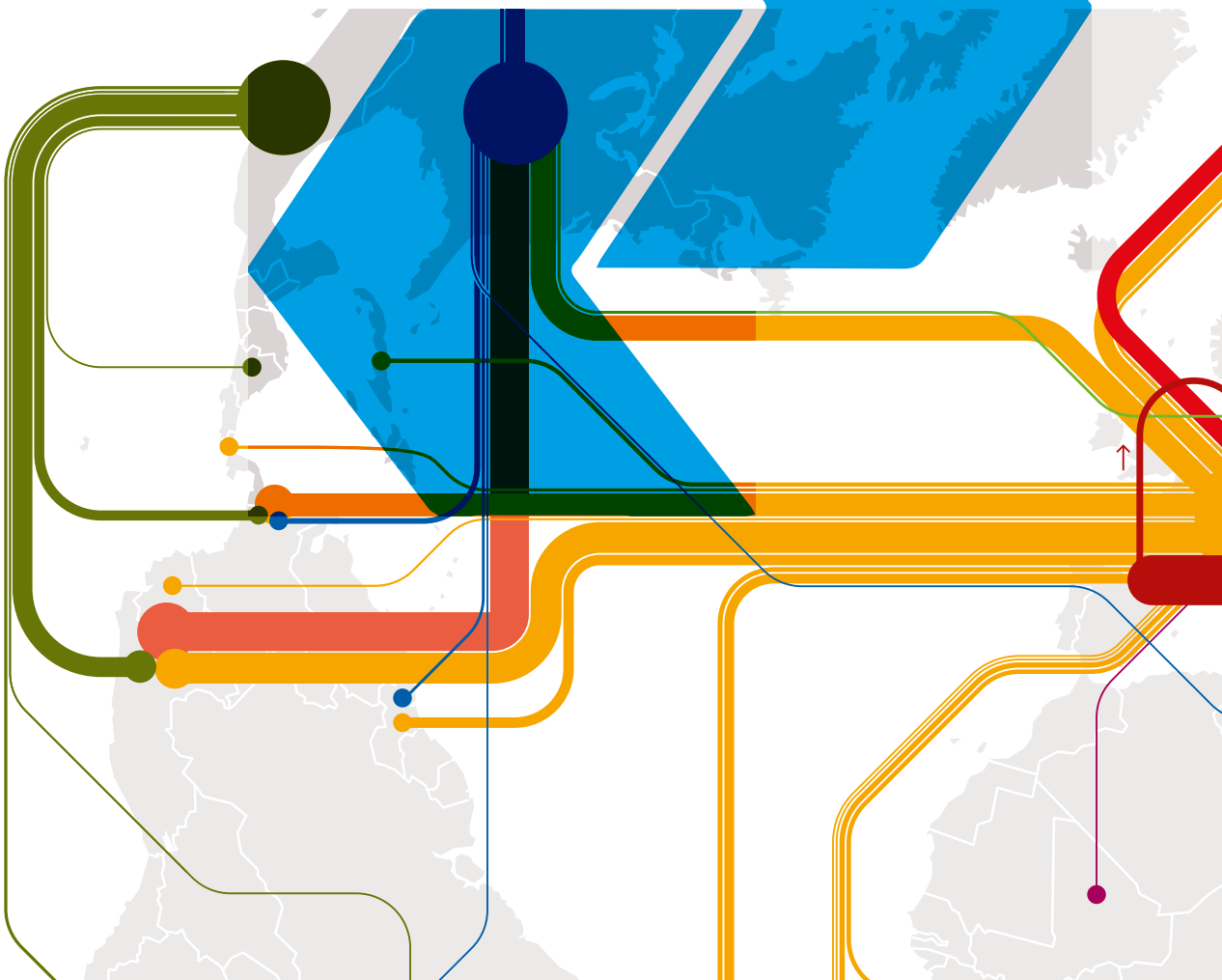
UN environment

Global mercury

supply, trade and demand

Executive Summary



September 2017

A response by the world's nations to the abundant evidence of the negative effects of mercury pollution on human health and the environment, the Minamata Convention on Mercury entered into force on 16 August 2017. The Convention includes provisions to control the supply, trade and use of mercury. This report provides an overview of the current state of these activities in order to assist governments and other stakeholders as the Convention moves into the implementation phase. The most important findings and observations are summarized here.

