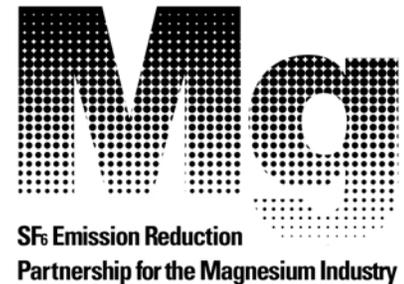
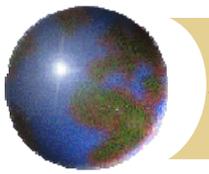


Update on Public / Private Cooperation for Climate Protection: EPA's Magnesium Industry Partnership

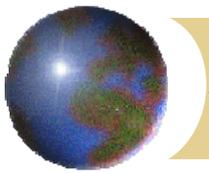
Scott C. Bartos
U.S. Environmental Protection Agency
Climate Change Division
November 28, 2006
bartos.scott@epa.gov





Organization

- Global Industry Trends
- Partnership Status and Accomplishments
 - 2006 Highlights
- Challenges & 2007 Strategy
- Conclusion



Global Industry Production Trends

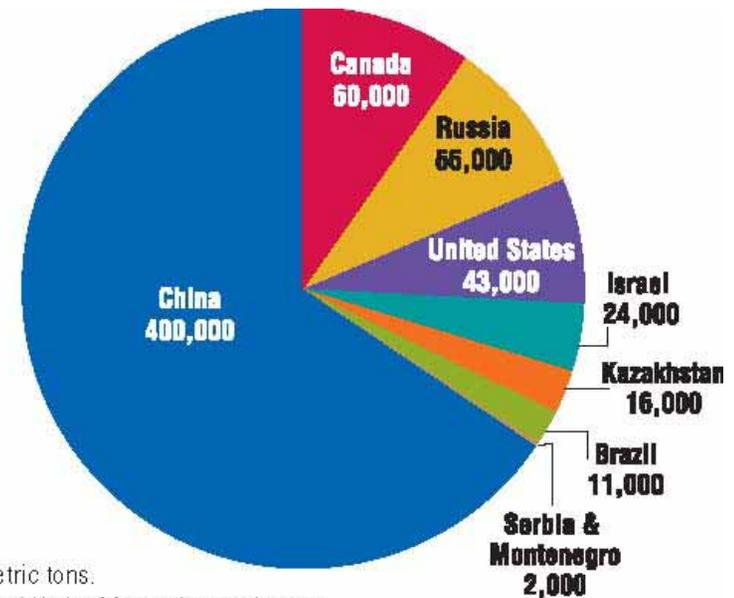
Mg Production

- China dominates production
 - Hydro Mg to close Canada plant – 48,000 tons
- 2° production grows 9.1% to 2010

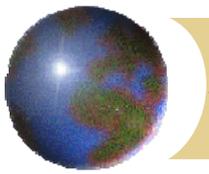
Die casting grows 10% in 2005

- 10.4% growth to 2010

2004 Global Primary Mg Production

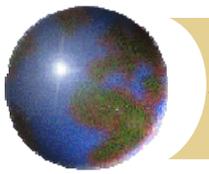


¹ Reported in metric tons.
Source: USGS and Hydro Magnesium estimates.



Industry Trends: Alternative Melt Protection

- Japan – Tokai Rika (die casting) adopting Novec™ 612
 - Strong support from Taiyo Nippon Sanso Corporation (TNSC)
 - 80% reduction from 2000
 - Complete phase out by March 2008
- CDM sparking new projects
 - Brazil – Rima
 - Israel – Dead Sea Mg
 - China – great interest
- European regulation of SF₆ begins Jan. 1, 2007
 - Ban SF₆ with 850 kg/year exemption
- U.S. Activities
 - Lunt trials with AM-cover, MTG Shield (Novec 612), and SO₂

