Commodity-Grade Mercury
U.S. Supply, Demand, and Reduction

Commodity-Grade Mercury Stakeholder Meeting

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Purpose

- Identify issues relating to mercury demand and domestic commodity-grade mercury.
- Discuss efforts by the U.S. to reduce demand and manage mercury supplies.
- Facilitate panel discussions on supply versus changing demand.

Overview

- Reductions in U.S Mercury Demand
- Existing U.S. Product and Process Demand
- Sources of U.S. Supply
- U.S. Efforts to Address Mercury Supplies

Reductions in U.S. Mercury Demand

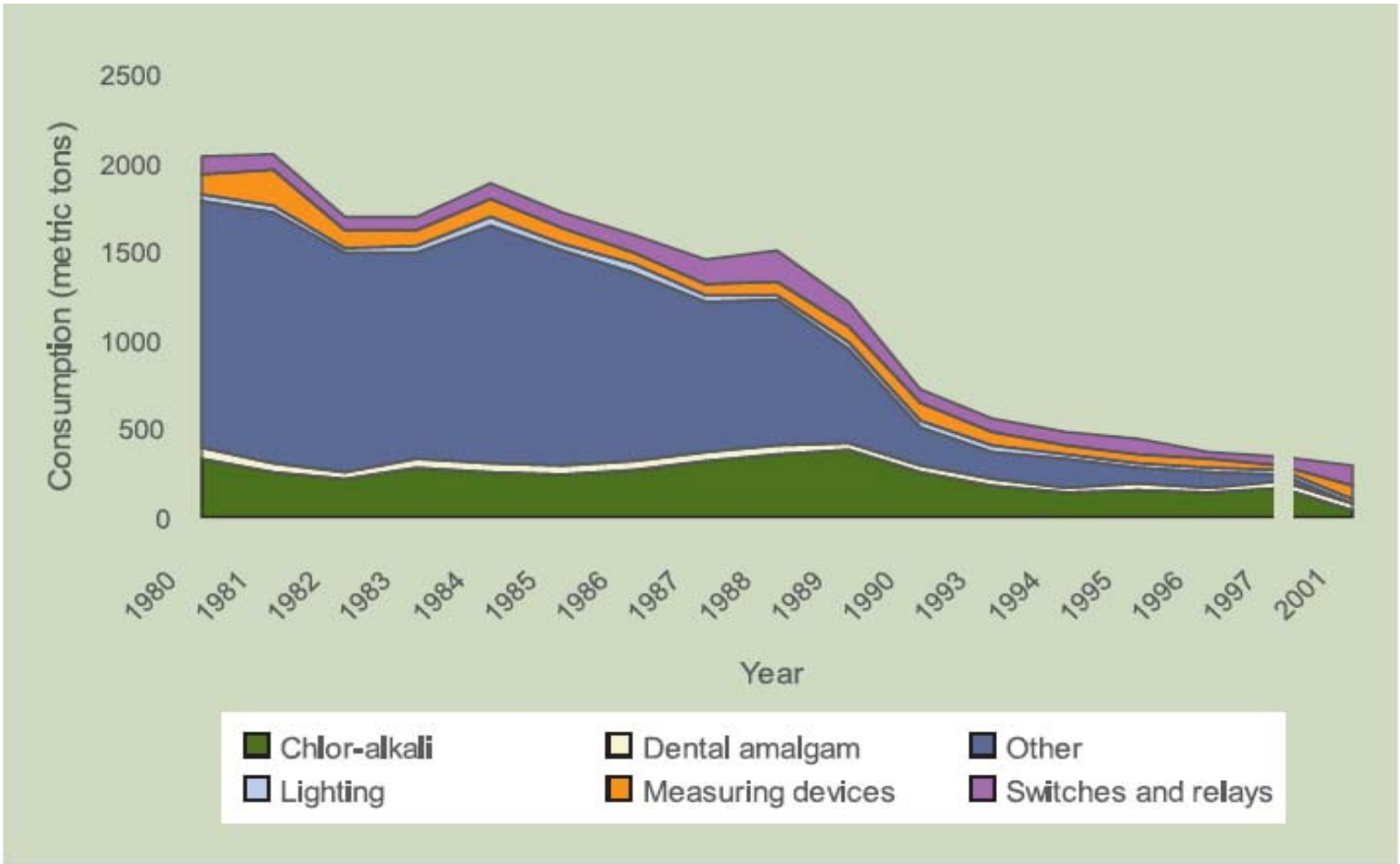
- Between 1980 and 2001, annual mercury use in the U.S. decreased from 2,225 to 271 metric tons.
- Reductions largely due to:
  - Limits on mercury use in batteries.
  - EPA cancellation of pesticide registrations for the use of mercury in paint.
  - Closure or conversion of mercury cell chlor-alkali production facilities.
  - Progress under the United States-Canada Great Lakes Binational Toxics Strategy.
    - Voluntary agreement which set forth a goal of 50 percent reduction of deliberate use and release of mercury by 2006.
  - Other international mercury partnerships: UNEP, CEC.

