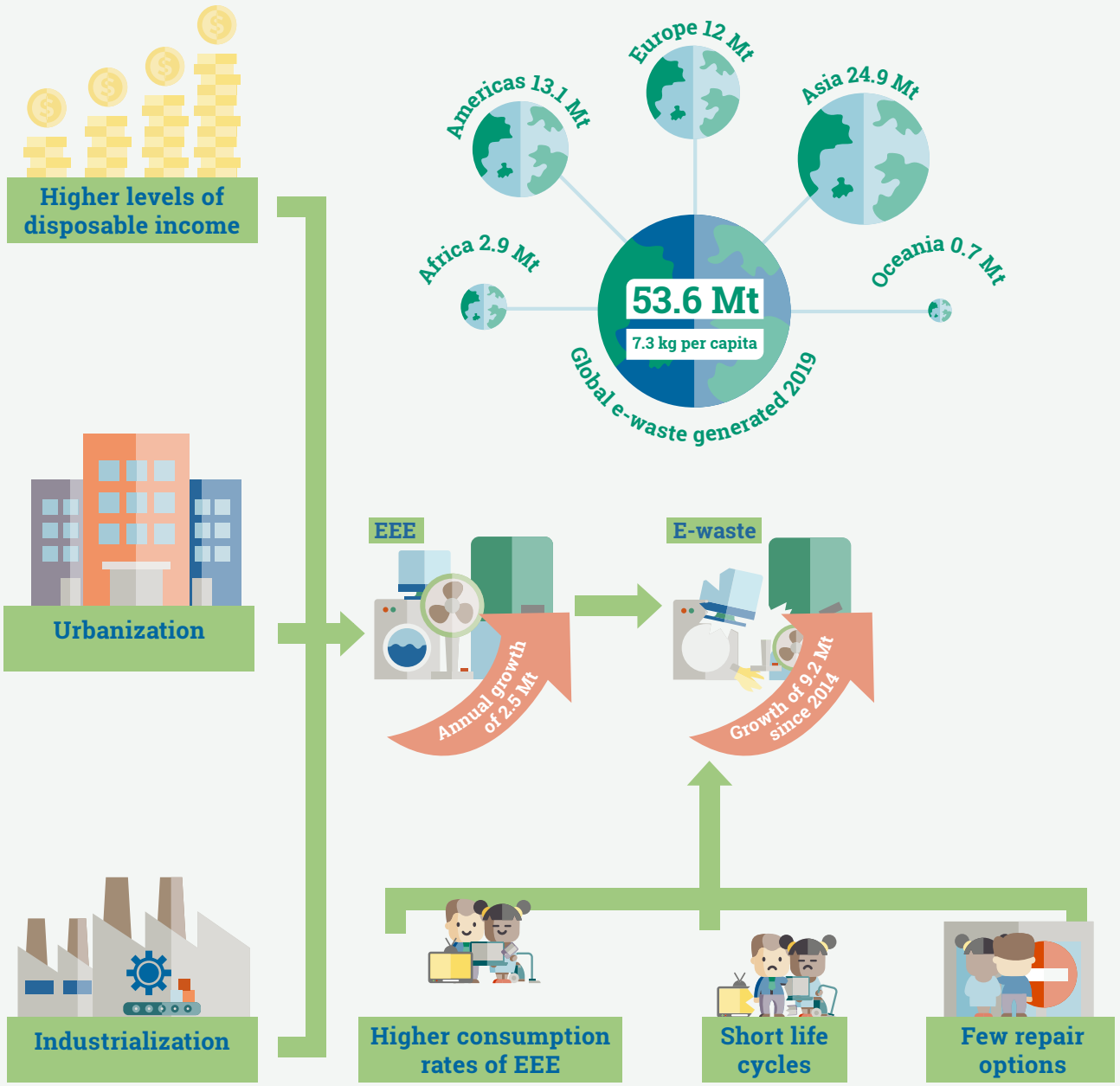
The consumption of Electrical and Electronic Equipment (EEE) is strongly linked to widespread global economic development. EEE has become indispensable in modern societies and is enhancing living standards, but its production and usage can be very resource-demanding, as such also illustrates a counter to that very improvement in living standards. Higher levels of disposable incomes, growing urbanization and mobility, and further industrialization in some parts of the world are leading to growing amounts of EEE. **On average, the total weight (excluding photovoltaic panels) of global EEE consumption increases annually by 2.5 million metric tons (Mt).**

