

The Chemical Industry in the 21st Century:
Challenges and Strategies for Success



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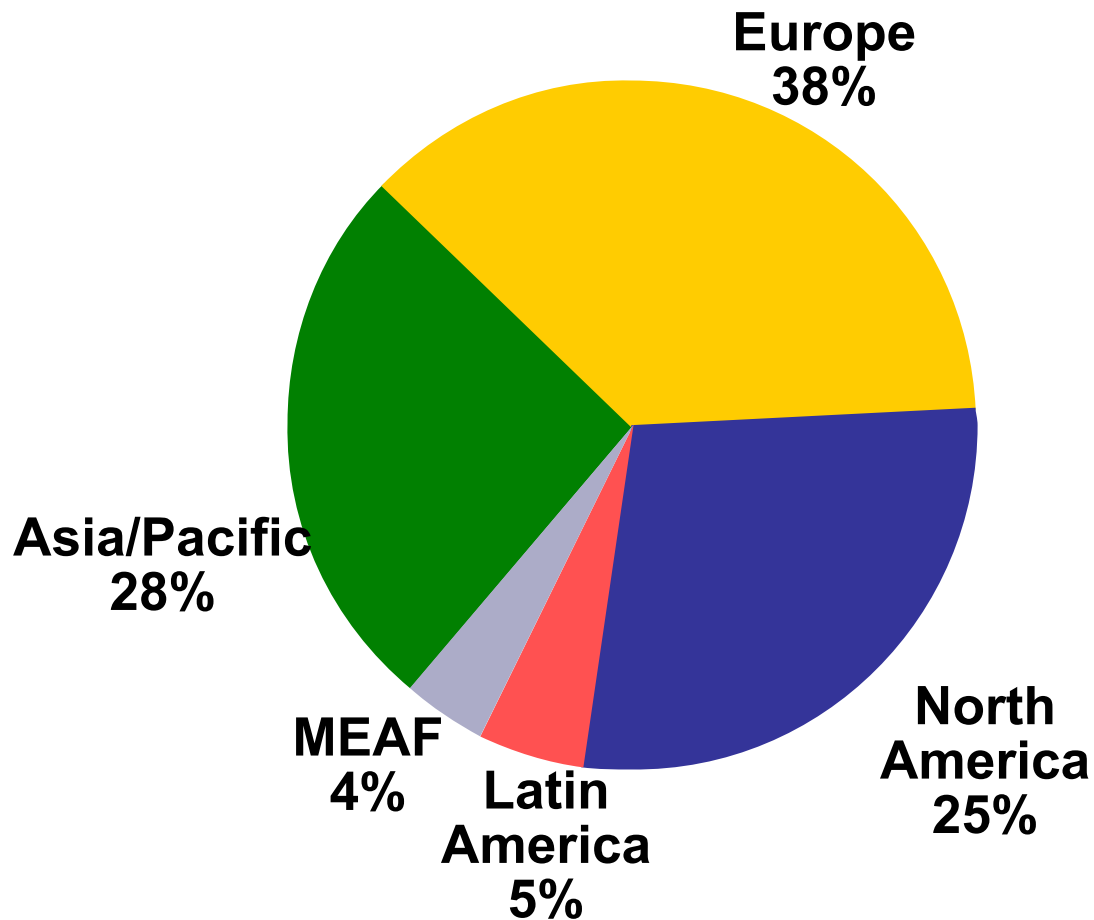
Global Chemical Industry

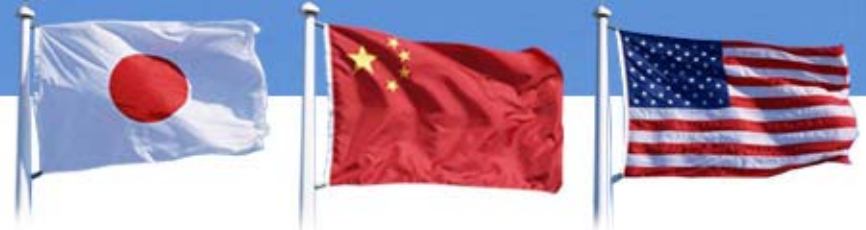
- Vital
 - 70,000 products
 - 10 million direct employees
 - 50 million indirect employees
 - Enabling better quality of life around the world
 - \$2.2 trillion ... and growing