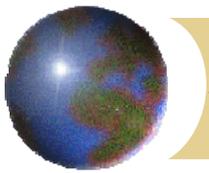


14 Active Partners, 90% U.S. Industry

● Partnership launched in 1999

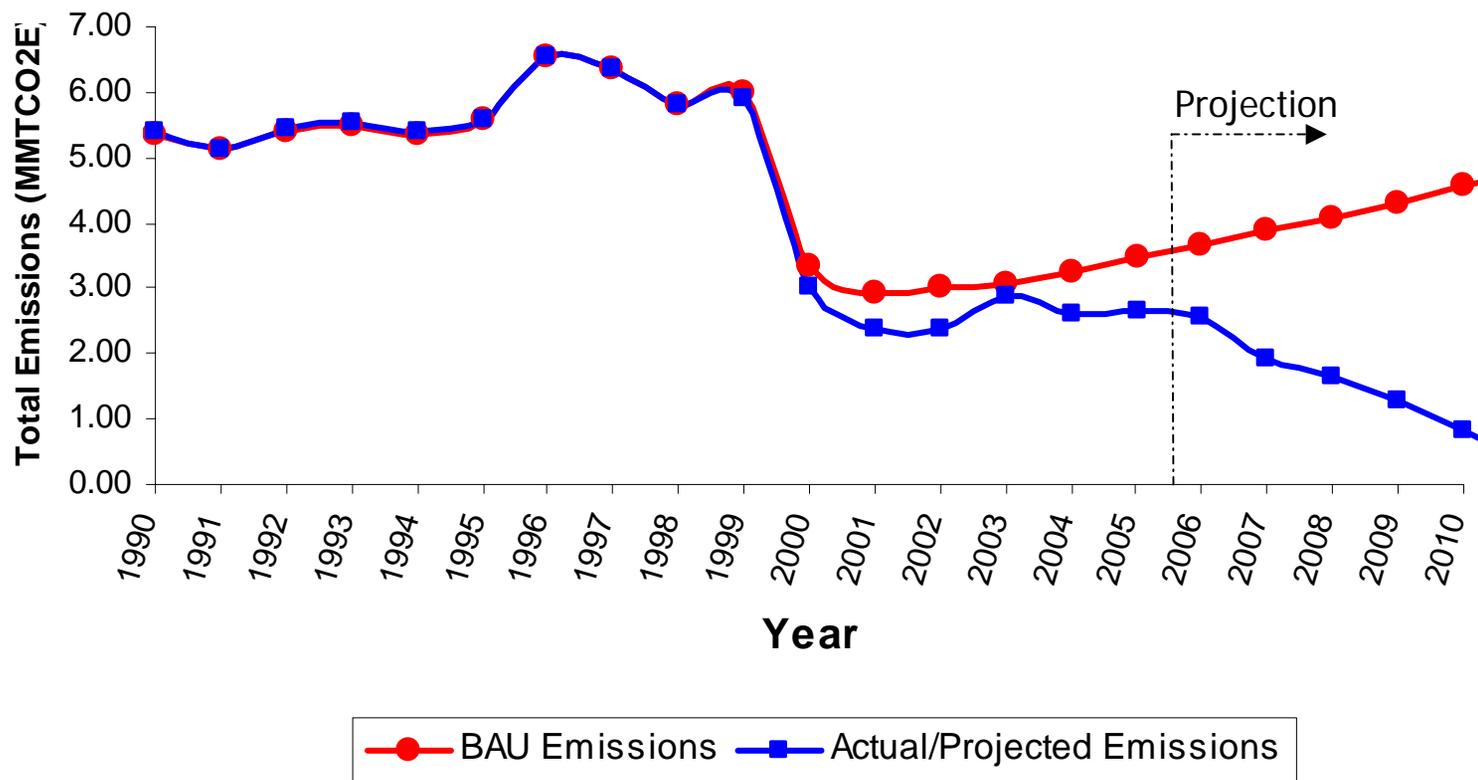
- Acme Die Casting (Northbrook, IL) – **Closed Mg casting**
- Advanced Magnesium Alloys Corporation (AMACOR) (Anderson, Indiana)
- Chicago White Metal Casting (Bensenville, IL)
- Consolidated Foundries (Pomona, CA)
- CONTECH Metal Forge Division of SPX Corporation (Alma, MI) – **Closed Mg casting**
- Del Mar Die Casting (Gardena, CA)
- Diversified Diemakers (Palmyra, MO)
- Garfield Alloys / MagReTech (Garfield Heights, OH) – **NEW Partner 2006**
- Hyatt Die Cast & Engineering Corporation (Cypress, CA)
- Lunt Manufacturing (Schaumburg and Hampshire, IL)
- Magnesium Aluminum Corporation (Cleveland, OH)
- Magnesium Products of America (Eaton Rapids, MI)
- Northern Diecast (Harbor Springs, MI) – **Announced closing 2006**
- Product Technologies (Maple Lake, MN)
- Spartan Light Metal Products (Sparta, IL)
- Twin City Die Castings (Monticello, Minnesota)
- U.S. Magnesium (Salt Lake City, UT)

