Gaining Business Value from LCM at Rio Tinto Borax

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InLCA/LCM Conference

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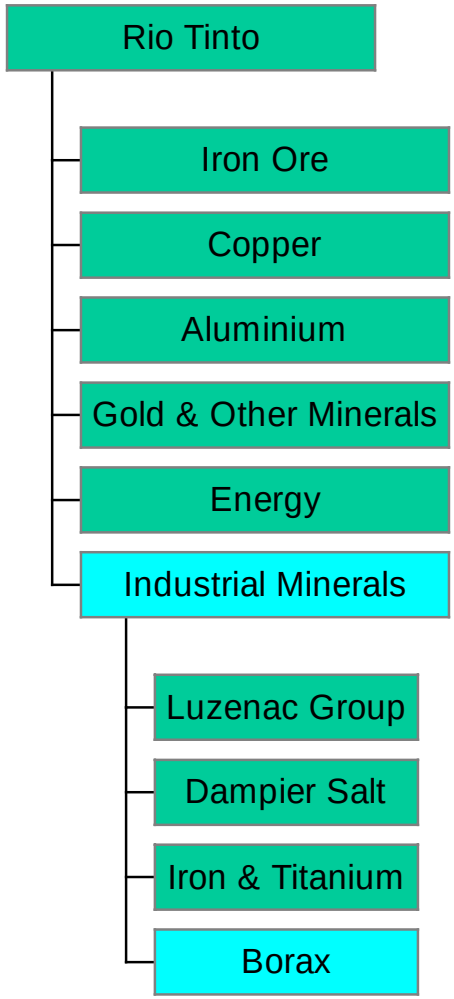
BORAX

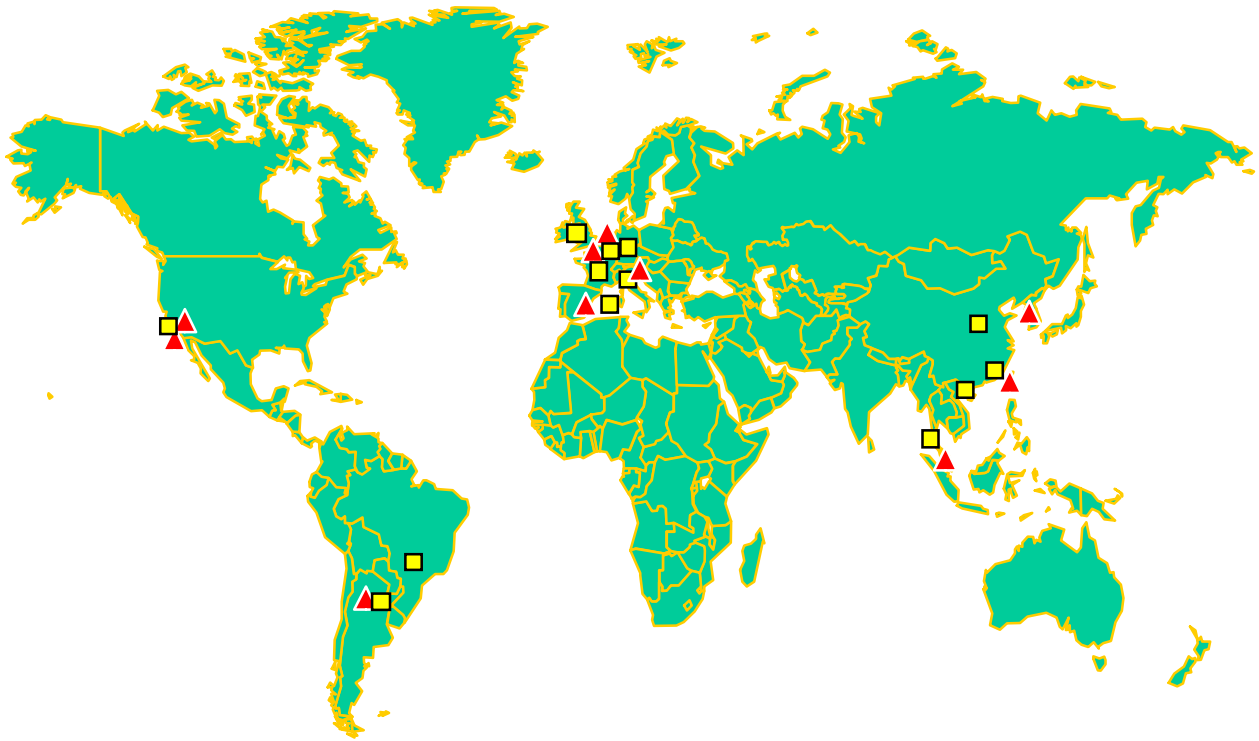
Outline

- **Who is Rio Tinto Borax?**
- **Sustainable Development at Borax**
- **LCM at Borax**
  - **Why Borax is using LCA**
  - **What Borax has done**
  - **How Borax is using LCA**
- **Future Uses**
- **Business Benefits**

BORAX


Rio Tinto
Iron Ore
Copper
Aluminium
Gold & Other Minerals
Energy
Industrial Minerals
Luzenac Group
Dampier Salt
Iron & Titanium
Borax

World-wide facilities



▲ Mines/Refineries/Terminals
- Boron, USA
- Wilmington, USA
- Salta, Argentina (4 mines plus refinery)
- Coudekerque, France
- Rotterdam, Netherlands
- Valencia, Spain
- Monfalcone, Italy
- Pusan, South Korea
- Kaoushiung, Taiwan
- Port Klang, Malaysia

