



# 4<sup>th</sup> Annual Global Magnesium Industry Climate Protection Workshop

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**65<sup>th</sup> Annual World Magnesium Conference**  
Warsaw, Poland  
May 18, 2008





- Purpose of Workshop:

- Inform and seek feedback on climate change policies related to Mg production and casting
- Share technical information and facilitate climate protection
- Consider strategy to bundle magnesium industry GHG emission reduction projects
- Develop collaborative networks

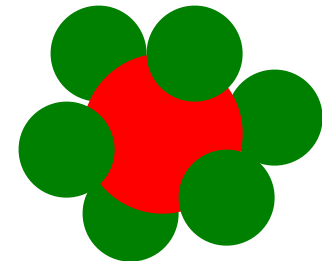
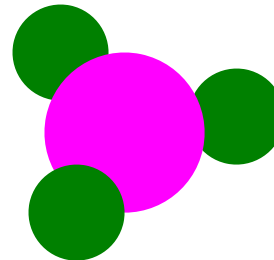
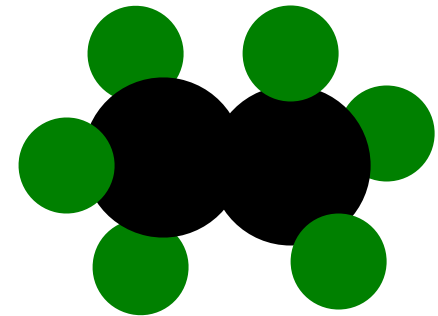
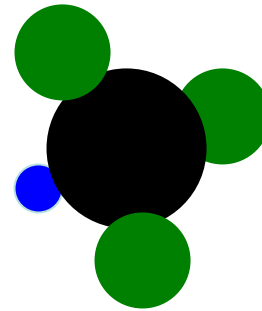
- Organization:

- Review relevant climate change policies
  - International, National, Regional, & State
  - U.S. Mandatory GHG Reporting Rule
- EPA Mg Partnership Activities and Progress
- Conclusion and Introduction of workshop participants



# High-GWP Fluorinated Gases

- Hydrofluorocarbons (HFCs)
  - e.g., HFC-23 ( $\text{CHF}_3$ )
- Perfluorocarbons (PFCs)
  - e.g., PFC-116 ( $\text{C}_2\text{F}_6$ )
- Nitrogen Trifluoride ( $\text{NF}_3$ )
- Sulfur Hexafluoride ( $\text{SF}_6$ )

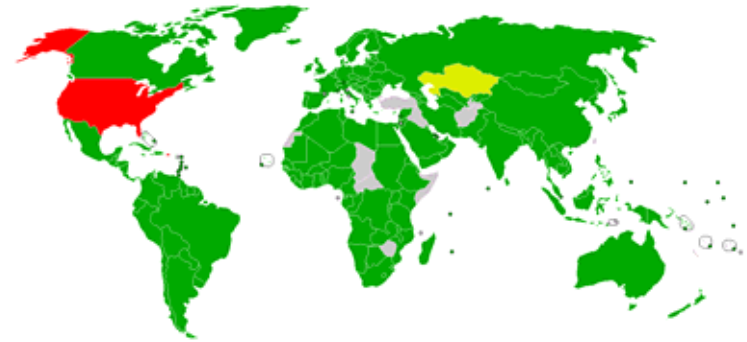




# Climate Protection Policies

- International

- Kyoto Protocol – entered into force on Feb. 16, 2005
- 170 countries; roughly 60% emissions
  - 1<sup>st</sup> commitment period 2008 – 2012
- Goal to reduce GHG emissions 5% below 1990 level



- European “F-Gas” Regulation

- European Commission “Use Ban” of SF<sub>6</sub> in Mg
- Effective January 1, 2008
- 850 kg/yr exemption = 19,380 tonnes CO<sub>2</sub> eq.



- United States

- Regional Initiatives
- California A.B. 32
  - 2000 levels by 2010, 1990 levels by 2010, 80% below 1990 by 2050
- White House
  - 18% reduction in GHG intensity from 2002 to 2012
  - Halt growth in absolute GHG emissions by 2025



■ Regional Greenhouse Gas Initiative RGGI  
■ RGGI Observer  
■ Midwestern Regional GHG Reduction Accord  
■ MRGHGRA Observer  
■ Western Climate Initiative  
■ Western Climate Initiative Observer



