

# **Global Control of Mercury Emissions**

Presentation to NEWMOA Mercury  
Science and Policy Conference

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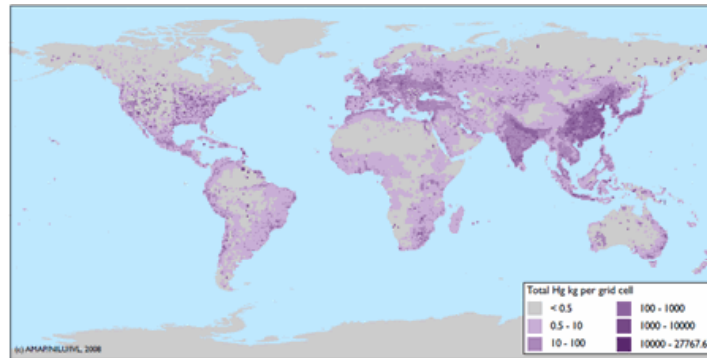
*EPA Office of International Affairs*

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## **Focus of the Presentation:**

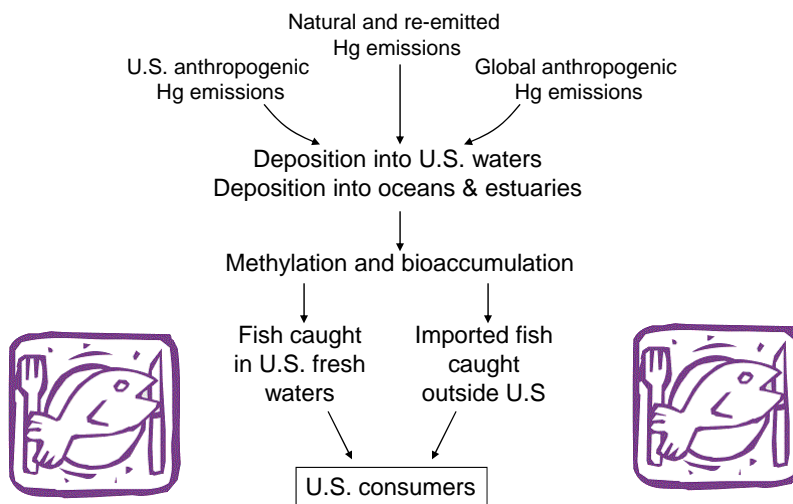
1. Global Mercury Emissions Sources
2. Impacts to the United States from Global Mercury Emissions Sources
  - transport and deposition, fresh water and marine sources,
  - exposures
3. Global Efforts to Address These Sources
  - UNEP Study of Major Emissions Sources
  - Immediate Actions Called for by UNEP Governing Council
  - UNEP Global Mercury Partnership

## Global Anthropogenic Mercury Emissions



Source: United Nations Environment Programme Global Atmospheric Mercury Assessment: Sources, Emissions and Transport, 2008, **using 2005 data**, as presented by the Arctic Monitoring and Assessment Programme Secretariat

## Mercury Exposure Pathways from Emissions Sources to U.S. Consumers



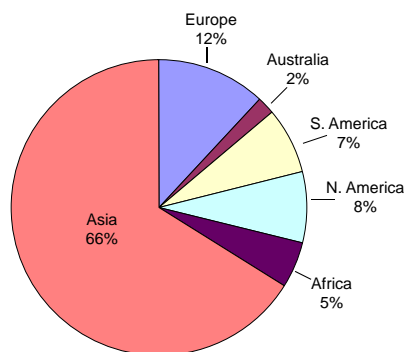
## What does this mean for U.S. exposures?

US exposures primarily from fish consumption

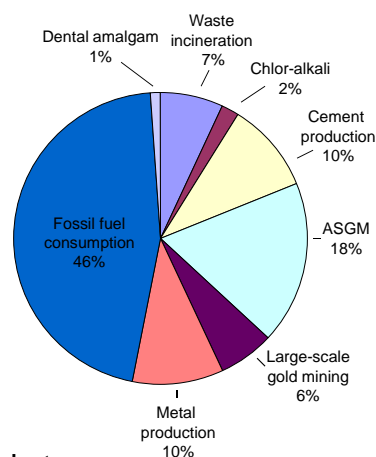
- **Most commercial fish consumed by Americans (over 90%) is from oceans and estuaries.**
  - Oceans and estuaries affected by deposition and methylation
  - Implications of current rates of deposition
- **Freshwater fish are a large part of the diet of some U.S. populations**
  - USGS August 2009 study: mercury in every fish sampled ; 27% of freshwater streams exceed EPA mercury criterion
  - EPA Fish Study 2009: about 50% of U.S. freshwater lakes exceed EPA mercury criterion
  - Over 3000 fish advisories in all 50 states for mercury
  - Challenges for state regulators

## Global Anthropogenic Emission of Mercury

By Region (2005)

