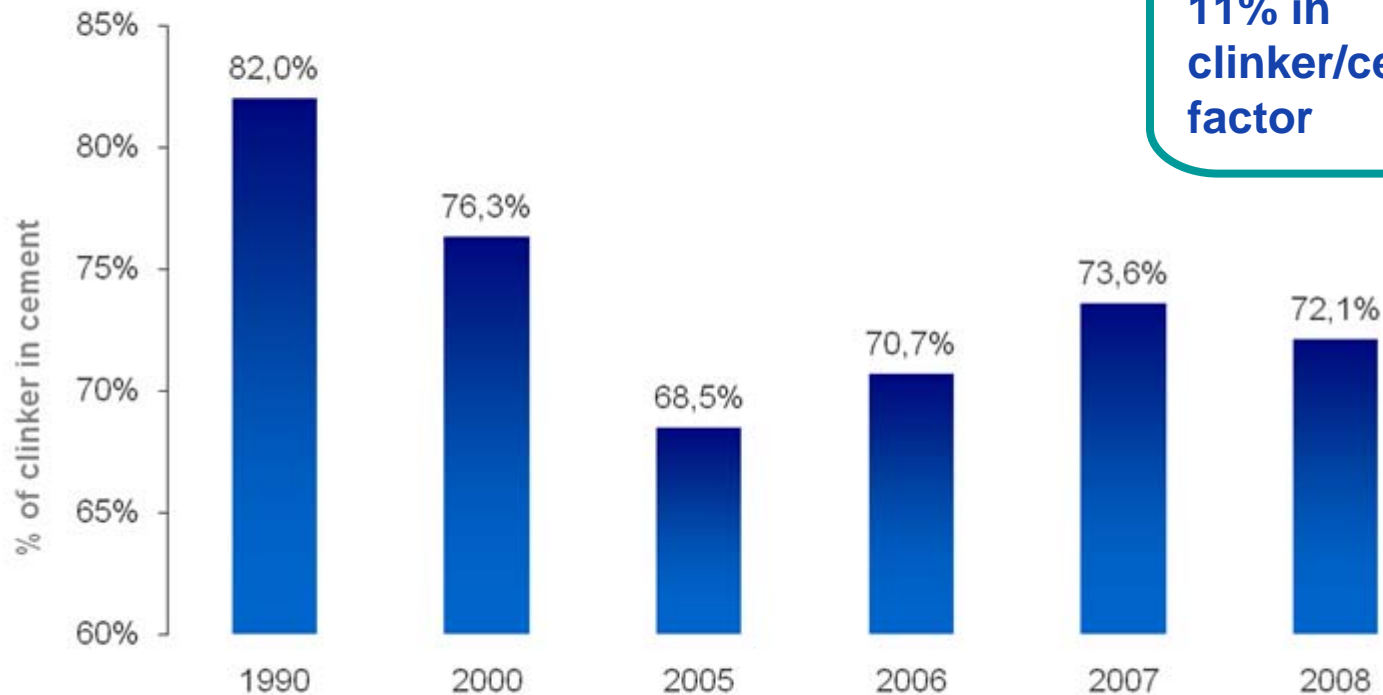
- Data from Porto Velho plant:
 - Production: 750.000 tons of cement
 - Start up: 1st half of august - 2009





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Blending Materials - Clinker/ Cement Factor (%) (VC Global- Brazil, USA and Canada)



Reduction of 11% in clinker/cement factor

CO2 Capture - Algae project in Canada

- ❑ The algae project, which went live last fall, is believed to be the first in the world to demonstrate the capture of CO₂ from a cement plant.
- ❑ In essence, St. Marys wants to grow its own fuel in a way that's constantly recycling the CO₂ emissions from its plant, allowing it to produce what could become "green" cement
- ❑ The company, part of Brazilian conglomerate Group Votorantim, is preparing for a carbon-constrained future that won't treat cement makers and other energy-intensive industries kindly. That's because producing 100 tonnes of cement releases an average of 83 tonnes of CO₂, according to the International Energy Agency.
- ❑ Considering cement is sold for a couple of hundred dollars a tonne, even a conservative \$30 price per tonne of CC-2 would add nearly 15 per cent to the final price tag.
- ❑ "The amount of exposure to carbon pricing we face as an industry is very high," says Vroegh. "If we want to be around tomorrow we have to be sustainable. This project helps us achieve that."