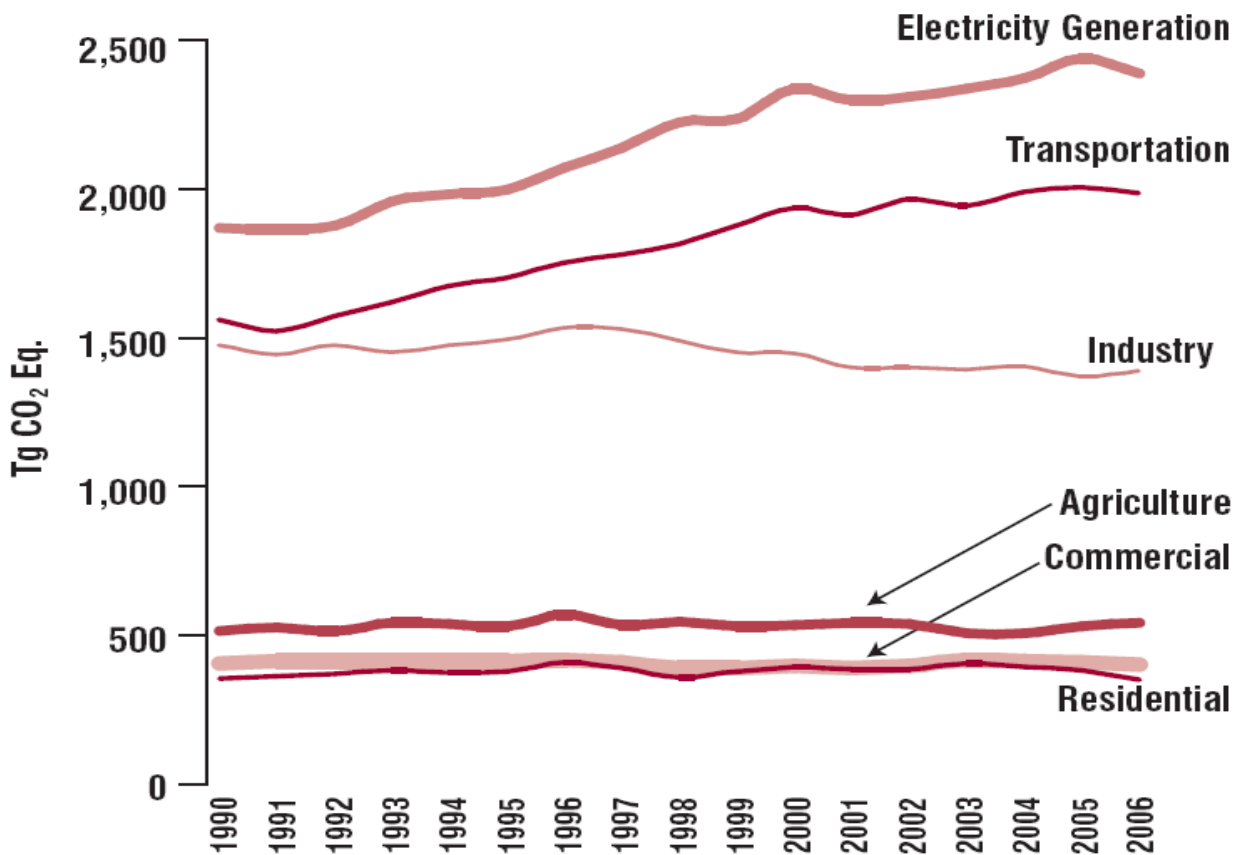
# U.S. GHG Reporting

- Objective of the Program – to collect comprehensive and accurate data relevant to future climate policy decisions, including potential future regulation under the Clean Air Act
- Scope of Coverage
  - Define gases- "...to require mandatory reporting of greenhouse gas emissions"
    - CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFC, PFC, SF<sub>6</sub>
  - Both upstream and downstream sources- "The Agency is further directed to include in its rule reporting of emissions resulting from upstream production and downstream sources..."
    - Upstream: fossil fuel and chemical producers and importers
    - Downstream: direct emitters - large industrial facilities



# U.S. GHG Emissions: 1990 – 2006

## Emissions Allocated to Economic Sectors





# EPA's Role in the Process

- Areas of flexibility:
  - Emissions threshold: “The Administrator shall determine appropriate thresholds of emissions above which reporting is required...”
  - Frequency of Reporting: “...and how frequently reports shall be submitted to EPA”
- Methods
  - “The Administrator shall have discretion to use existing reporting requirements for electric generating units under Section 821 of the Clean Air Act”
- EPA is prepared to implement GHG reporting
  - Existing methods in many sectors
  - Significant expertise in all sectors
  - Infrastructure to collect/house comprehensive emissions data



# U.S. Reporting – Timetable & Process

- Proposed rule by September 2008, final rule by June 2009
  - Ambitious timetable but we will work towards these deadlines
- EPA will involve agency and interagency expertise
  - Have already worked extensively with interagency counterparts on measurement and reporting issues (e.g., US GHG inventory, IPCC guidelines)
- EPA welcomes your input
  - Building on existing approaches
  - Engaging stakeholders to answer key technical issues and craft a viable proposed and final rule