After its use, EEE is disposed of, generating a waste stream that contains hazardous and valuable materials. This waste stream is referred to as e-waste, or Waste Electrical and Electronic Equipment (WEEE), a term used mainly in Europe.

This monitor provides the most comprehensive update of global e-waste statistics. **In 2019, the world generated a striking 53.6 Mt of e-waste, an average of 7.3 kg per capita.** The global generation of e-waste grew by 9.2 Mt since 2014 and is projected to grow to 74.7 Mt by 2030 – almost doubling in only 16 years. The growing amount of e-waste is mainly fueled by higher consumption rates of EEE, short life cycles, and few repair options. Asia generated the highest quantity of e-waste in 2019 at 24.9 Mt, followed by the Americas (13.1 Mt) and Europe (12 Mt), while Africa and Oceania generated 2.9 Mt and 0.7 Mt, respectively. Europe ranked first worldwide in terms of e-waste generation per capita, with 16.2 kg per capita. Oceania was second (16.1 kg per capita), followed by the Americas (13.3 kg per capita), while Asia and Africa generated just 5.6 and 2.5 kg per capita, respectively.

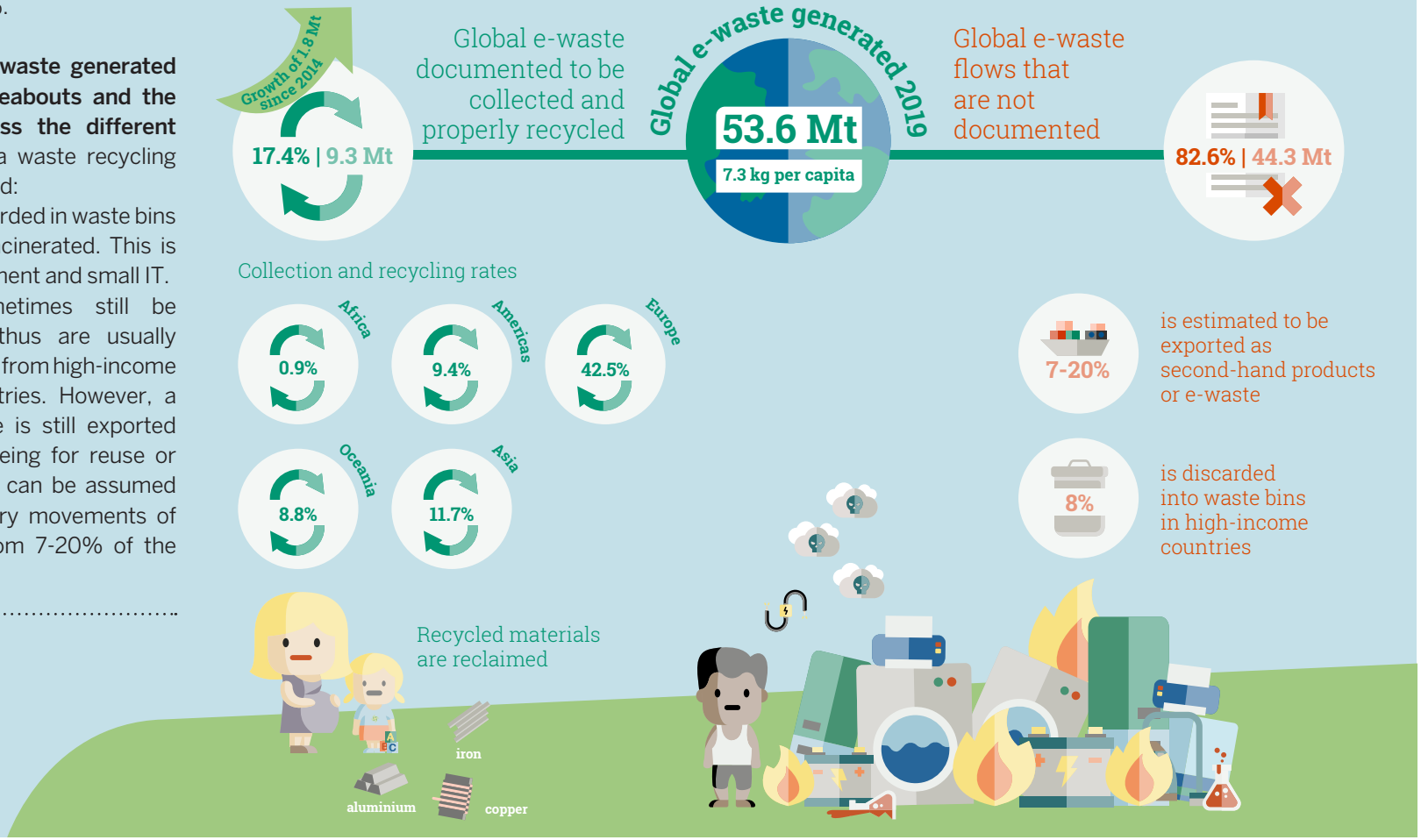


In 2019, the formal documented collection and recycling was 9.3 Mt, thus 17.4% compared to e-waste generated. It grew with 1.8 Mt since 2014, an annual growth of almost 0.4 Mt. However, the total e-waste generation increased by 9.2 Mt, with an annual growth of almost 2 Mt. Thus the recycling activities are not keeping pace with the global growth of e-waste. The statistics show that in 2019, the continent with the highest collection and recycling rate was Europe with 42.5%, Asia ranked second at 11.7%, the Americas and Oceania were similar at 9.4% and 8.8%, respectively, and Africa had the lowest rate at 0.9%.

The fate of 82.6% (44.3 Mt) of e-waste generated in 2019 is uncertain, and its whereabouts and the environmental impact varies across the different regions. In high income countries, a waste recycling infrastructure is usually developed, and:

- Around 8% of the e-waste is discarded in waste bins and subsequently landfilled or incinerated. This is mostly comprised of small equipment and small IT.
- Discarded products can sometimes still be refurbished and reused, and thus are usually shipped as second-hand products from high-income to low- or middle-income countries. However, a considerable amount of e-waste is still exported illegally or under the guise of being for reuse or pretending to be scrap metal. It can be assumed that the volume of transboundary movements of used EEE or e-waste ranges from 7-20% of the e-waste generated.
- The majority of undocumented domestic and commercial e-waste is probably mixed with other waste streams, such as plastic waste and metal waste. This means that easily recyclable fractions might be recycled but often under inferior conditions without depollution and without the recovery of all valuable materials. Therefore, such recycling is not preferred.

In middle- and low-income countries, the e-waste management infrastructure is not yet fully developed or, in some cases, is entirely absent. Hence, **e-waste is managed mostly by the informal sector**. In this case, e-waste is often handled under inferior conditions, causing severe health effects to workers as well as to the children who often live, work and play near e-waste management activities.