□ Corporate/Sales Technical Support
- U.S. Borax, Valencia, USA
- Borax Argentina, Argentina
- Borax Brasil, Brazil
- Borax Benelux, Belgium
- Deutsche Borax, Germany
- Borax España - Spain
- Borax Europe, UK
- Borax Francais - France
- Borax Italia - Italy
- Borax Asia - Singapore
- Borax Asia - Beijing
- Borax Asia - Shanghai
- Borax Asia - Guangzhou

Warehouses (not shown)
- Austria
- Germany
- Norway
- Russia
- Ukraine
- United Kingdom

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Borax principal products

Sodium Borates	Principal Uses
Borax Decahydrate (10 Mol)	Cleaning
Borax Pentahydrate (5 Mol)	IFG, Detergents, Agriculture
Anhydrous Borax	Borosilicate Glass, Enamel
Non Sodium Borates	
Boric Acid	TFG, Ceramics, Chemicals
Anhydrous Boric Acid	Specialty glass

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- **What is SD?**
  - **core business strategy of Rio Tinto and Borax, it includes an integrated consideration of:**
    - **economic performance**
    - **environmental management**
    - **social responsibility**
    - **ethical, transparent & accountable business practices**
  - **Integrating SD into Sales and Marketing processes is key to achieving business value**

Borax Sustainable Development Objectives

1. To protect the safety and health of employees, contractors, neighboring communities and the public.

2. To enhance the human potential and well-being of communities and employees

3. ***To maximize efficient utilization of resources while minimizing environmental impacts of our operations***