Chemical Industry Sales by Region, 2004





Critical Issues & Challenges

1. Rising energy and feedstock costs
- 2.
- 3.
- 4.



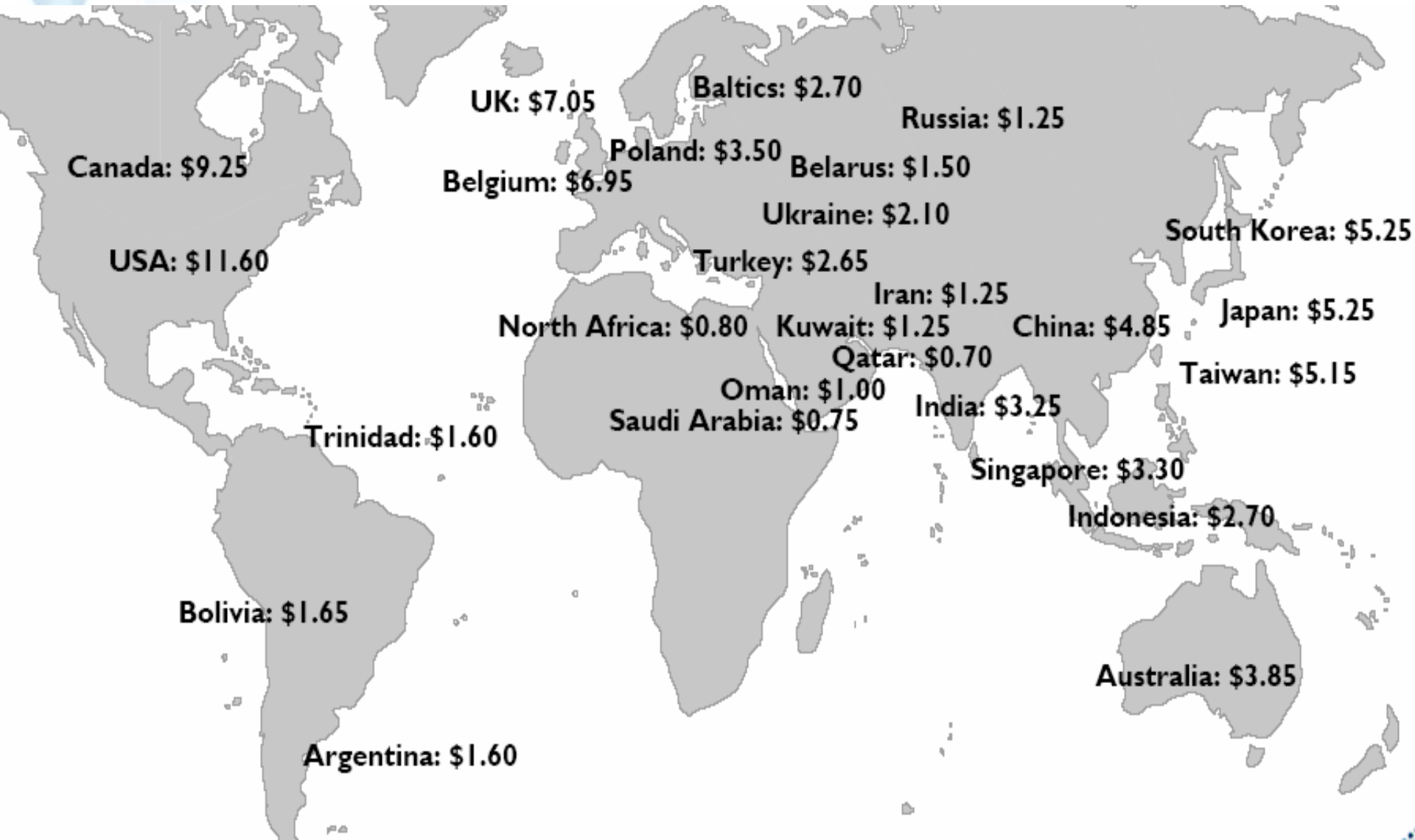
Critical Issues: Rising Oil Prices

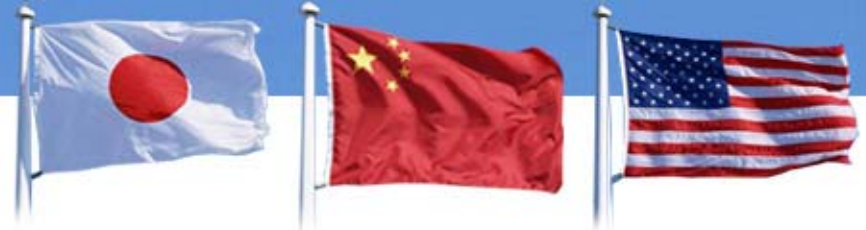
Dated Brent Crude





Critical Issues: Rising Natural Gas Prices





Critical Issues & Challenges

1. Rising energy and feedstock costs
2. Cyclical nature of industry
- 3.
- 4.



Critical Issues & Challenges