Mercury supply

Chlor-alkali residual mercury

One of the major changes in mercury supply since 2011 is the reduced volume of chlor-alkali residual mercury available on the open market, due in large part to restrictions imposed by export bans. In the European Union alone, an estimated 650 tonnes per year of chlor-alkali related mercury are no longer available. Despite such advances, many countries do not yet have plans to move away from the mercury process in this industry.

Mercury mining

A second fundamental change in mercury supply is the emergence of new mercury mining in Mexico and Indonesia, with production estimated at 800-1 100 tonnes in 2015. In neither of these cases is the extent or the rate of growth of production very clear. The Minamata Convention requires Parties to phase out existing mercury mining. Once such operations are established, however, and mining communities become accustomed to the economic benefits, it may be difficult to phase out these mining activities and disrupt the social structure that has developed around them.

Mercury price

The greatly reduced global supply of mercury during 2011 and 2012 encouraged a spike in the market price between 2011 and 2013, and this likely encouraged some of the new mining activities. That price spike appears to be past, but the free market price of mercury remains high in historical terms. Also as a result of the export bans, a two-tiered pricing system has emerged in the United States and European Union. With export bans in place, the domestic price of mercury in these two regions, where supply is plentiful and demand limited, has become significantly lower than the free market price. This low domestic price of mercury may act to discourage the collection and recycling of mercury-added products and "scrap".

The two-tiered pricing system also creates an incentive for less scrupulous operators to attempt to profit from the price difference. Some have already tried to circumvent export restrictions in an attempt to sell mercury for a higher price on the open market. Authorities aware of this possibility are in a better position to counter such activities.

Recent trends

While the quantity of mercury available on the open market from the chlor-alkali industry has declined in recent years, primary mercury mining has increased overall in response to strong demand, such that the global mercury supply in 2015 was in the range of 3 850 to 4 400 tonnes per year. Better information to be provided under the Minamata Convention will permit more precise estimates.

Mercury trade

Mercury trading hubs

Largely due to restrictions on mercury exports from the European Union and the United States, since 2010 there has been a major shift in the locations of the key mercury trading hubs. The main United States and Spanish mercury traders operating in 2010 are no longer in the international trading business, and the main European trader operating mostly out of Rotterdam in 2010 has moved all mercury stocks outside the European Union. The former European Union and United States trading hubs have given way to Singapore and Hong Kong, and to a lesser extent Turkey and Viet Nam, which have become the major storage and transit points for global mercury trade. Periodic reporting on stocks held in such locations would help to clarify the links between the sources and final destinations of international mercury trade.

Undocumented and illegal transfers

As mercury trade has been subjected to additional scrutiny, and the market price remains relatively high, undocumented or illegal transfers have increased. In one example, a German company illegally exported large quantities of mercury (improperly characterized as waste) from Germany to Switzerland. Customs agents in Indonesia and the Philippines have intercepted Indonesian mercury and cinnabar ore smuggled in shipping containers. Mercury from China has appeared informally in sub-Saharan Africa and Myanmar. Undocumented Mexican mercury moves across the country's southern border. Large quantities of mercury imported by Colombia and Bolivia are transferred informally to neighbouring countries such as Peru, primarily for use in artisanal and small-scale gold mining.

Potentially dangerous practices

Along with the increase in informal mercury trade, there are also accounts of substandard mercury shipping flasks being used in Asia. In some cases non-certified steel flasks have been found with plastic bags inserted as internal liners in order to prevent mercury leakage. Forged hazardous transport safety labels have been fixed to substandard mercury flasks.