4. To optimize our economic contribution to society

5. ***To expand how our products contribute to sustainable development***

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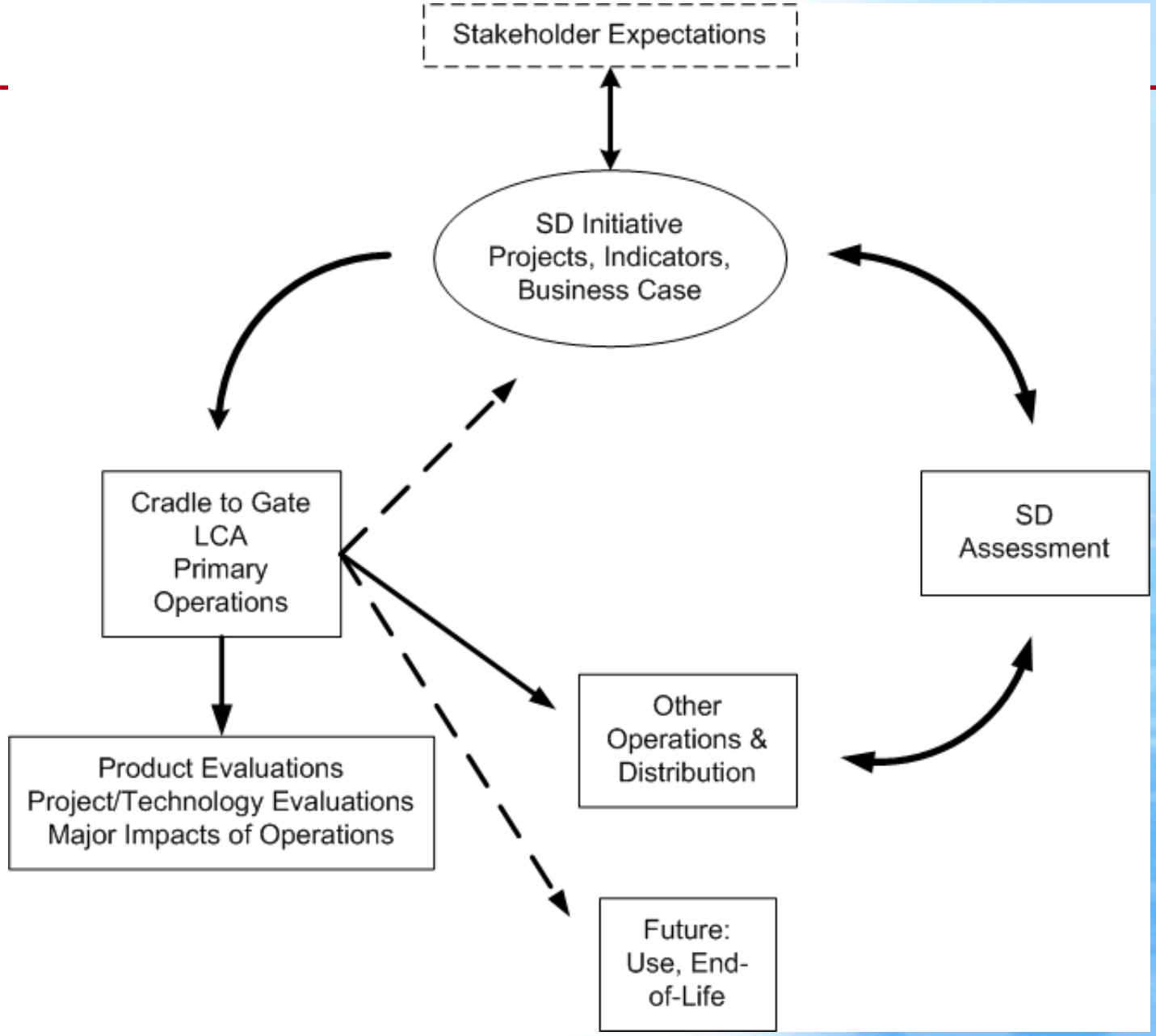
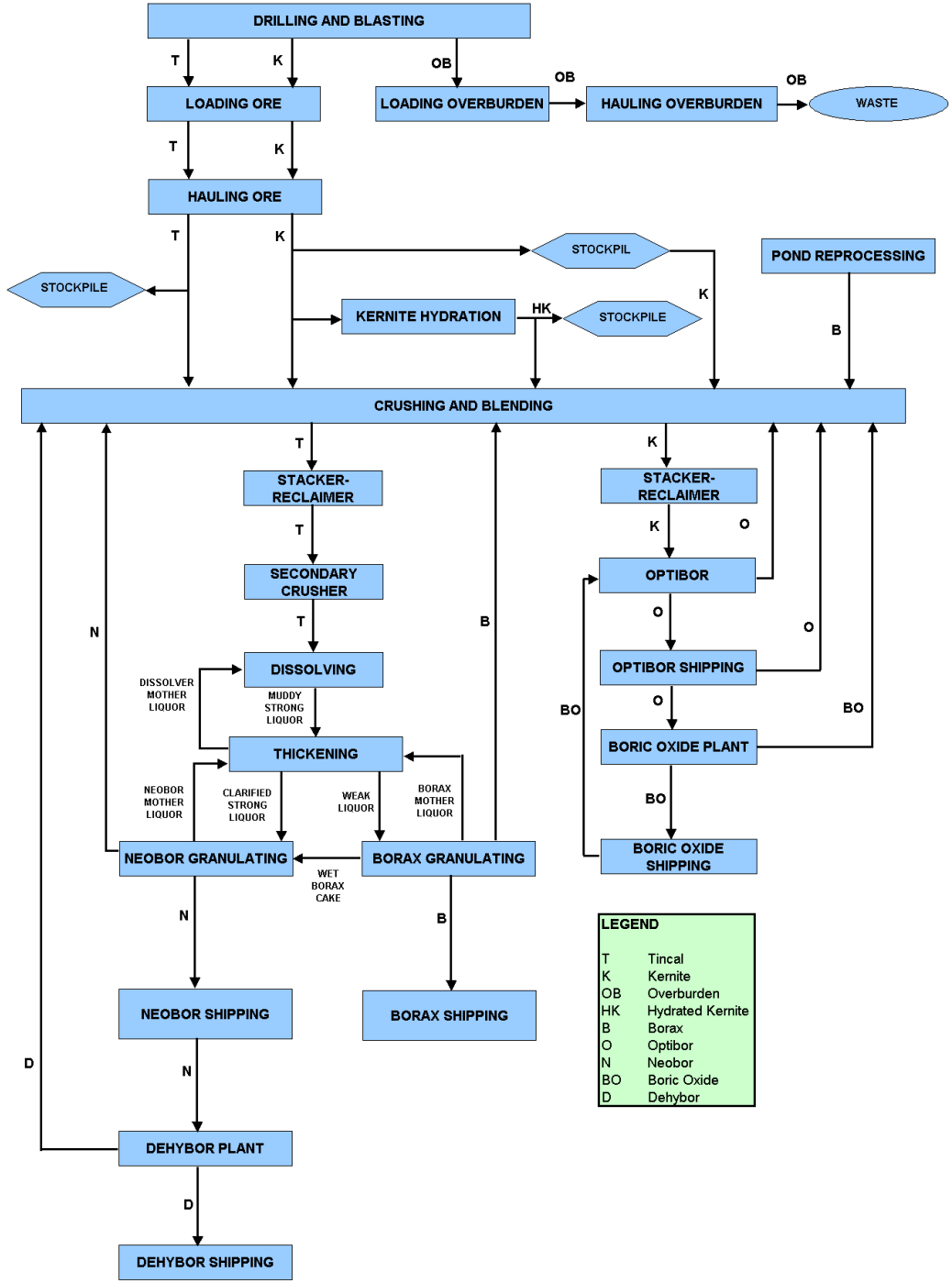
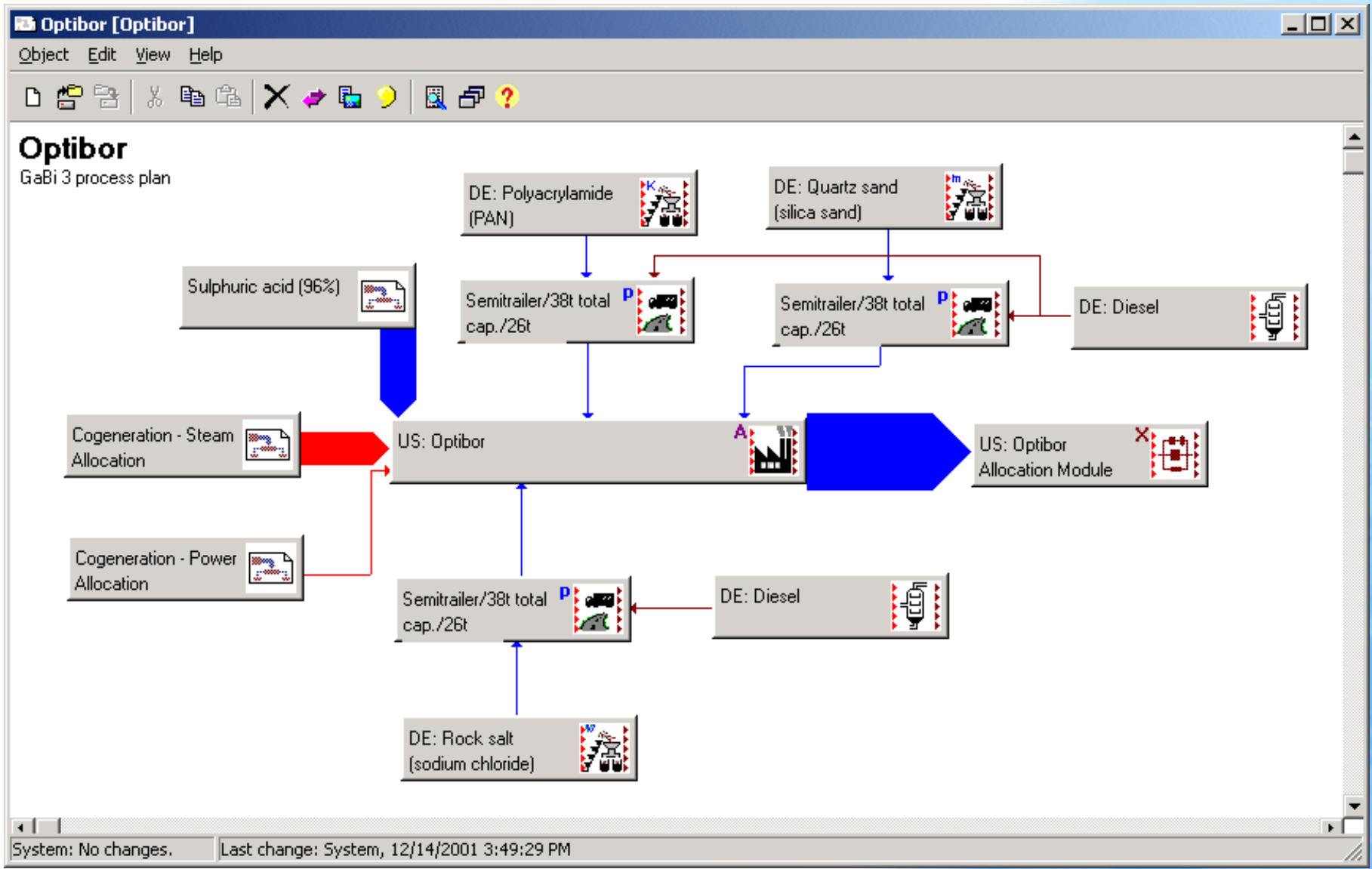