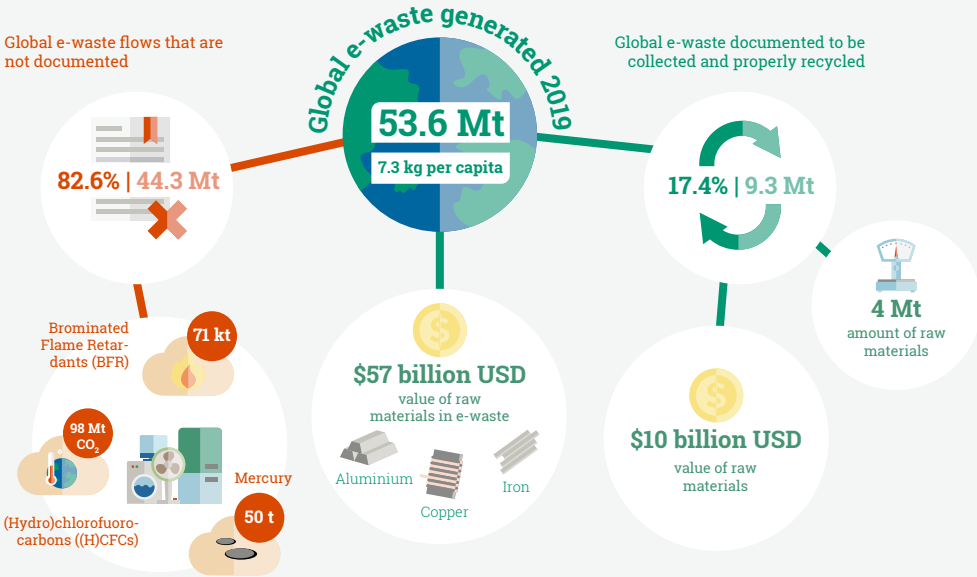


Since 2014, the number of countries that have adopted a national e-waste policy, legislation, or regulation has increased from 61 to 78. However, regulatory advances in some regions are slow, enforcement is poor, and policy, legislation, or regulation does not yet stimulate the collection and proper management of e-waste due to lack of investment and political motivation. In addition, the product scope in the legislation is usually different than the e-waste classification systems suggested by the commonly used, internationally harmonised methodological framework on e-waste statistics. These differences in the product scopes lead to a lack of harmonisation of e-waste statistics across countries.

E-waste contains several toxic additives or hazardous substances, such as mercury, brominated flame retardants (BFR), and chlorofluorocarbons (CFCs), or hydrochlorofluorocarbons (HCFCs). The increasing levels of e-waste, low collection rates, and non-environmentally sound disposal and treatment of this waste stream pose significant risks to the environment and to human health. **A total of 50 t of mercury and 71 kt of BFR plastics are found in globally undocumented flows of e-waste annually**, which is largely released into the environment and impacts the health of the exposed workers.

Improper management of e-waste also contributes to global warming. First of all, if the materials in e-waste are not recycled, they cannot substitute primary raw materials and reduce greenhouse gas emissions from extraction and refinement of primary raw materials. Next, the refrigerants that are found in some temperature exchange equipment are greenhouse gases. A total of **98 Mt of CO_2-equivalents were released into the atmosphere from discarded fridges and air-conditioners** that were not managed in an environmentally sound manner. This is approximately 0.3% of global energy-related emissions in 2019 (IEA).

E-waste is an 'urban mine', as it contains several precious, critical, and other non-critical metals that, if recycled, can be used as secondary materials. **The value of raw materials in the global e-waste generated in 2019 is equal to approximately $57 billion USD.** Iron, copper, and gold contribute mostly to this value. With the current documented collection and recycling rate of 17.4%, a raw material value of $10 billion USD is recovered in an environmental sound way from e-waste globally, and 4 Mt of raw materials could be made available for recycling. The recycling of iron, aluminium, and copper contributed to a net saving of 15 Mt of CO_2, equivalent to emissions from the recycling of secondary raw materials substituted to virgin materials.



In summary, it is essential to substantially increase the officially documented 17.4% global e-waste collection and recycling rate, especially in view of the rapid growth of this waste stream, which is already projected to reach 74.7 Mt by 2030, combined with increasing recovery of materials towards closed material loops and reducing the use of virgin materials.