

# Emission and Energy Reduction Initiatives



**Tennessee Climate  
Change Dialogue**

**August 13, 2008**

**Morristown, TN**

**Presented By:**

**Chris Moore  
Alcoa Inc.**

**Tennessee Operations**





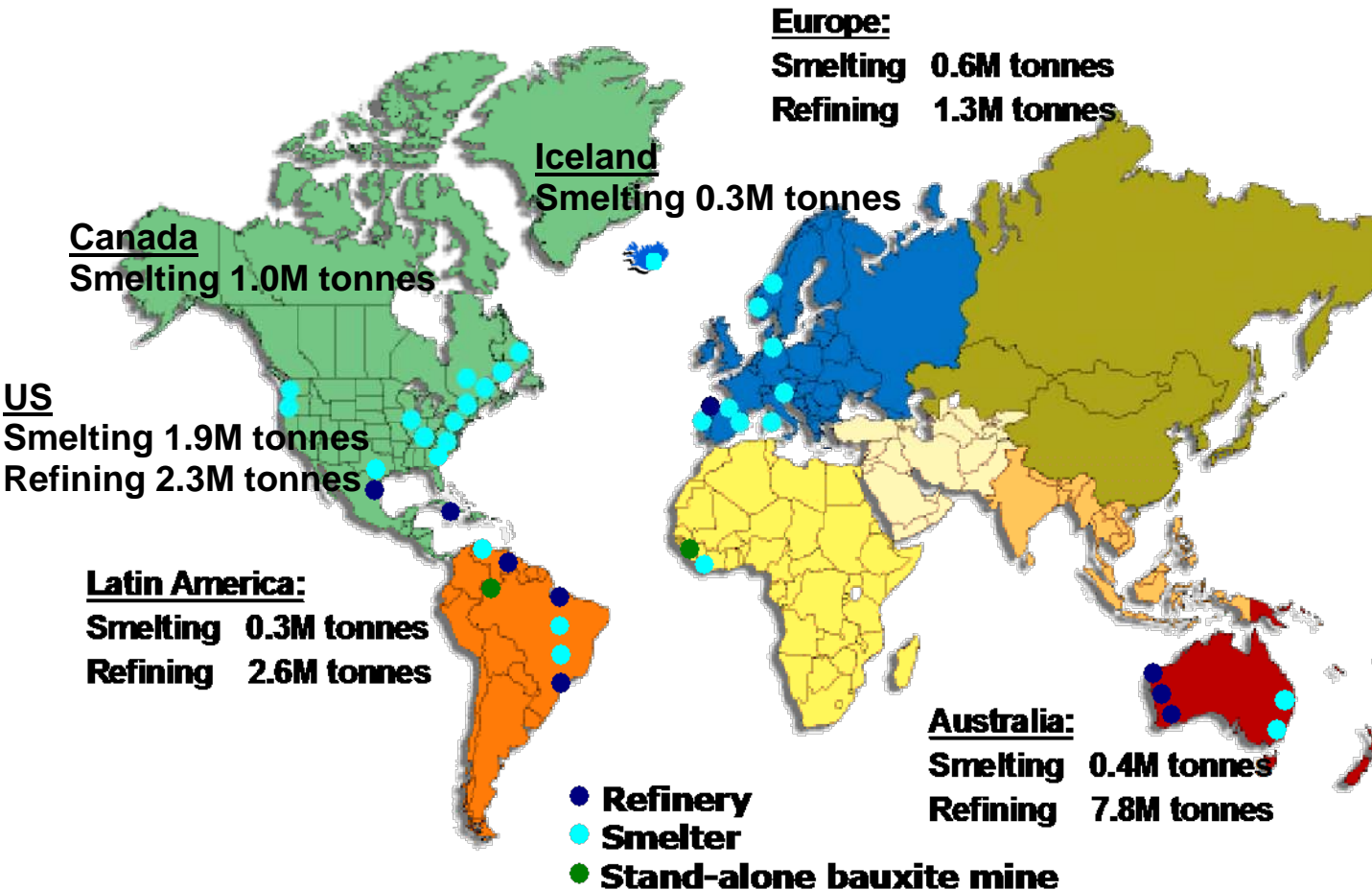
# Alcoa at a glance

- Leading aluminum products company
  - Primary aluminum and alumina
  - Flat-rolled aluminum and hard-alloy extrusions
- Active in all major segments of the industry:
  - Technology
  - Smelting
  - Mining
  - Fabricating
  - Refining
  - Recycling

Products serving the aerospace, automotive, commercial transportation, packaging, building and construction, and industrial markets.