Stakeholder Expectations
SD Initiative
Projects, Indicators,
Business Case
Cradle to Gate
LCA
Primary
Operations
SD
Assessment
Other
Operations &
Distribution
Product Evaluations
Project/Technology Evaluations
Major Impacts of Operations
Future:
Use, End-
of-Life

LCA – Boron Operations

Detailed process map of processes defined for LCA study



Optibor(Boric Acid) GaBi Model



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- **Completed Boron Operations LCA**
- **Conducted LCA of Wilmington Operations & products**
- **Conducted logistics analysis of 20 routes used worldwide**
- **Initiated an LCA of borate treated wood and OSB**
- **Conducted high level training for some sales staff**
- **Aligning models (Boron and Wilmington) with GHG reporting**
- **Assessed Boric Acid Plant upgrade options (project alternatives)**

Customers

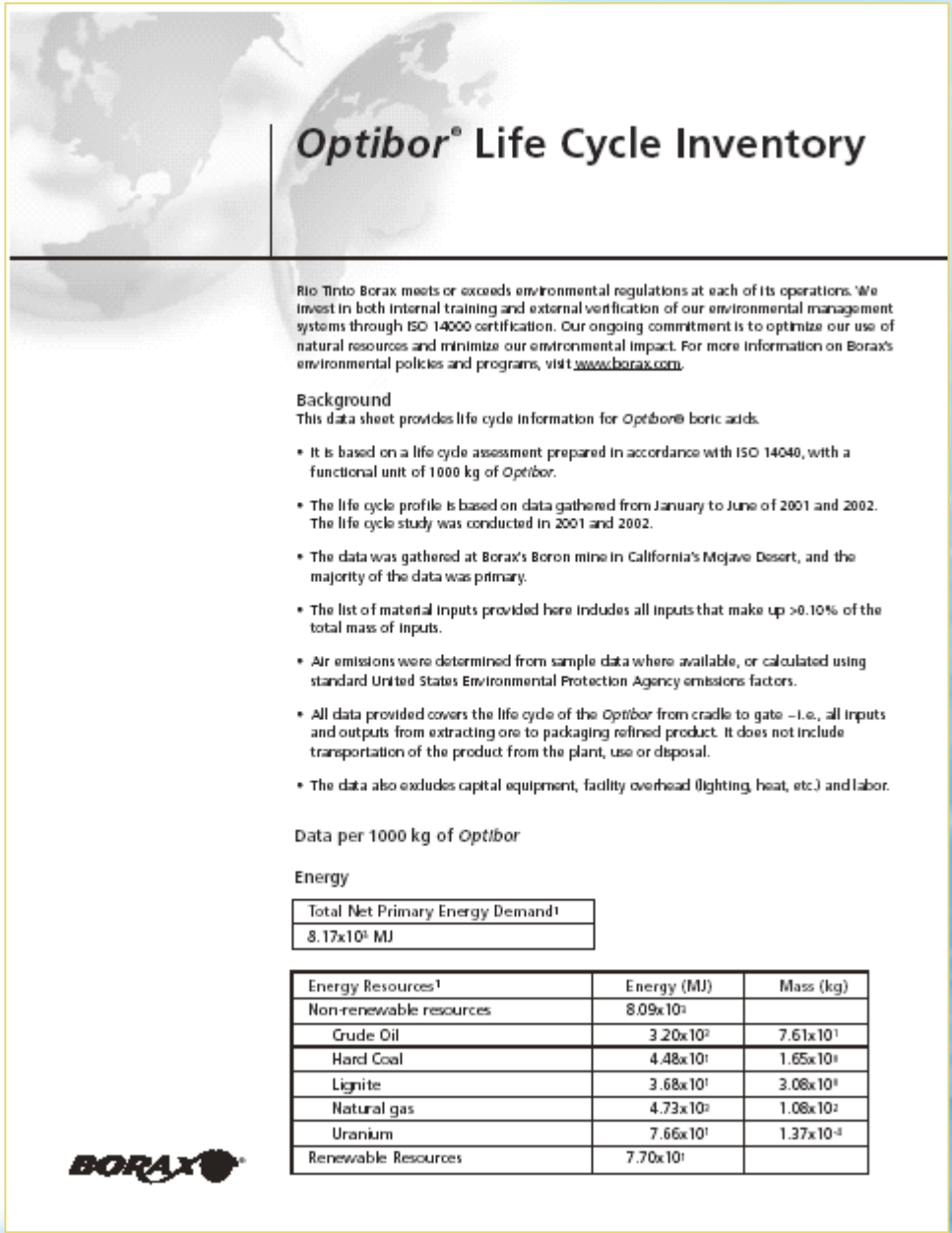
- Understand customer requirements
- Identify competitive opportunities
- Tailor data to meet needs and build into customer consultations and sales and marketing efforts
- Protect proprietary information - Black box LCI data transfer to existing customers

Other Stakeholders

- **Communicating contribution of Borax products to Sustainable Development through SD report and other product communications**
- **As Borax develops processes to identify stakeholder information needs, LCA data can support this effort**

Life Cycle Inventories for Customers

- **Customers such as DaimlerChrysler and Warmcell asking for LCA information on Borax's products**
- **Using LCA model and European Eco-Labeling standards, developed LCI Profiles on 5 of Borax's products to date**



Optibor® Life Cycle Inventory

Rio Tinto Borax meets or exceeds environmental regulations at each of its operations. We invest in both internal training and external verification of our environmental management systems through ISO 14000 certification. Our ongoing commitment is to optimize our use of natural resources and minimize our environmental impact. For more information on Borax's environmental policies and programs, visit www.borax.com.

Background

This data sheet provides life cycle information for *Optibor*® boric acids.

- It is based on a life cycle assessment prepared in accordance with ISO 14040, with a functional unit of 1000 kg of *Optibor*.
- The life cycle profile is based on data gathered from January to June of 2001 and 2002. The life cycle study was conducted in 2001 and 2002.
- The data was gathered at Borax's Boron mine in California's Mojave Desert, and the majority of the data was primary.
- The list of material inputs provided here includes all inputs that make up >0.10% of the total mass of inputs.
- Air emissions were determined from sample data where available, or calculated using standard United States Environmental Protection Agency emissions factors.
- All data provided covers the life cycle of the *Optibor* from cradle to gate – i.e., all inputs and outputs from extracting ore to packaging refined product. It does not include transportation of the product from the plant, use or disposal.
- The data also excludes capital equipment, facility overhead (lighting, heat, etc.) and labor.

Data per 1000 kg of *Optibor*

Energy

Total Net Primary Energy Demand[1]
8.17×10^{3} MJ

Energy Resources[1]	Energy (MJ)	Mass (kg)
Non-renewable resources	8.09×10^{3}	
Crude Oil	3.20×10^{2}	7.61×10^{1}
Hard Coal	4.48×10^{1}	1.65×10^{0}
Lignite	3.68×10^{1}	3.08×10^{0}
Natural gas	4.73×10^{2}	1.08×10^{2}
Uranium	7.66×10^{1}	1.37×10^{-4}
Renewable Resources	7.70×10^{1}	