Quality of trade data

This research has confirmed that, although databases such as Comtrade and Eurostat are populated by data furnished by national statistical agencies, they are imperfect resources for understanding demand for and trade of mercury, and even more so, mercury-added products. For example, these databases do not show informal or illegal transfers. Moreover, in light of the enormous number of shipments and related documentation that customs agencies deal with, the authorities are able to carry out no more than spot checks to confirm that shipping manifests are consistent with the commodities carried; the trade data typically do not differentiate between mercury-added and mercury-free products; there is occasional difficulty in identifying the actual origins and final destinations of shipments; and there are sometimes mistakes (some of them intentional) in the tariff codes listed with shipments of certain commodities. These sorts of errors could be reduced by closer scrutiny of mercury shipments, and by the creation of additional tariff codes for mercury-added products. Even with such improvements, however, there would still be limits to the level of detail available from trade data, especially as some of the shipping information is considered to be commercially sensitive and therefore not accessible to the public.

Recent trends

It is notable that global imports and exports of mercury have decreased significantly during the last five years. According to the Comtrade database, in 2010 global imports were about 2 600 tonnes, and exports were about 3 200 tonnes. By 2015 global imports were less than 1 200 tonnes, and exports were just more than 1 300 tonnes. This decreased level of trade suggests that there are fewer steps in the mercury supply chain, and probably implies that the end uses are increasingly focused on specific sectors such as artisanal and small-scale gold mining and the production of vinyl chloride monomer. Even while the total volume of mercury trade has decreased, the fact that the overall supply of mercury has increased during the same period is a reminder of the significant challenges faced in the implementation of the Minamata Convention.

Mercury demand

Principal industrial processes using mercury

Since 2005 the major mercury uses continue to be in artisanal and small-scale gold mining (primarily in Africa, Asia and Latin America) and for the production of vinyl chloride monomer (mostly in China). These two applications are responsible for over 60 per cent of global mercury demand. The extent of artisanal and small-scale gold mining has steadily increased (along with the spot price of gold) since about 2000, and shows no sign of falling off as long as the price of gold remains historically high. Multiple programs are in place to help miners shift to mercury-free mining processes, but the challenges are vast. Mercury use in the production of vinyl chloride monomer is also at an all-time high, although measures are in place to reduce and ultimately phase out the mercury-based process.

In contrast, the use of mercury in chlor-alkali production has shown a significant global decline over the past ten years as mercury-cell facilities age, and a number of nations are encouraging their closure and/or replacement with mercury-free processes. Provisions in the Minamata Convention further encourage the mercury-free transition in all of these processes – artisanal and small-scale gold mining, vinyl chloride monomer and chlor-alkali production.