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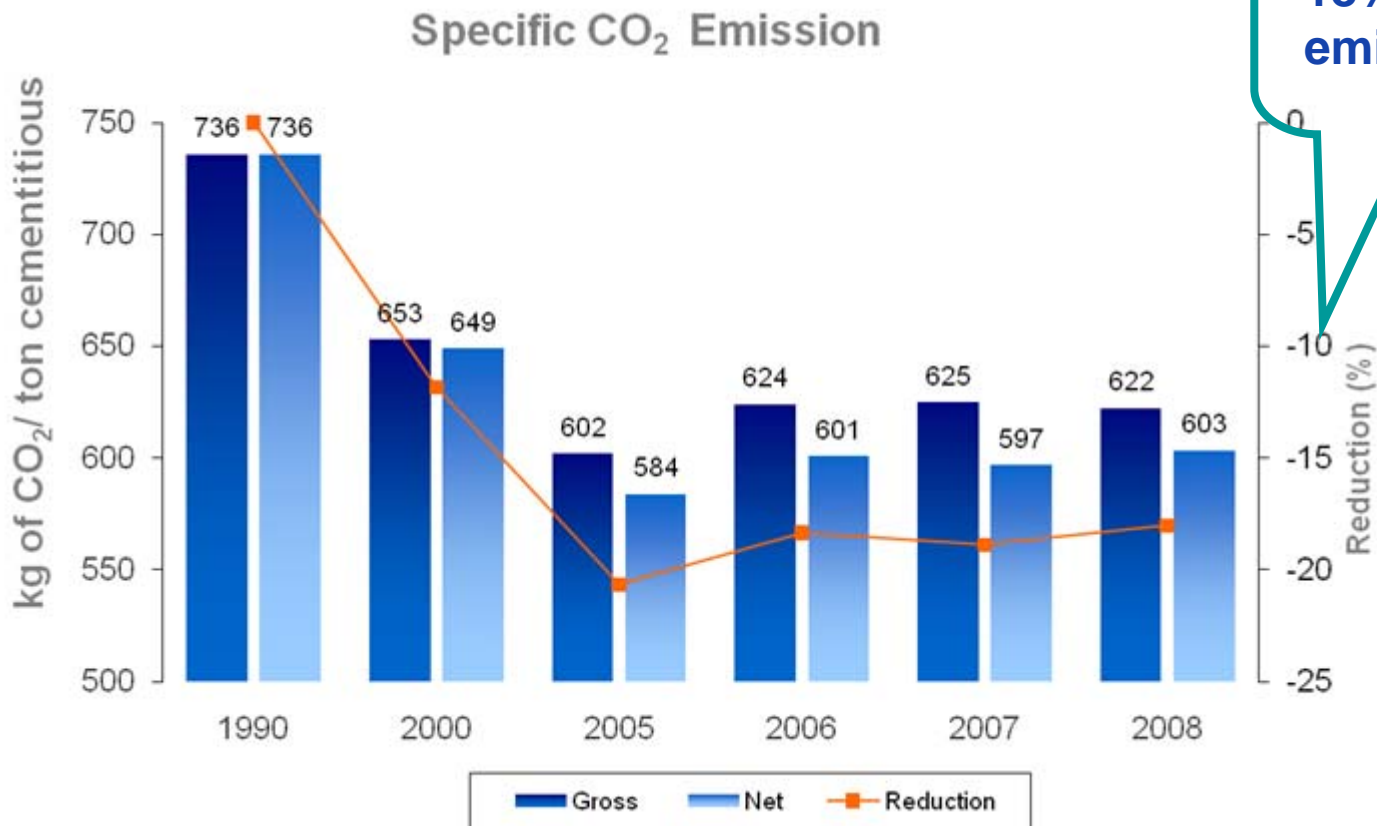
□ Carbon Emission Inventory for Votorantim Cimentos





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VC CO₂ Emissions Inventory (VC Global- Brazil, USA and Canada)





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□ CDM Projects at Votorantim Cimentos





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CDM Project - Cubatão

- ❑ **Registration date: December 28th 2006**

- ❑ **Summary: The project consists in replacing fuel oil with natural gas in the blast furnace slag drier at Votorantim Cimentos, in the plant of Cubatão - SP, contributing to mitigation emission of greenhouse gases.**

- ❑ **Approved methodology: AMS.III-B – Substitution of Fossil Fuels**

- ❑ **Volume of CO2 equivalent reduced: 14,518 ton**

- ❑ **Crediting period: 2004 to 2010**



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CDM Project – Pedra do Cavalo

- ❑ **Registration date: December 31st 2006**
- ❑ **Summary: The project consists in building electrical substations and in manufacturing and installing turbines and generators for a hydroelectric generation center built on a reservoir, whose main objective was supplying water to the city of Salvador.**
- ❑ **Approved Methodology: ACM0002 - “Consolidated baseline methodology for generation of electricity from renewable sources linked to the main grid” – Version 6 of May 19th 2006**
- ❑ **Volume of CO2 equivalent reduced: 416.395 ton**
- ❑ **Crediting period: 2005 to 2011**

□ Prizes





In 2009 and 2010 Votorantim Cimentos was awarded as a “**Leader Company in Climate Policy**” by Época magazine

Project: Porto Velho



In 2008 Votorantim Cimentos was awarded the “**Best Carbon Management**” by Época magazine Climate Change Prize



In 2005, Votorantim Cimentos was awarded the CNI Prize in the Environmental category.

Project: Co-processing of tyres in Rio Branco



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□ Final Considerations



□ Company contact data



Company Contact Data

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Towards a Sustainable Cement Industry !