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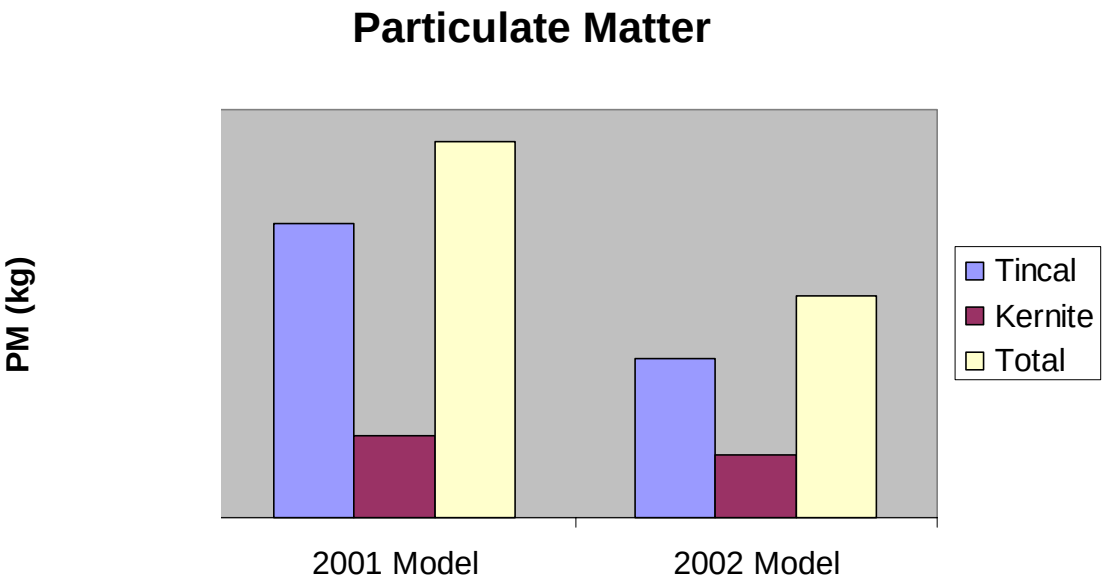