1. Rising energy and feedstock costs
2. Cyclical nature of industry
3. Commoditization and the need for innovation
- 4.



Critical Issues & Challenges

1. Rising energy and feedstock costs
2. Cyclical nature of industry
3. Commoditization and the need for innovation
4. Higher regulatory standards and poor public image



Strategies to Address These Challenges

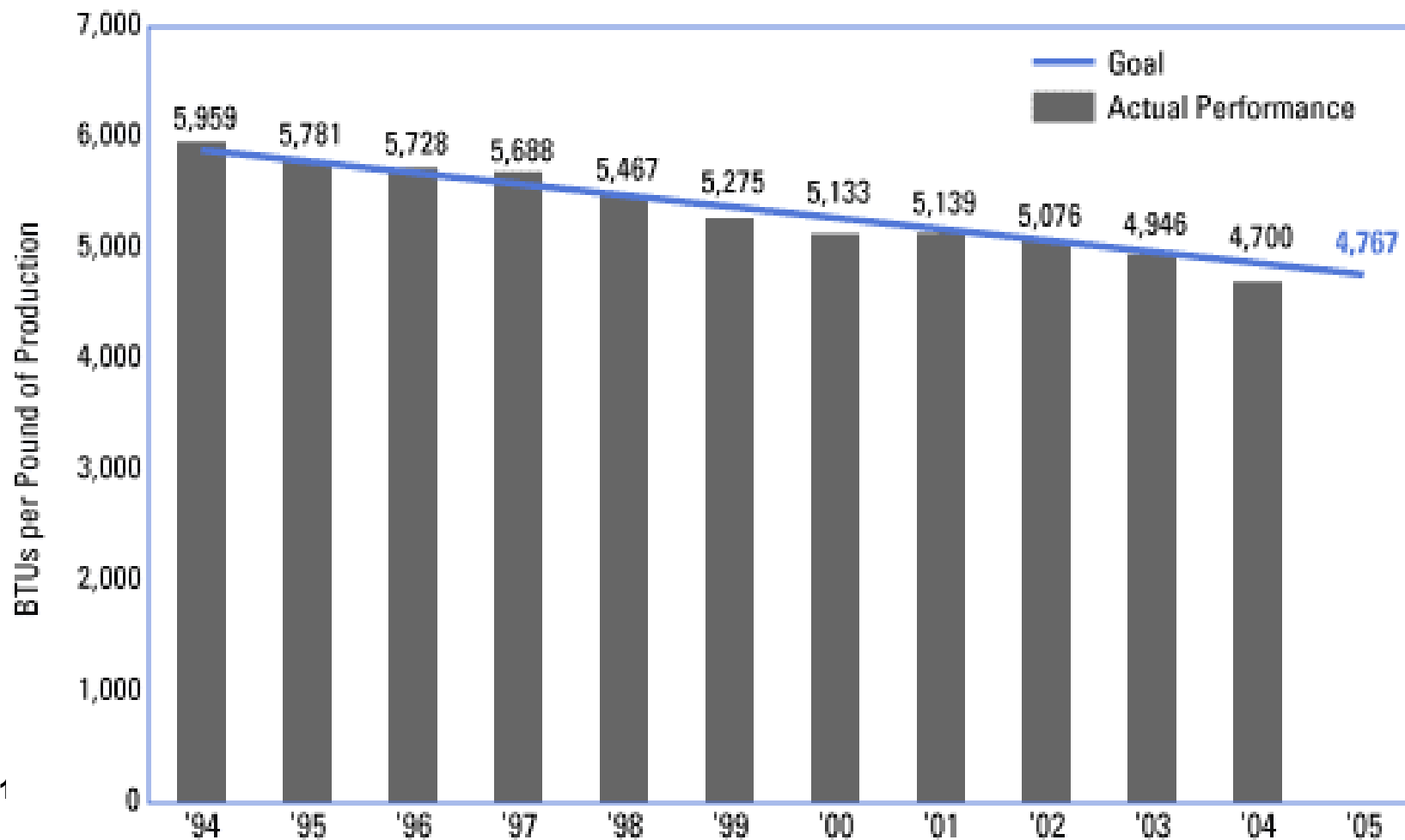
- Energy and Feedstock costs
 - Conservation and Efficiency