Reductions in U.S. Mercury Demand (cont'd)

- In the U.S., there continues to be focus on reducing use where cost-effective substitutes exist.
- Increased efforts to identify and promote mercury alternatives in products and processes:
  - Reductions in mercury use in products.
  - Reductions in the use of mercury in processes.
    - Two of eight remaining U.S. mercury cell chlor-alkali production facilities scheduled to close in 2008.
    - From 1995 to 2005, 91 percent decrease in the amount of mercury used in production of chlorine and caustic soda.
    - Final rule issued in 2003 will further reduce emissions from the use of mercury in mercury cell chlor-alkali production.
    - Other regulations prohibit the new construction of mercury cell chlor-alkali production facilities.

Reductions in U.S. Mercury Demand (cont'd)

U.S. Mercury Product and Process Use Trends



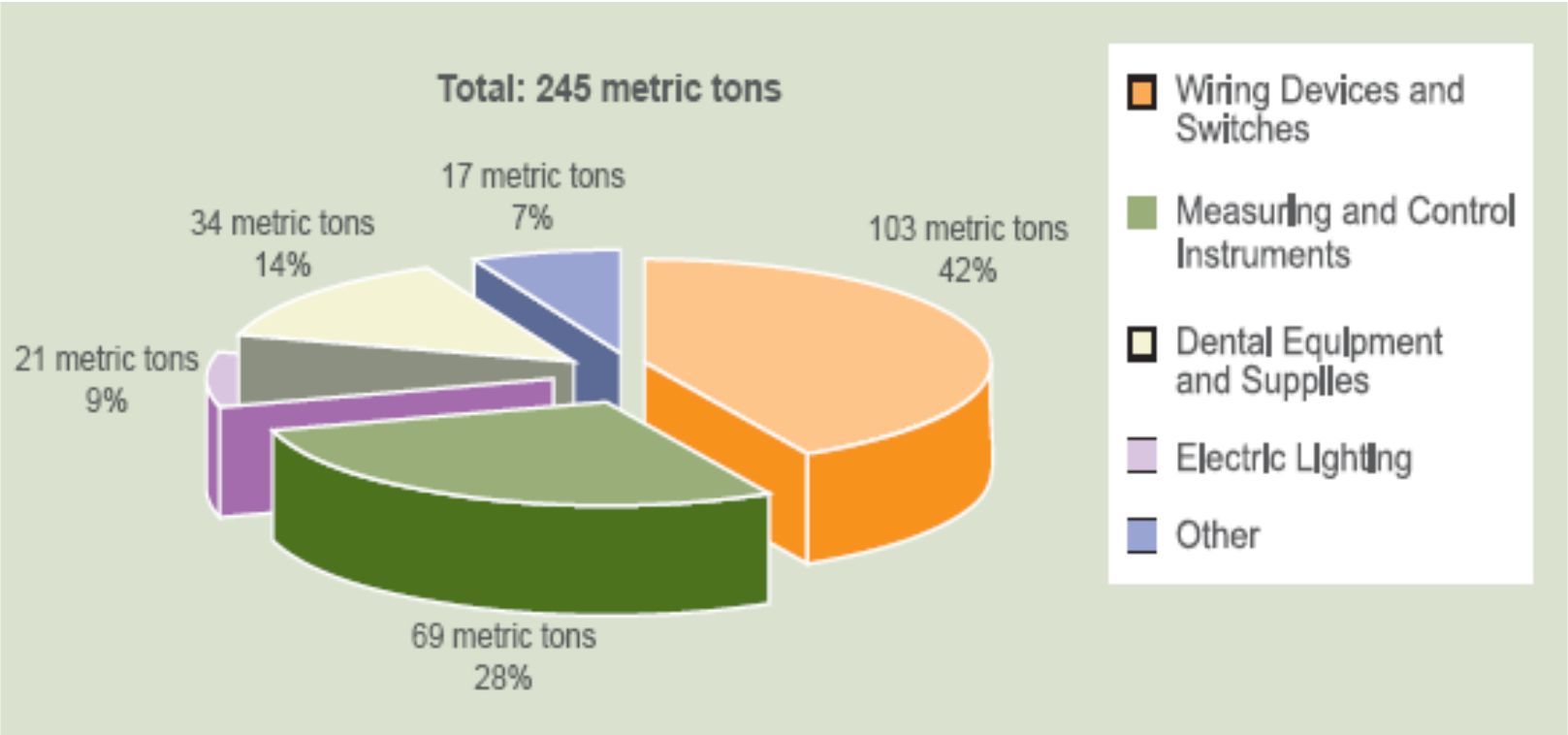
U.S. EPA. EPA's Roadmap for Mercury, *available at* http://www.epa.gov/mercury/pdfs/FINAL-Mercury-Roadmap-6-29.pdf, p. 37.