# Alcoa Primary Operations



## Key Facts (2007)

- 25 Smelters on 5 continents
- 9 refineries on 4 continents
- 3.7 mmt Aluminum Production -- 11% of world output
- 15.1 mmt Alumina production -- 23% of world output
- \$9.3 billion in 3<sup>rd</sup> Party Revenue
- \$14.4 billion total Revenue including intercompany sales to downstream operations



# Committed to sustainability





# Worldwide Sustainability Goals

- From base year 2000:
  - 60% reduction sulfur dioxide by 2010
  - 50% reduction volatile organic compounds by 2008
  - 30% reduction nitrogen oxides by 2007
  - 80% reduction mercury emissions by 2008
  - 50% reduction landfill waste by 2007
  - Reduce energy intensity 10% by 2010
  - 60% reduction in process water use and discharge by 2009
- From base year 1990:
  - 25% reduction in greenhouse gas emissions by 2010.



# United States Climate Action Partnership



- **Alcoa a founding member**
- **US Corporations and NGOs**
- **Slow, stop and reverse climate change**
- **A call for action to the US Government**
- **Founding principles**
  - Account for the global dimensions of climate change
  - Recognize the importance of technology
  - Be environmentally effective
  - Create economic opportunity and advantage
  - Be fair to sectors disproportionately impacted
  - Recognize and encourage early action
- **“I am convinced that we can build a global plan of action on climate change in ways that create more economic opportunities than risks.”**

Alain Belda





# Recognition

## Sustainability

- One of the Global 100 Most Sustainable Corporations
- Most Sustainable Corporation / World Economic Forum in Davos
- Inclusion Dow Jones Sustainability Index