Strategies: Conservation and Efficiency

Dow Goal: Reduce Energy use by 20%
(per pound of production, 1994-2005)





Strategies to Address These Challenges

- Energy and feedstock costs
 - Conservation and efficiency
 - Integrate upstream





Strategies to Address These Challenges

- Energy and feedstock costs
 - Conservation and efficiency
 - Integrate upstream
 - Achieve scale

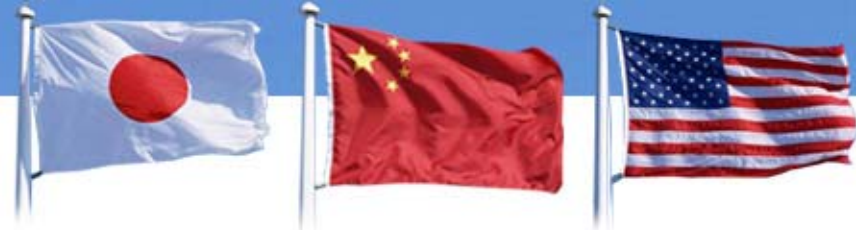




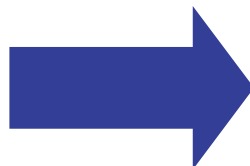
Strategies to Address These Challenges

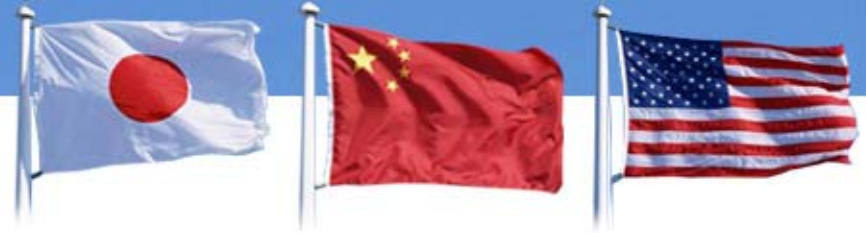
- Energy and feedstock costs
 - Conservation and efficiency
 - Integrate upstream
 - Achieve scale
 - Alternative feedstocks





Alternative Feedstocks: Coal to Chemicals





Strategies to Address These Challenges

- Energy and feedstock costs
 - Conservation and efficiency
 - Integrate upstream
 - Achieve scale
 - Alternative feedstocks
 - Biomass and renewables



Alternative Feedstocks: Biomass and Renewables



Seed oils as feedstock



Strategies to Address These Challenges

- Energy and feedstock costs
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 - Integrate upstream
 - Achieve scale
 - Alternative feedstocks
 - Biomass and renewables
- **Manage cyclicalality**
 - Discipline and restraint in adding capital