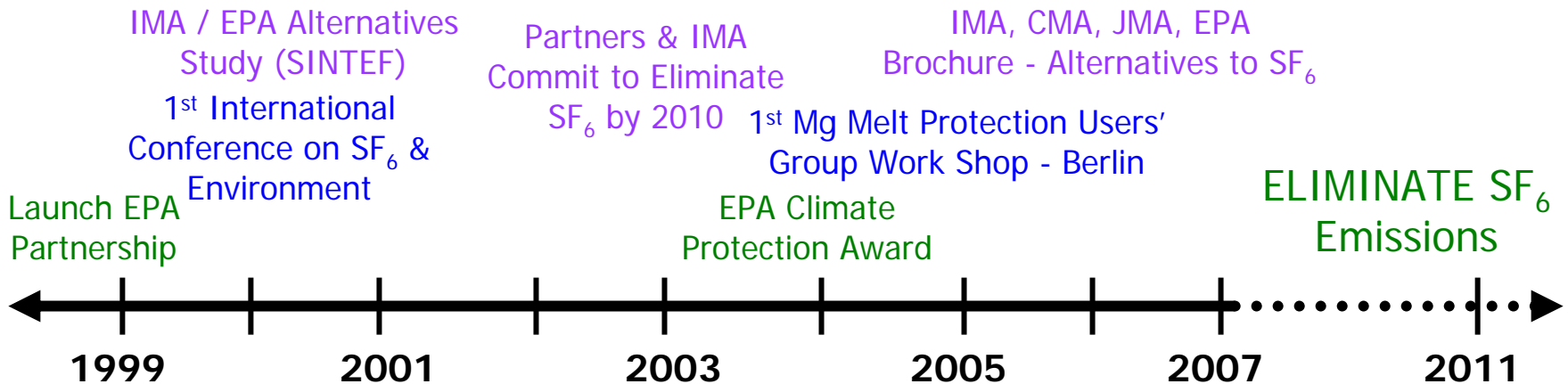
# More Information on U.S. GHG Reporting

- GHG Reporting Rule Website
  - [www.epa.gov/climatechange/emissions/ghgrulemaking.html](http://www.epa.gov/climatechange/emissions/ghgrulemaking.html)
- Katherine Sibold
  - E-mail: [sibold.katherine@epa.gov](mailto:sibold.katherine@epa.gov) or
  - Telephone: 202-343-9280



# Partnership Timeline – Cooperation & Groundbreaking Achievements

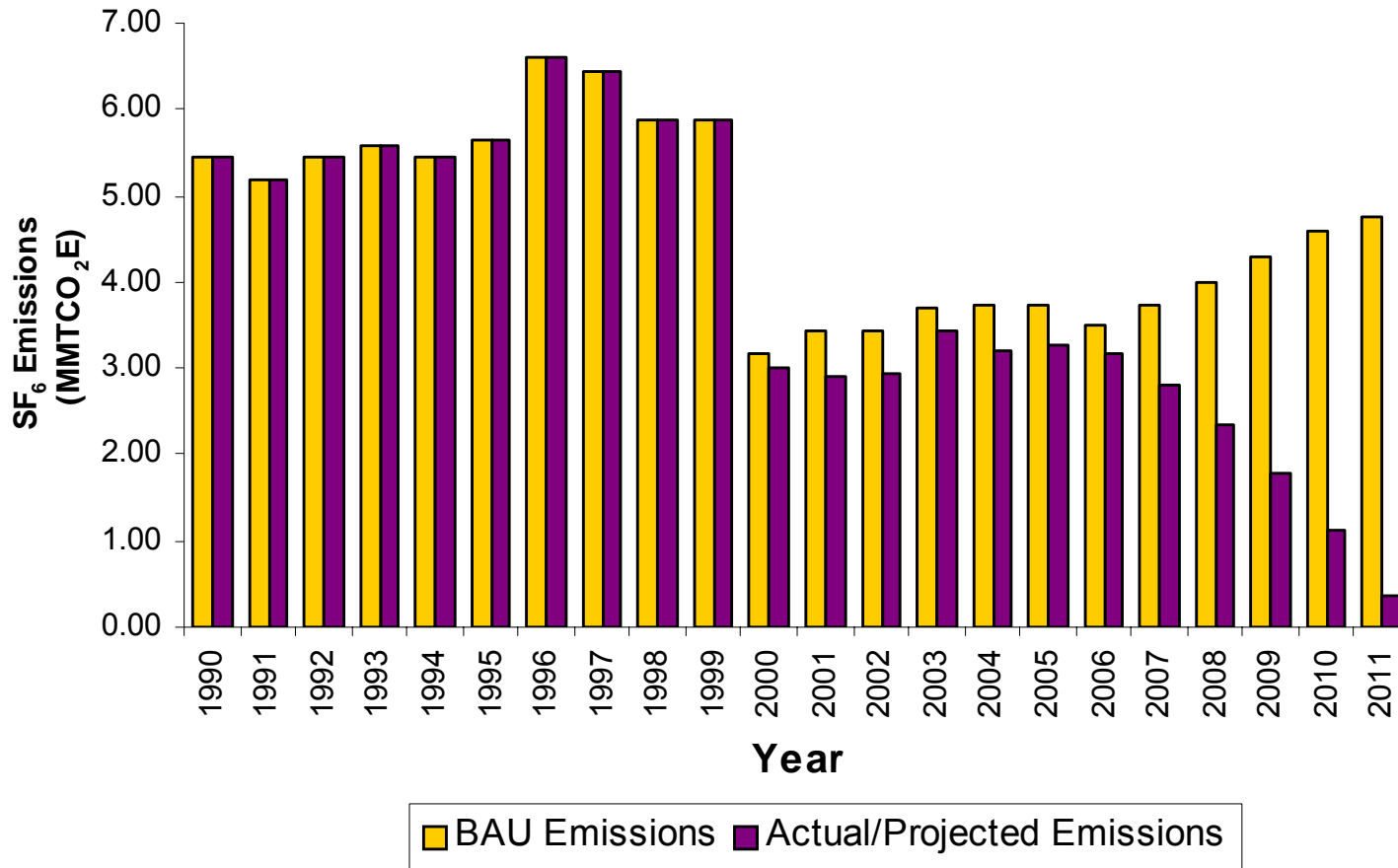
- Full conversions to alternatives underway!
  - Magnesium Elektron (United Kingdom)
  - Tokai Rika (Japan)
  - Meridian Technologies (N. America)
  - Dead Sea Magnesium (Israel)