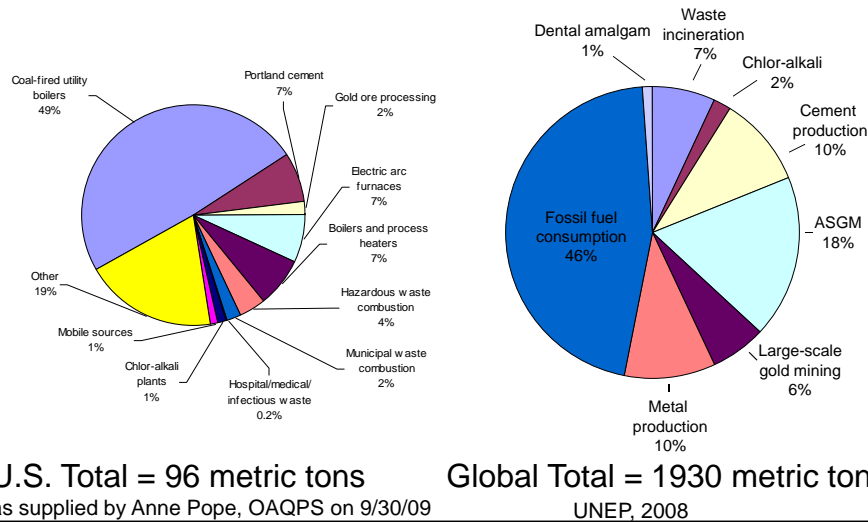


By Industry (2005)



Total = 1930 metric tons  
(UNEP, 2008)

## U.S. vs. Global Anthropogenic Emissions of Mercury (By industry, 2005)



## Global Efforts to Address Mercury

- 2002 UNEP Global Mercury Assessment identified state of science, global nature of problem, significant contributors, and reduction initiatives. UNEP initiated Mercury Program in 2003.
- December 2003, Long-Range Transboundary Air Pollution (LRTAP) Convention Heavy Metals Protocol entered into force.
- 2005 UNEP Governing Council called for partnerships as one approach. The U.S. initiated partnership work in five areas.
- UNEP 2008 Mercury Working Group agreed on policy framework for future mercury action.
- **February 2009 UNEP Governing Council agreed to begin negotiations on legally-binding mercury instrument.**

## GC Decision: Additional Elements

- UNEP to conduct “Para 29 Study” of current and future trends of mercury emissions sources, analysing and assessing the costs and the effectiveness of alternative control technologies and measures.
- Focus is on most significant “unintentional” emissions sources – those sources which do not use mercury as an input but which emit mercury: Coal combustion, cement kilns, industrial metals production, and waste combustion
- Source inventories and extent of current emissions controls
- Control options and indications of costs
- Study is expected to focus on key mercury-emitting countries/regions which give a regionally-balanced picture:
  - China, India, Russia, South Africa, Brazil, U.S., EU
  - Current data limitations prevent clear determinations of many countries’ overall emissions levels

## GC Decision: Additional Elements

- Immediate Actions
  - Enhance capacity for mercury storage
  - Reduce supply (e.g. primary mercury mining)
  - Reduce use in artisanal gold mining
  - Reduce use in products and processes
  - Provide information on BAT/BEP and conversions
  - Enhance development of national inventories
  - Raise public awareness, support risk communication
  - Provide information on sound management of mercury

## UNEP Global Mercury Partnership

- Launched in 2005
- Widely accepted as an important component of a global mercury control regime
- Overarching framework, with goals, objectives, and business plans, put in place in 2008
- Partnership Areas:
  - Coal Combustion
  - Products
  - Chlor-alkali
  - Artisanal Gold Mining
  - Supply and Storage
  - Fate and Transport Research
  - Waste
  - Non-ferrous Metals
  - Vinyl Chloride Monomer

## Examples of Partnership Work: Air Transport and Fate Research

- Led by Italy
- “Mercury Fate and Transport in the Global Atmosphere,”
  - comprehensive report to UNEP in 2008 on global emissions, air monitoring and air modeling, involving 70 scientists from 12 different countries. Critical input to UNEP 2008 emissions report.
- Speciated mercury measurements supported by USEPA at NOAA’s Mauna Loa High Altitude Monitoring Station
  - better understand transformation and fate;
  - investigate oxidation of elemental mercury to RGM in the marine free troposphere;
  - support long-term record of various mercury species;
  - evaluate formation mechanisms of particulate mercury;
  - support understanding of global baseline.

## Coal Combustion

- Largest Emissions Sector Globally
- Led by International Energy Agency
- Best Practice Options for Coal Fired Power Plants
- Economics of Mercury Control
- Sorbents research at Russian coal-fired power station
- Mercury control optimization demonstration project in Russia, China, South Africa, and India

## Artisanal Gold Mining

- Responsible for emissions of about 400 tons per year globally
- Involves 10 million miners, 3 million women and children, over 70 countries, and produces at least 12% of the world's gold @ about \$10 billion per year
- Led by UNIDO and NRDC
- Solutions: technical, market-based, policy
  - retorts
  - mercury capture systems for gold processing
  - national and regional action plans



## Mercury Supply and Storage

- Kyrgyzstan Primary Mercury Mining
  - Mercury now mined in only two countries in significant quantities; China for internal use
  - Government of Kyrgyzstan has recognized the importance of ceasing primary mercury mining, but faces economic challenges
  - Next Steps: remediation, small-scale development, large scale pre-feasibility work
- Asia and Latin America Storage Projects
  - Result of UNEP Governing Council (GC) decision 23/9 to explore options for long term safe and secure management of mercury
  - the GC has established mercury supply reduction as a global priority, and urged governments “to gather information on the options and solutions for the long-term storage of mercury”
  - Projects are underway in Asia and Latin America



Additional Partnership Area Projects:

- VCM
- Chloralkali
- Products
- Metals

*Thank You!*

For more information:

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