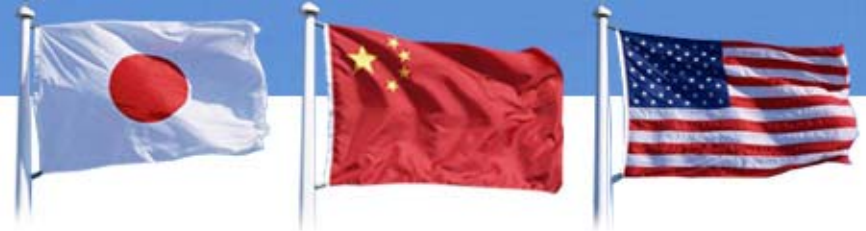


Strategy: Manage Cyclicity



- 9 new crackers announced in China for startup in 2008-2010.
- 6 new crackers announced in Saudi Arabia for startup in 2008.





Strategies to Address These Challenges

- Energy and feedstock costs
 - Conservation and efficiency
 - Integrate upstream
 - Achieve scale
 - Alternative feedstocks
 - Biomass and renewables
- **Manage cyclicalality**
 - Discipline and restraint in adding capital
 - **Form partnerships and joint ventures**





Strategies to Address These Challenges

- Energy and feedstock costs
- Manage cyclicalality
- Increase innovation
 - Partnerships: industry and academia
 - Focus on people

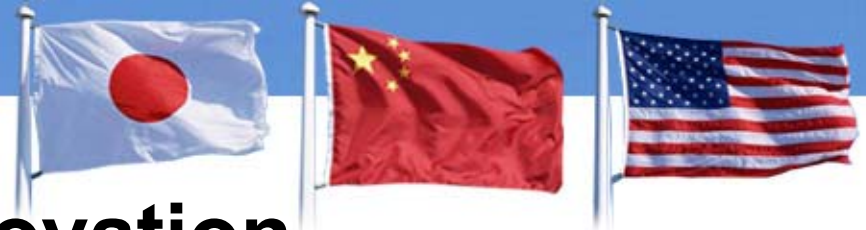




Strategy: Increase Innovation

- Partnerships: industry and academia
- Focus on people
 - Achieve critical mass in R&D





Strategy: Increase Innovation

- Partnerships: industry and academia
- Focus on people
 - Achieve critical mass in R&D
- Innovate where market gaps exist

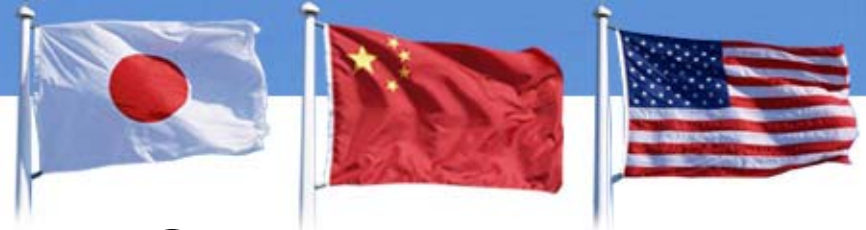




Strategy: Increase Innovation

- Partnerships: industry and academia
- Focus on people
 - Achieve critical mass in R&D
- Innovate where market gaps exist

*Innovation = Invention
successfully applied to a market gap*



What are the Market Gaps?

- Alternative feed stocks and routes
- Water technology
- Infrastructure
- Food – diet and health

more...





What are the Market Gaps?

continued...