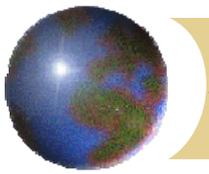




Mg Partner Accomplishments

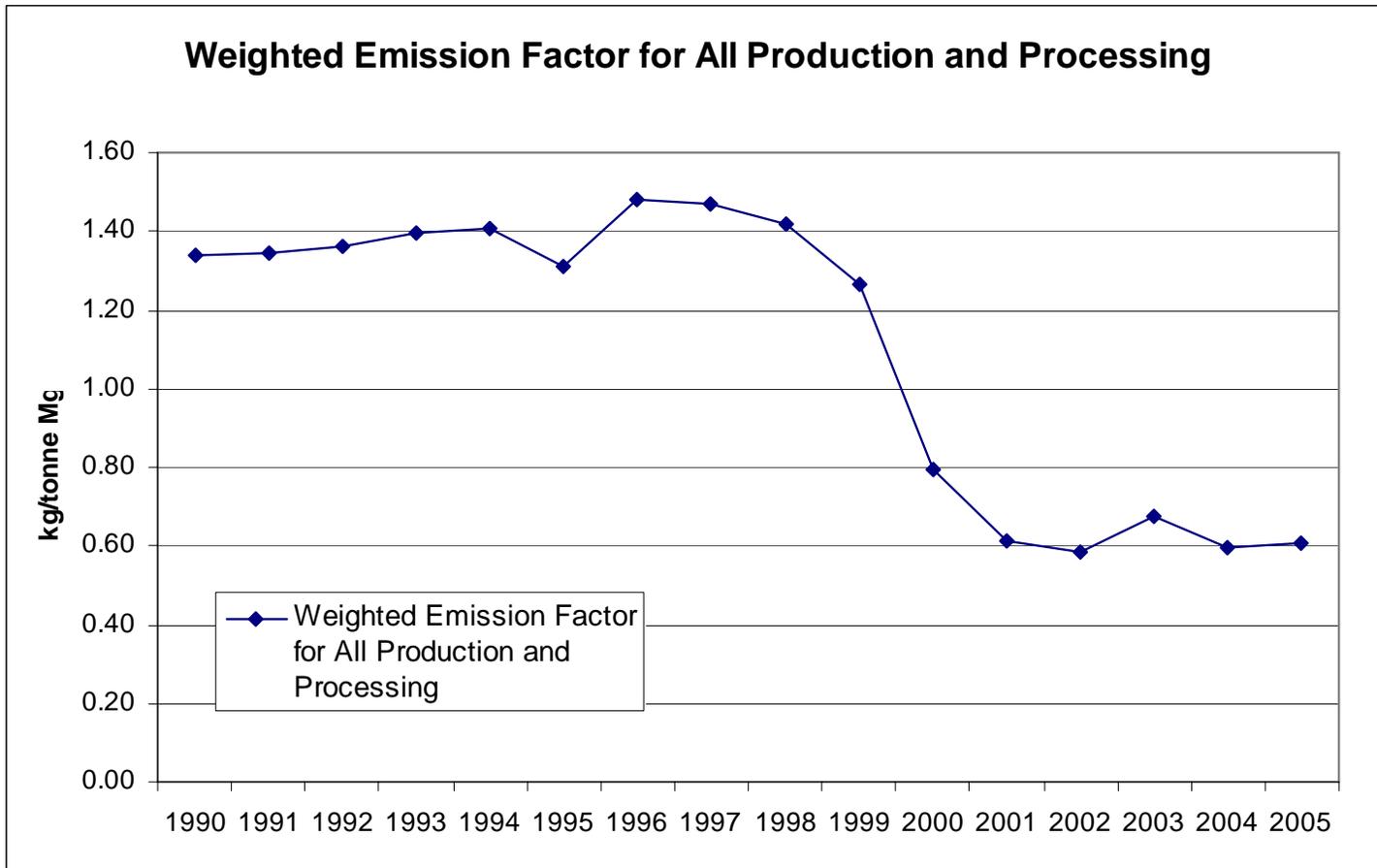
BAU vs. Actual/Projected Emissions