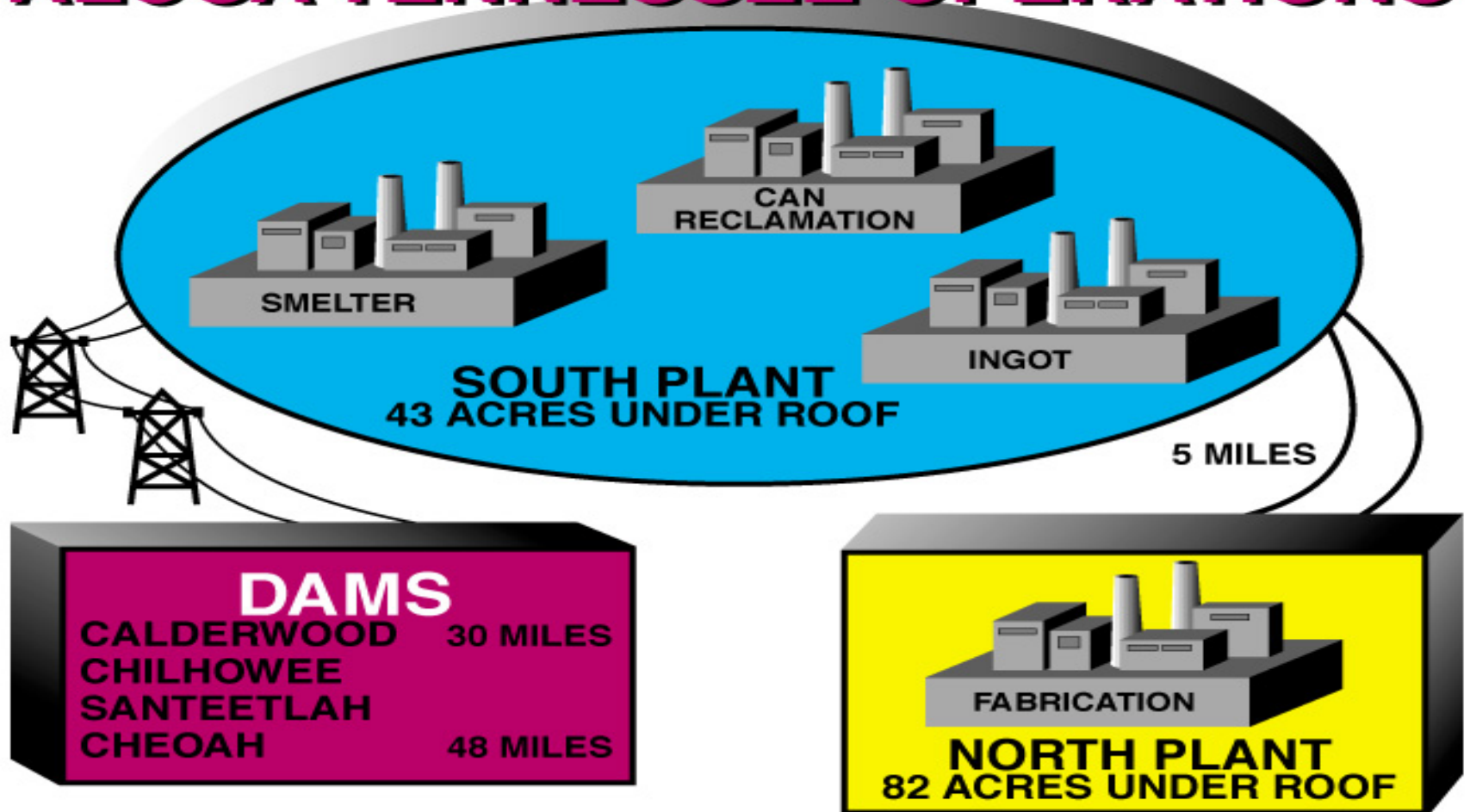
## Climate Change

- Founding Reporter of the Climate Registry
- Top Green Company – BusinessWeek and the Climate Group
- Low Carbon Pioneer – CNBC European Business
- Best in Class – Carbon Disclosure Project
- Leader in climate change and governance -- CERES





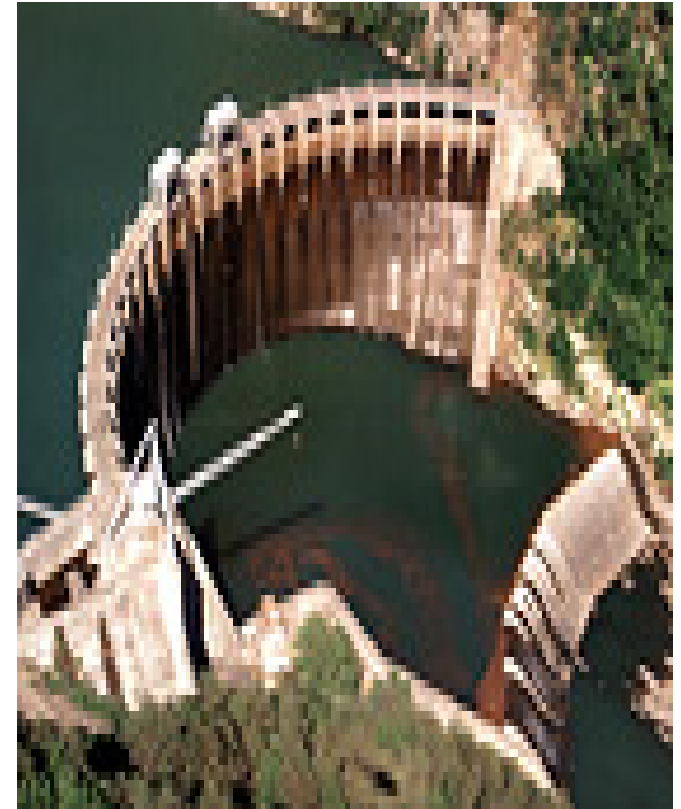
# ALCOA TENNESSEE OPERATIONS





# Sustainable Energy

- More than a century of hydropower expertise:
  - 4 hydro-facilities in use for TN OPS
  - 50% of power consumption for TN Operations from hydro-facilities
  - More efficient technology improving yield of existing projects



Calderwood Dam,  
Tennessee



# Alternative Fuels

- B20 bio-fuels in use since 2004 at Tennessee Operations
- More than 550 pieces of mobile equipment use bio-fuels year round
- > 100,000 gallons per year of B100 equivalent consumed
- Approximate 20% reductions in emissions of CO<sub>2</sub>, PM, SO<sub>2</sub>; equal or slightly lower NO<sub>x</sub> emissions (w/ additives) compared to traditional diesel usage





# Energy Conservation: Recycling



- Alcoa worldwide uses nearly 900,000 mt/year of recycled aluminum
- Approximately 50% of the aluminum produced at TN OPS is from recycled aluminum (predominately used beverage cans)
- Recycling aluminum consumes only 5% of the energy needed to produce an equivalent quantity of aluminum from Smelting
- Recycling one aluminum can saves enough energy to keep a 100-watt bulb burning for almost four hours or run your television for three hours.



# Grow US recycling to 75%

- Alcoa recycled 14 *billion* cans in 2007
- 50% capacity expansion announced 12/07 at Tennessee Operations
- \$22 million investment in new crusher and delacquering technology
- Expected completion 2009
- **Alcoa goal: raise US recycling rate from 52% to 75% by 2015**





# Emissions Management – Burner and Equipment Improvements

- More efficient and lower emitting burner installations on melting furnaces throughout facility (e.g., low NOX and regenerative burners)
- Localized process heater installation for rolling mills and subsequent boiler/steam system shutdown resulting in natural gas usage/emission reductions
- Two new technology aluminum preheat furnaces being installed to replace the existing 27 furnaces at TN OPS
- Replaced existing locomotives with lower emitting EPA Tier III engines