Existing U.S. Product and Process Demand

- Major U.S. Products
  - Wiring devices and switches
  - Measuring and control devices
  - Electrical lighting
  - Button cell batteries
  - Dental amalgam
- Major U.S. Processes
  - Mercury cell chlor-alkali production

Existing U.S. Product and Process Demand (cont'd)

Total U.S. Mercury Use in Products (2001)



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Existing U.S. Product and Process Demand (cont'd)

- Wiring Devices and Switches
  - 2001 Baseline: 103 metric tons
  - Current: 88 metric tons
    - 15 percent reduction
  - By 2006, Honeywell International ceased manufacture of mercury switches and reduced mercury use by 11.5 metric tons.
  - U.S. motor vehicles produced after January 1, 2003 do not contain mercury switches.
  - Eight states enacted legislation prohibiting the purchase of new mercury-containing thermostats.

Existing U.S. Product and Process Demand (cont'd)

- Measuring and Control Devices
  - 2001 Baseline: 69 metric tons
  - Current: 65 metric tons
    - 6 percent reduction
  - Hospitals for a Healthy Environment estimates a 3.9 metric ton decrease by 2012.
  - Three U.S. manufacturers of precision measuring devices announced phase-out of mercury-added commercial products.
  - Fifteen states enacted legislation prohibiting the purchase of new mercury-containing thermometers.

Existing U.S. Product and Process Demand (cont'd)

- Electrical Lighting
  - 2001 Baseline: 21 metric tons
  - Current: 5 metric tons
    - 74 percent reduction
  - Mercury use in motor vehicle headlamp lighting is being phased out.
  - Increased promotion of fluorescent lamps shifts emphasis from mercury demand reduction to disposal and recycling.

Existing U.S. Product and Process Demand (cont'd)

- Button Cell Batteries
  - 2001 Baseline: 17 metric tons
  - Current: 15 metric tons
    - 12 percent reduction
  - Members of National Electrical Manufacturers Association (NEMA) plan to phase out mercury use in button-cell battery production by 2011.
  - Four states enacted legislation prohibiting the distribution of items containing mercury-added button cell batteries.

Existing U.S. Product and Process Demand (cont'd)

- Dental Amalgam
  - 2001 Baseline: 34 metric tons
  - Between 1979 and 1990, CDC reports a 38 percent decrease in use of mercury dental amalgam.
  - 17 states enacted legislation to regulate dental amalgam, including bans, informed consent requirements, and mandatory notification of available alternatives.
  - EPA's Office of Water is conducting a two-year study geared toward developing effluent guidelines for dental amalgam wastes.