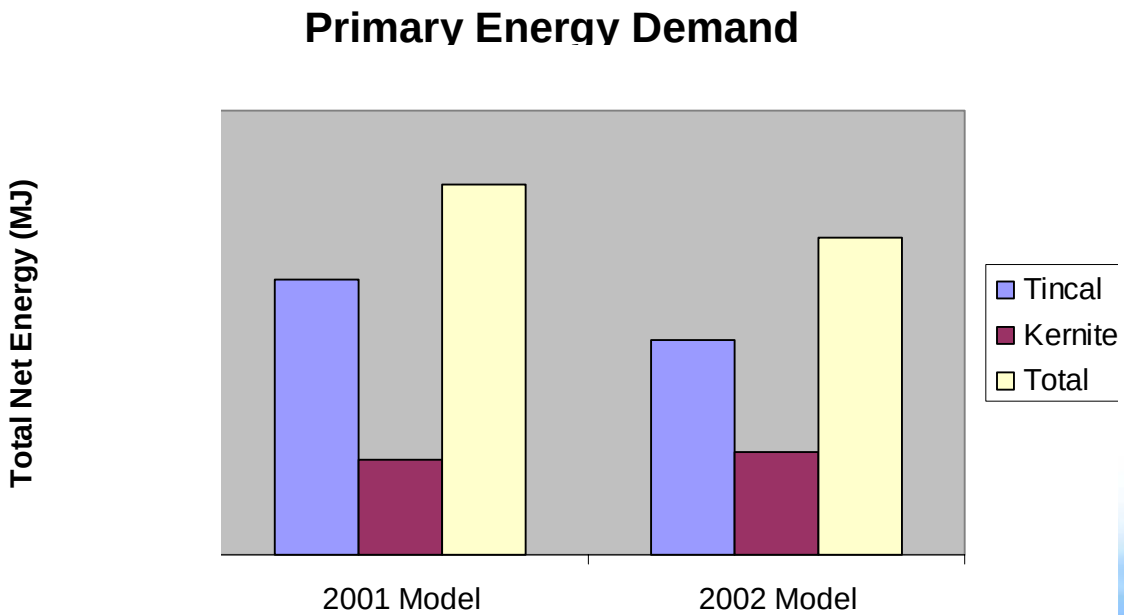
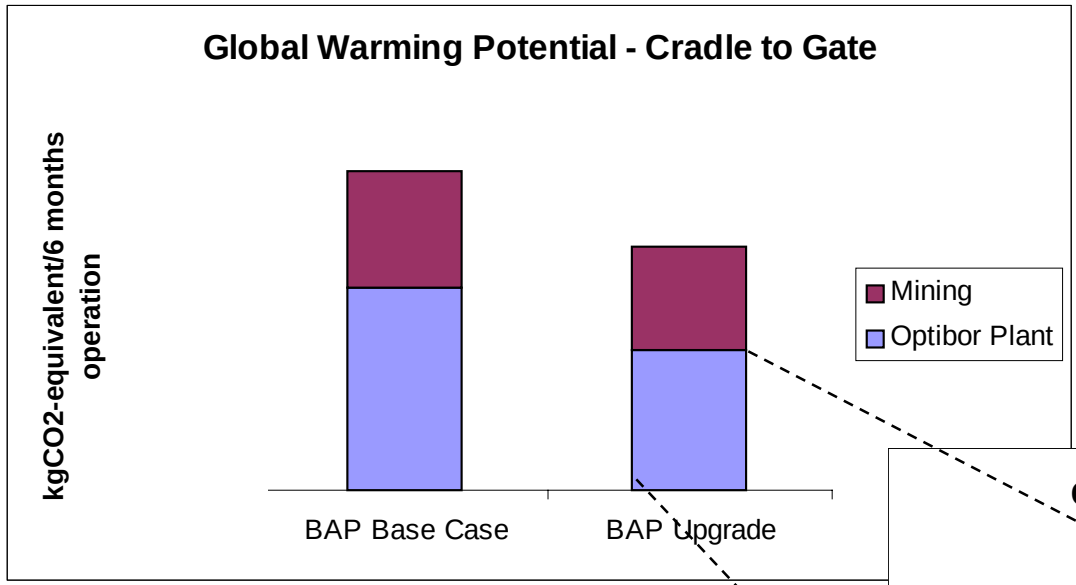
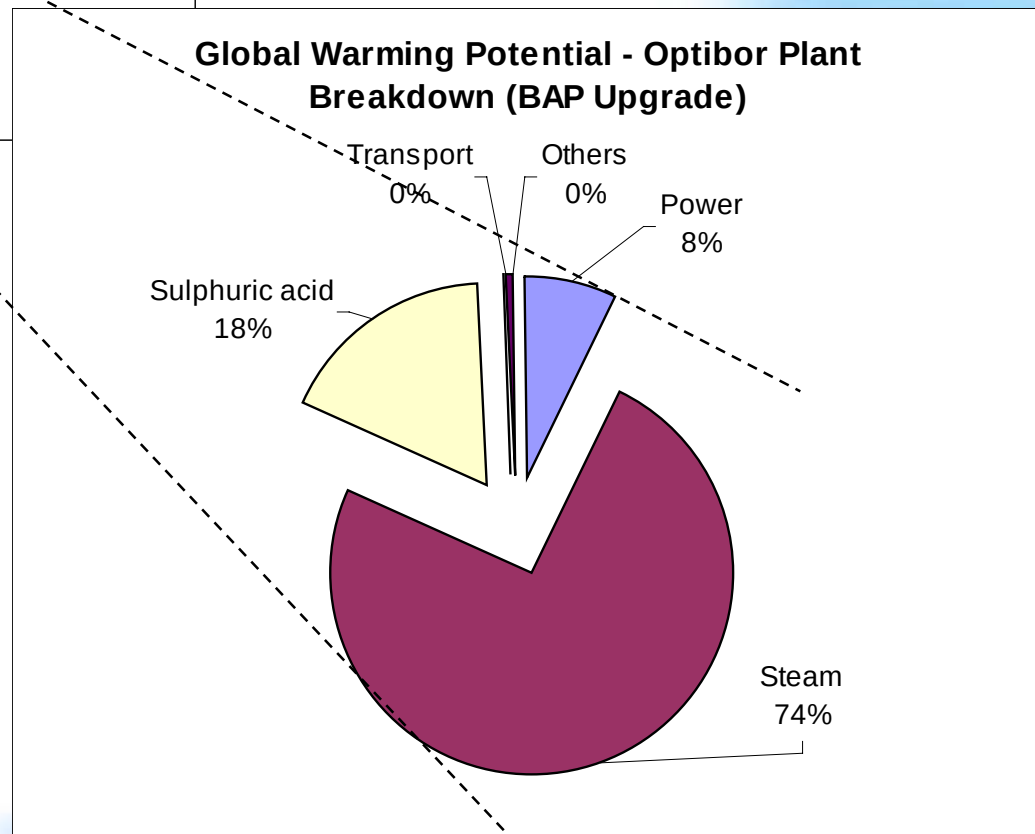