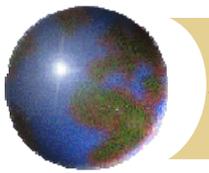




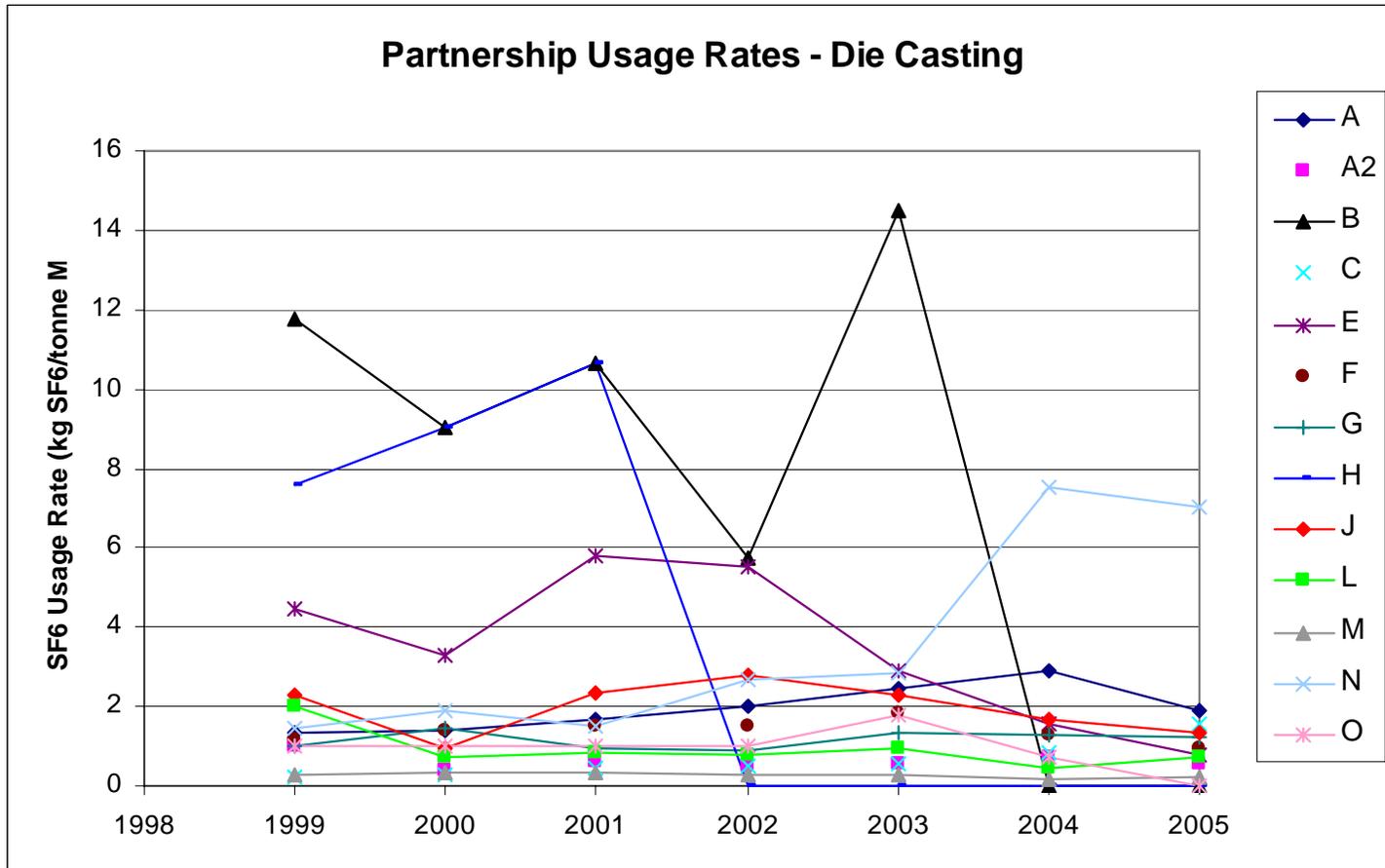
Limits of Return on Gas Management?