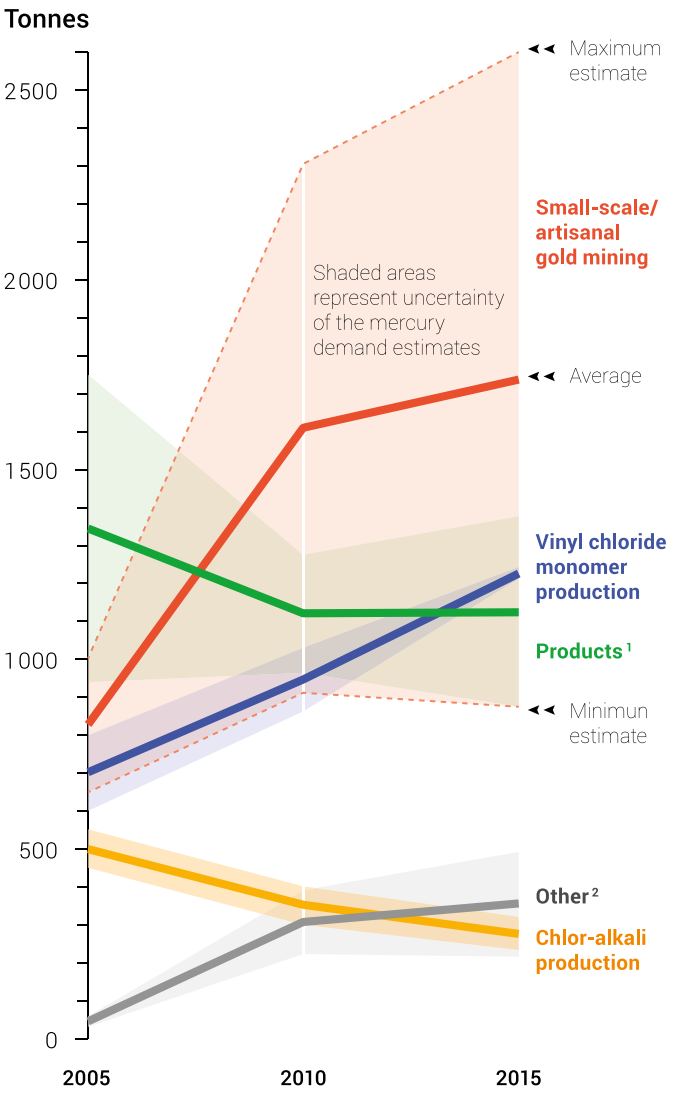
Mercury-added products and other uses

For mercury-added products, China remains a major manufacturer of such key products as measuring instruments, batteries and lamps. Mercury demand for all of these products has declined modestly in recent years, although some are subject to competing influences. For example, incentives for reduced energy demand have encouraged the substitution of incandescent lamps (that do not contain mercury) by compact fluorescent lamps (that do contain mercury) in many countries. At the same time, wealthier economies are already witnessing the replacement of compact fluorescent lamps by such energy-efficient and mercury-free alternatives as light-emitting diodes.

The use of dental amalgams, which contain about 50 per cent mercury, is also widespread, although global mercury demand has declined somewhat as mercury-free composites and other alternatives become more available and more reasonably priced. Many countries are seeing a growing preference for alternatives to amalgam and some, like Sweden and Norway, have already effectively phased out the use of mercury in dental care. In this sector as well, however, improvements in dental health care in less prosperous countries, where cost-effective mercury-free alternatives to amalgam may be less available, have led to increases in the use of amalgam (and therefore mercury) in those countries.

The accompanying figure summarizes the evolution of mercury demand in different sectors over the last 10 years, although the marked increase in the category of "other" uses should be seen more as a reflection of the recent availability of better information about these uses, than as an indication of a significant increase in demand. The shaded areas bordering each trend line in the figure show the extent of the uncertainties in the data.

Evolving mercury demand by sector, including uncertainties



1. Batteries, dental applications, measuring and control devices, lamps, electrical and electronic devices
2. Paints, laboratory, pharmaceutical, cultural/traditional uses, etc.

Sources: UNEP, 2006; AMAP, 2013; this report.

Recent trends

Largely due to the increases in demand for mercury in artisanal and small-scale gold mining and the production of vinyl chloride monomer, the global demand for mercury in products and processes has increased during the past ten years. For 2015, global demand for mercury was in the range of 4 500 to 4 900 tonnes, of which over 50 per cent was attributed to East Asia and Southeast Asia. These trends in certain sectors informed the negotiations leading up to the Minamata Convention, which includes provisions addressing all of the main categories of mercury demand.

Linking global mercury supply and demand

The analysis summarized in this report permits the visualization of global mercury pathways, from sources of supply to uses and sinks. The overview presented in the next figure is predicated on the assumption that all of the sources or intentional inputs of mercury to the economy must - even if they remain accumulated in the economy for some years - eventually become outputs from the economy. This model simplifies the outputs as:

1. Mercury in products or wastes that go to recycling
2. Releases to the environment
3. Transfers to long-term storage or disposal (e.g., hazardous waste landfill or salt mine)

Of all the intentional uses of mercury in a given year, only about one-third of the mercury supply comes from recovery and recycling, while approximately twice that quantity still ends up as releases to the environment, if one includes releases from mercury-added products and applications that were previously accumulated in society (e.g., mercury fever thermometers, blood pressure cuffs, batteries, etc., going into the municipal waste stream).

Mercury demand presently exceeds the basic supply by a significant amount, and it is likely that much of the difference in 2015 was made up through a drawdown of mercury stocks or inventories. Unless mercury demand can be reduced rather rapidly, this imbalance will further stimulate formal and informal mercury supplies and trade, and will add to the difficulty of changing course.

Global mercury supply and demand, 2015