Existing U.S. Product and Process Demand (cont'd)

- Mercury Cell Chlor-Alkali Production
  - Current Inventory: >2,300 mt
  - Average per facility: 300 mt
  - Largest U.S. private-sector source of stored and in-use mercury.
  - Facilities generally operate 40 to 60 years.
    - No new construction in U.S. since 1970.
  - By 2008, two plants anticipate closure or conversion.
    - Remaining six plants expected to close/convert during next 30 years, but rate uncertain.

Sources of U.S. Mercury Supply

- Recycling
- Industrial Mining By-Product Recovery (Gold & Copper)
- Industrial Waste Recovery
- Importing, Exporting, & Brokering
- Elemental Mercury (Primary Industrial Mining)
  - Inactive in the U.S. since 1990.

Sources of U.S. Mercury Supply (cont'd)

- Recycling
  - Nearly all mercury used in U.S. derives from secondary sources (e.g., mercury recovered from spent batteries, chlor-alkali wastewater sludge, mercury vapor and fluorescent lamps, dental amalgams, electrical apparatus, and measuring instruments).
  - Approximately 35 mt/yr recovered in recycling of mercury-added products.
    - Highly variable per annum.
    - Approximately 2,000 mt in products currently in use.
  - Approximately 42 mt/yr disposed.
  - Amounts of mercury recovered anticipated to increase.
    - Increased number of collection programs.
    - Increased use of certain mercury-added products (e.g., fluorescent lamps).

Sources of U.S. Mercury Supply (cont'd)

- Industrial Mining By-Product Recovery (Gold, Silver, & Copper)
  - Generally second-largest source of U.S. mercury supply.
    - Highly variable per annum.
  - More than 110 mt/yr from domestic mines.
    - Nevada gold and silver mines.
  - Imported from Chilean and Peruvian gold mines for domestic processing and resale.
  - Future increases anticipated.
    - Emissions capture technologies in Nevada.
    - Increased gold production drives market for by-product mercury.

Sources of U.S. Mercury Supply (cont'd)

- Industrial Waste Recovery
  - Approximately 35 mt/yr recovered from mercury process waste.
    - Highly variable per annum.
  - Potential sources of recoverable mercury:
    - Contaminated soil and debris at closed mines.
    - Contaminated soil near natural gas pipelines.
    - Discarded dental amalgam from dental offices.

Sources of U.S. Mercury Supply (cont'd)

- Importing, Exporting, & Brokering
  - U.S. mercury trade significantly driven by distillers and brokers, not merely domestic use/production.
    - Amount of mercury imported highly variable per annum.
    - Recent estimates indicate that U.S. domestic production is able to meet or exceed U.S. domestic demand.
  - Future U.S. imports of mercury anticipated to be driven by short-term domestic need and non-domestic trade interests of brokers and distillers.

U.S. Efforts to Address Mercury Supplies

- The wholesale price of mercury is increasing.
  - Increase of $155 USD/flask to $750 USD/flask (2000-2005).
  - The price of gold also has increased significantly.
- As demand decreases in developed countries, it appears that mercury flows from developed countries to developing countries.
  - Use of mercury for artisanal mining in developing countries increased ~54 percent (2000-2005).
- Difficult to track global origins, destinations, end-use/users, as uniform standards for tracking global mercury flows do not exist.

U.S. Efforts to Address Mercury Supplies (cont'd)

- Current U.S. stocks: ~8,010 metric tons.
- Progress to date:
  - More than half is already in long-term storage.
  - DOD maintains 4,436 metric tons of mercury in strategic stockpile.
    - Will be stored at one location for at least 40 years.
  - DOE stated it will continue to store 1,200 metric tons.
  - Remaining mercury stores in non-federal stocks is ~2,400 metric tons.

U.S. Efforts to Address Mercury Supplies (cont'd)

- Other stockpiles and potential stockpiles:
  - Of ~2,400 metric tons in mercury cell chlor-alkali production facilities, ~1,800 metric tons recoverable at closure or conversion.
  - Smaller quantities from other sources:
    - Recovered mercury.
    - By-product mercury (e.g., mining of other ores).