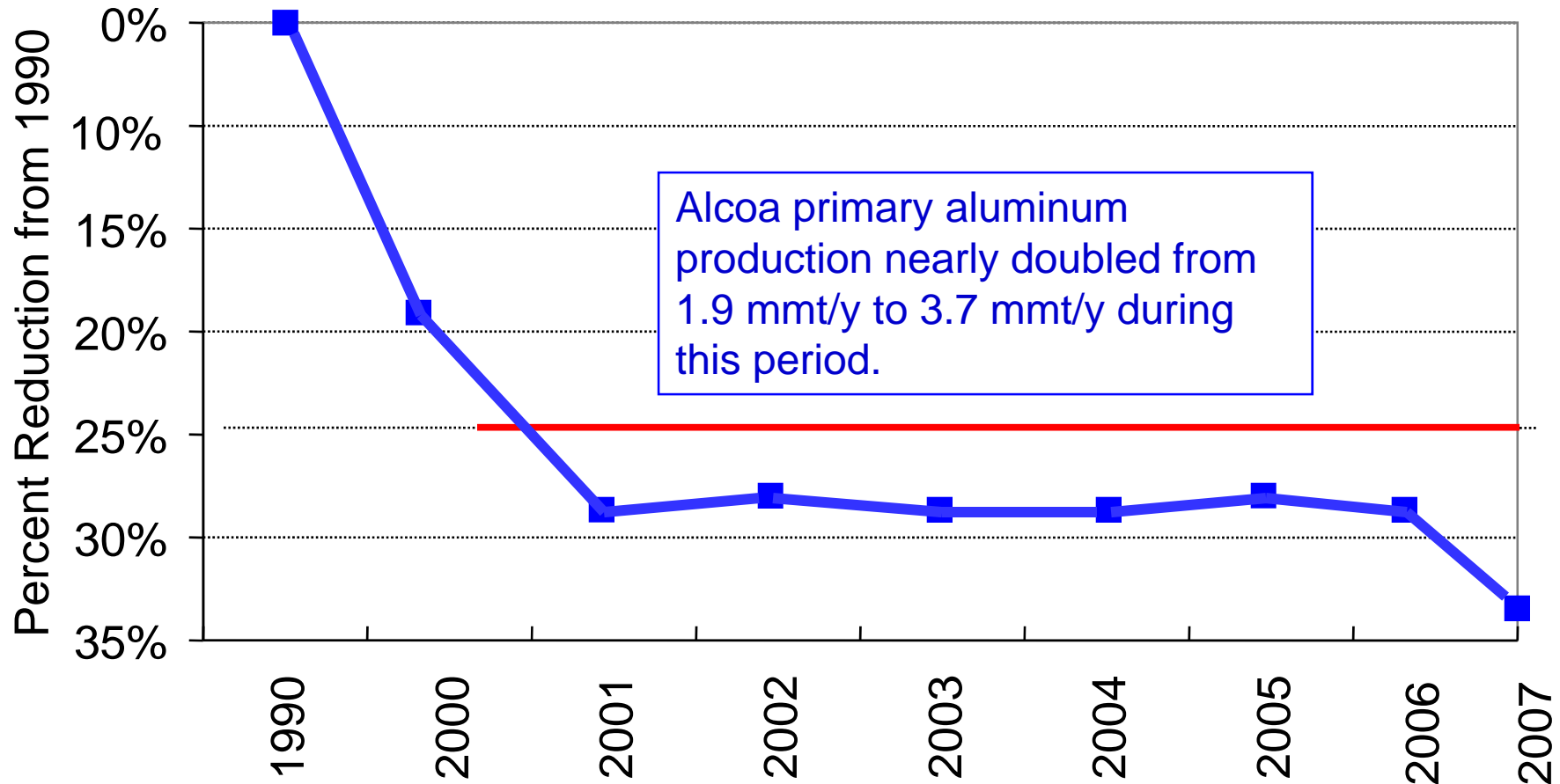
# GHG Emissions Management - Anode Effects

- Operational excellence in smelting process
- Consistent, stable reaction
- Contributes to 33% reduction in CO<sub>2e</sub> emissions since 1990
- Exceeded target 5 years ahead of schedule
- 75% reduction in PFC emissions since 1990
- Concurrent energy savings
- Best practices shared across the Alcoa system





# Progress – Worldwide Greenhouse Gas Emission Reductions





# The Future - Breakthrough Smelting Technologies

## Post-Carbon technology

- Possible next-generation process
- Replaces most CO<sub>2</sub> emissions with O<sub>2</sub> emissions
- Reduces operating costs
- Eliminates all sulfur and carbon emissions from anodes

## Carbothermic process

- Electrolysis-free process
- Reduction in energy



Alcoa Technical Center

**Alcoa aspires to be  
the best company in  
the world.**