- Greener products and processes
- Serve the emerging consumer in developing economies
- Technology to reduce greenhouse gasses





Strategy: Improve Performance and Reputation

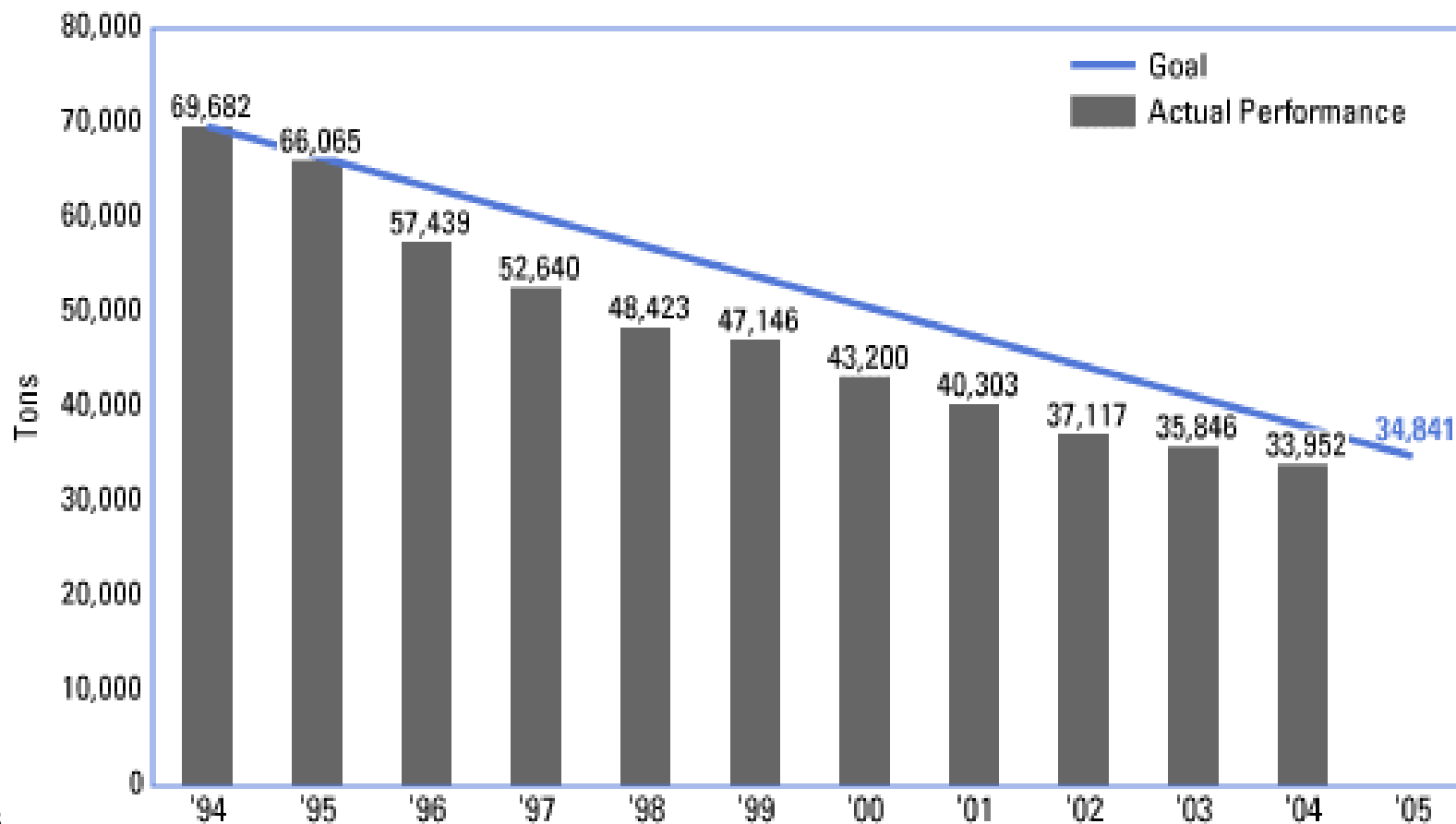
- Solve societal challenges and needs
- Part of the solution
- Improve industry performance – environment, health, safety, product stewardship





Strategy: Improve Performance

Goal: Reduce Chemical Emissions by 50% (1994-2005)





Strategy: Improve Performance and Reputation

- Manage risk
- Product stewardship
- Responsible Care®
- Shape regulations and public policy
- Be part of the solution





“The wise leave the road
and find the way;
fools cling to the way
and lose the road.”