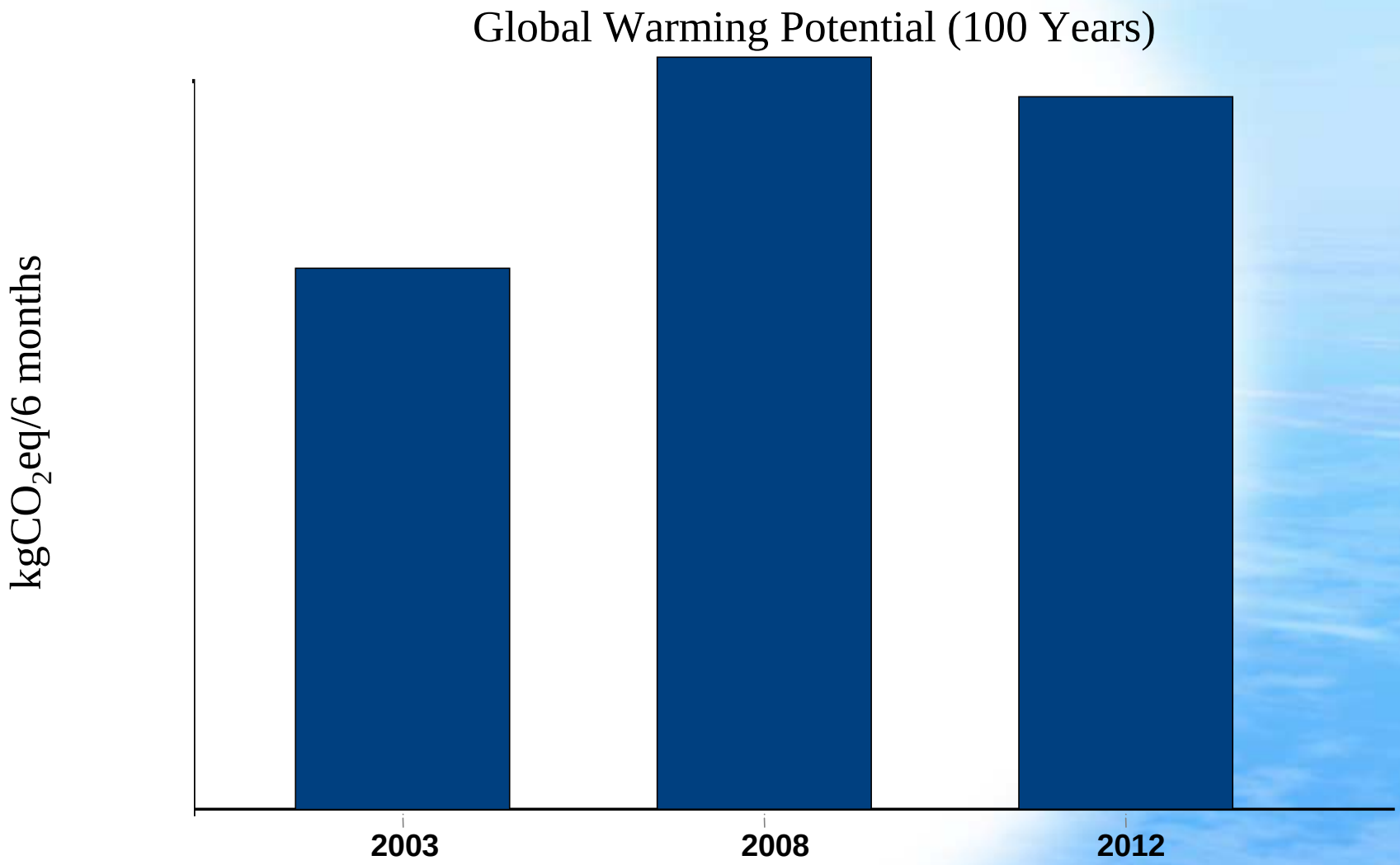


Benchmarking &
Yearly Reporting

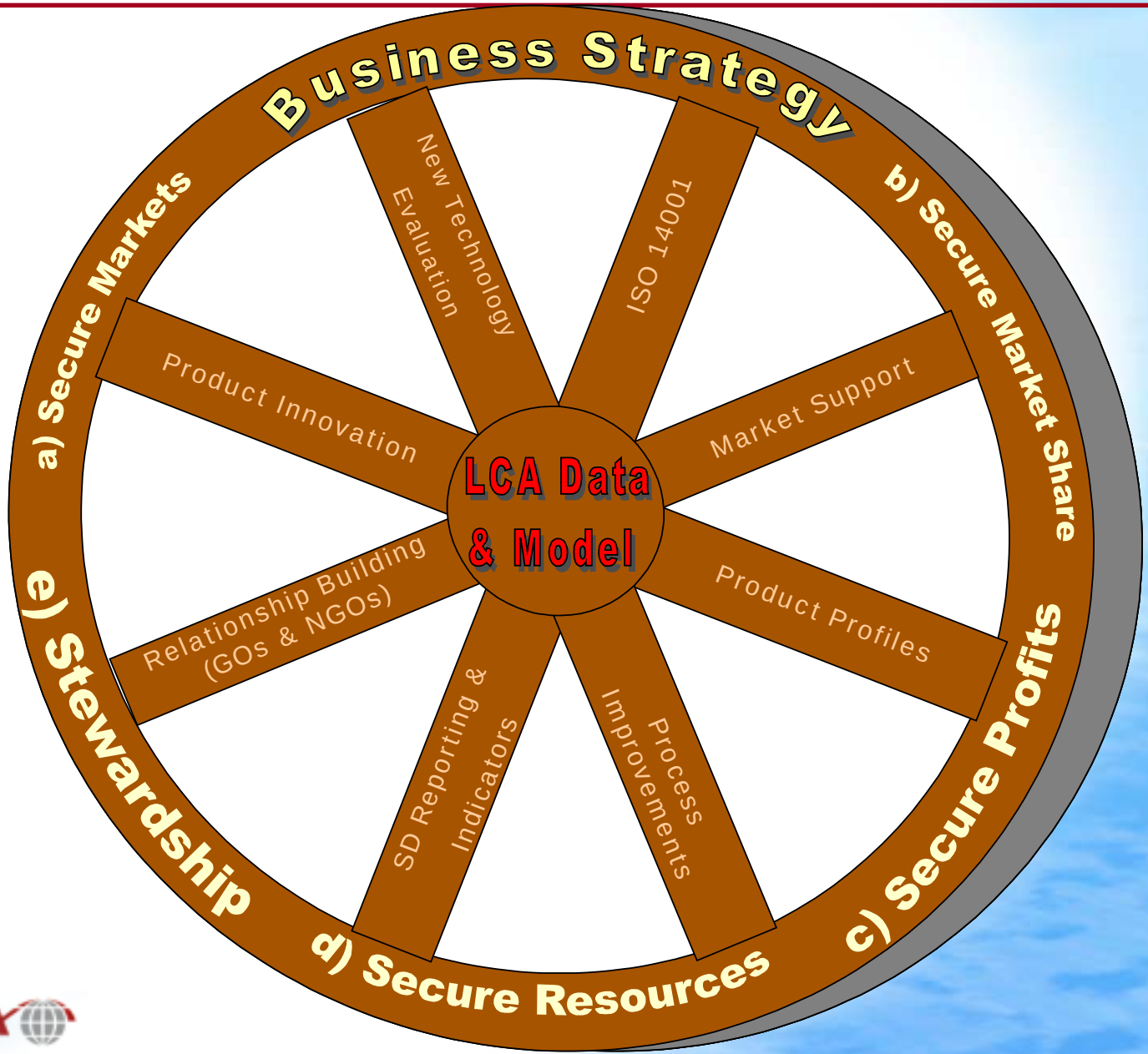
Scenario Analysis/Project Alternatives






Global Warming Potential (100 Years)
kgCO2eq/6 months
2003
2008
2012

Business Benefits



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