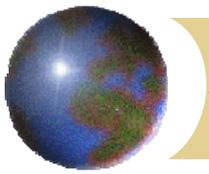
Partnership Emissions Intensity (kg SF₆/tonne Mg)





U.S. Mg Die Casting SF₆ Usage Rates

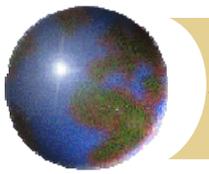




2006 Partnership Highlights

- Partner reductions = 0.8 MMTCO₂ in 2005
- Published Alternative Melt Protection brochure with IMA, JMA, and CMA
- Completed 3rd melt protection study w/Lunt Manufacturing
 - ✚ EPA's first look at dilute SO₂
 - ✚ Fluorinated alternatives provide >97% GHG emission reduction v. SF₆

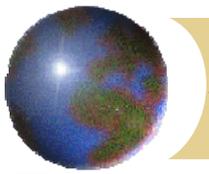




Expanding International Cooperation

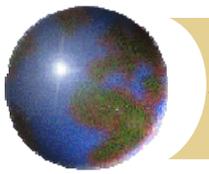
- 2nd Mg Melt Protection Users Group (MPUG) Workshop – Beijing May 2006
 - ❏ 50+ participants from around world
 - ❏ China moving rapidly to SF₆
- Initiate cooperation with China's Energy Research Institute (NDRC)
 - ❏ High GWP emissions inventory
 - ❏ Partnerships with industry





Proposal for Global Mg Industry “Climate Protection Council”

- EPA initiated discussion on global industry climate protection initiative
 - ▣ IMA, JMA, CMA
 - ▣ National government representatives
 - ▣ Others?
- Potential Benefits
 - ▣ Increase exchange of technical information
 - ▣ Harmonized emissions reporting consistent with IPCC Guidelines
 - ▣ Identify feasible CDM projects
 - ▣ Avoid (or comply with) regulations
 - ▣ Consistent industry messages
 - Environmental stewardship
 - Promote Mg as “climate friendly” material
- Challenge to industry
 - ▣ Adopt 2010 emissions elimination goal



Barriers & Challenges to 2010 Goal

● Fear of unknown

■ Patents, user licenses, CDM

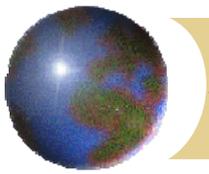
- Ownership / value of emission reduction credits

■ Limited number of technology suppliers

- 3M sole supplier of Novec™ 612

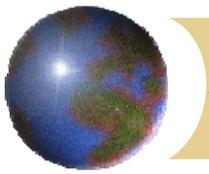
■ New, more sophisticated materials and delivery systems

- Mass flow meters, toxicity concerns, leak monitors



2007 Strategy – Facilitate Technology Transformation

- **Demonstrate & Deploy Alternative Melt Protection Technologies**
 - Organize 4th study for 2007
 - Garfield Alloys
 - Prepare case study and recognition for first U.S. partner to eliminate SF₆ emissions
- **Maintain Attention to Proper Cover Gas Management**
 - Avoid “over protection”
 - Waste of resources and EHS hazard
- **Cooperation & Information Sharing**
 - Track issues such as 3M patent, emissions trading possibilities and implications
 - Complete review and publish report / journal paper on Lunt study
 - Conduct web cast trainings on EPA’s XL-based SF₆ Tracking and Reporting Tool
 - U.S. Partners
 - International
 - Support 1st Global Industry Report on SF₆ and Cooperative Climate Protection
 - Identify and support technology demonstration project in China
 - Organize 3rd Mg MPUG Workshop at IMA Vancouver, Canada – May 2006



Conclusion

- Great progress
 - Improved understanding of and experience with alternative melt protection
- Leaders needed to begin implementing new technologies
 - May require capital investment
 - Two to three year phased adoption
 - Share information with industry partners
- Global industry cooperation will expand information sharing, reduce costs