# U.S. Mg Partner Accomplishments

## BAU vs. Actual/Projected Emissions





# Latest Melt Protection Measurement Study

- Where: MagReTech facility in Bellevue, OH
- What: Secondary Mg Ingot Caster
- When: Fall, 2007
- Who: MagReTech / Garfield Alloys  
Matheson Tri-Gas/Taiyo Nippon  
Sanso Corporation  
Polycontrols Technologies  
ICF International  
URS Corporation



# DRAFT Measurement Study Results

Average Amount of Destruction:

$SF_6$	$\approx 5\%$
MTG-Shield™ (Novec™ 612)	$\approx 9\%$
$SO_2$	$\approx 39\%$

- Significant ambient air intrusion (dilution) - 90%
- Ingot casting hood cover gas destruction is significantly less than die casting crucible (except for  $SO_2$ )



# DRAFT Measurement Study Results

## Byproducts/Emissions of Concern:

SF <sub>6</sub>	ND
MTG-Shield™ (Novec™ 612)	ND
SO <sub>2</sub>	ND

- ND - None Detected in Operator Room
- Significant ambient air intrusion (dilution) - 90%
- Minimal thermo-chemical reaction in the hood limits byproduct formation (relative to a holding furnace)



# DRAFT Measurement Study Results

GHG Emission Reduction\*:

SF <sub>6</sub>	na
MTG-Shield™ (Novec™ 612)	99%
SO <sub>2</sub>	99%

\*GHG emission reduction relative to current SF<sub>6</sub>/SO<sub>2</sub> system

Release of final report pending



# Appropriations Language

## FY2008 Consolidated Appropriations Act:

- "... not less than \$3,500,000 shall be provided for activities to develop and publish a draft rule not later than 9 months after the date of enactment of this Act, and a final rule not later than 18 months after the date of enactment of this Act, to require mandatory reporting of greenhouse gas emissions above appropriate thresholds in all sectors of the economy..."

## Accompanying Explanatory Statement:

- The Agency shall "use its existing authority under the Clean Air Act" to develop a mandatory GHG reporting rule. "The Agency is further directed to include in its rule reporting of emissions resulting from upstream production and downstream sources, to the extent that the Administrator deems it appropriate. The Administrator shall determine appropriate thresholds of emissions above which reporting is required, and how frequently reports shall be submitted to EPA. The Administrator shall have discretion to use existing reporting requirements for electric generating units under Section 821 of the Clean Air Act...."





# Legal Authorities

- Sections 114 and 208 of the CAA allow for data collection and measurement and recordkeeping from stationary or mobile related sources
- Appropriations language provides EPA with \$3.5 million in FY 2008 to develop proposed and final rules



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