

# 1. INTRODUCTION

## A. What is E-waste?

Electrical and Electronic Equipment (EEE) contains all products and parts that run on a power or battery supply. Upon being discarded by its owner, EEE becomes Waste Electrical and Electronic Equipment (WEEE) or electronic waste (e-waste) for short, which currently constitutes the fastest growing waste stream globally.

Electrical and Electronic Equipment (EEE) includes a wide range of products, including nearly all household or business items (excluding vehicles) with circuitry or electrical components that have a power or battery supply for performing their functions [1]. EEE is increasingly used in everyday living activities at home, work, transport, school, health, recreation, etc. Typical examples include refrigerators, washing machines, lamps, dishwashers, laptops, servers, electric transport, mobile phones, dialysis machines, imaging equipment, and musical instruments. The use of EEE is growing rapidly alongside the overall development of societies, and demand is increasing as new features are introduced, especially in Small IT and telecommunication devices (such as mobile phones and tablets).

E-waste encompasses a wide variety of discarded products and is classified into six main categories.

**Electrical and Electronic Equipment (EEE) includes a wide range of products with circuitry or electrical components that have a power or battery supply for performing their functions.**

According to the EU WEEE Directive<sup>(4)</sup> and the 'E-waste Statistics Standards Guidelines' [2], EEE is classified into six main treatment-oriented categories:



1. Temperature Exchange Equipment



2. Screens and Monitors



3. Lamps



4. Large Equipment (incl. PV panels)



5. Small Equipment



6. Small IT and Telecommunication Equipment

The six categories can be further detailed using the product-oriented UNU-KEYs classification, which divides EEE into 54 different product-centric categories. The UNU-KEYs focus on similarities in function, comparable material composition, average weight, and similar end-of-life attributes. The full list of the UNU-KEYs and six e-waste categories can be viewed in Annex A.

Once the EEE is discarded, it becomes Waste Electrical and Electronic Equipment (WEEE), also referred to as electronic waste (e-waste). E-waste refers to all electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of reuse [1].



## B. E-waste: An Issue of Concern in the Western Balkan Region

Managing the increasing quantities of e-waste generated annually has become a global challenge, due to the waste's material composition and the inadequacies of collection and treatment infrastructure.

Economic development and rapid change in technology render EEE obsolete, making e-waste the fastest growing waste stream globally. The rising quantities of e-waste pose a threat to the environment, while simultaneously providing business opportunities for extracting and recycling the raw materials embedded in the e-waste stream. Each type of e-waste has a specific size, hazardous components and valuable materials that affect the way it must be collected, treated, recycled, or disposed of in an environmentally sound manner (ESM). Unfortunately, the vast majority of EEE is mismanaged and creates considerable material losses of valuable commodities such as steel, aluminum, copper, and rare earth metals, leading to a greater pressure to extract new raw materials and causing indirect environmental impacts as a result. The adoption of inappropriate management options may cause potential exposure to a complex mixture of chemicals, some of which release toxicity and have environmental properties that have not yet been thoroughly investigated, especially to workers from exposure to hazardous processes and chemicals from improper use, toxic fumes, and other harmful substances. Existing evidence indicates that chronic exposure to such practices might disproportionately impact women and children by affecting neonatal development and impacting hormonal levels and immune function<sup>(6)</sup>. As a complex and relatively recent waste stream, countries need to introduce specific legislation to enforce ESM for e-waste. Though more countries have introduced specific policies and legislative/regulatory frameworks, implementation and enforcement are sometimes inadequate. As well, most developed countries focus on improving e-waste management systems, but not on the reduction of the volumes of e-waste generated in the first place.

E-waste management is monitored in the United Nations' Sustainable Development Goals under SDG 12 on Sustainable Consumption and Production.

The United Nations' 'Global indicator framework for the Sustainable Development Goals (SDGs) and targets of the 2030 Agenda for Sustainable Development' has targets for ESM of e-waste as well as targets on the well-being of operators in the sector. SDG 12 (Sustainable consumption and production) has indicators for improving national recycling rates (SDG 12.5.1), reducing hazardous waste generation (SDG 12.4.2) and the ESM of chemicals and all waste, and substantially reducing waste generation through prevention, reduction, recycling, and reuse (SDG 12.5) to reduce pollution and minimise their adverse impacts on human health and the environment (SDG 12.4).

## C. Socio-economic Framework Conditions in the Western Balkans

The five countries covered in this report seek to join the EU and have signed the Sofia Declaration on the Green Agenda Declaration, which acknowledges the European Green Deal.

This Regional E-waste Monitor (REM) of the Western Balkans covers the following countries: Albania (ALB), Bosnia and Herzegovina (BiH)<sup>(6)</sup>, Montenegro (MNE), North Macedonia (MKD), and Serbia (SRB). In recent years, these countries have stepped up efforts to reduce dependence on landfilling and modernise waste management infrastructures and have introduced or strengthened EPR (e.g. for e-waste, batteries, or packaging) and aligned their legal framework with that of the EU. Nearly all of the countries established ambitious waste collection and recycling targets modelled on those in the EU, which they all aspire to join. In practice, however, waste collection and recycling rates remain relatively low in comparison to most European countries<sup>(7)</sup>.



During the Western Balkans Sofia Summit, held on 10 November 2020, the countries endorsed the Declaration on the Green Agenda that aligns with the EU Green Deal. The Sofia Declaration acknowledges the European Green Deal as the European Union’s new growth strategy toward a modern, climate-neutral, resource-efficient, and competitive economy. The Sofia Declaration supports and accelerates changes and processes in the region with the overarching goal of addressing climate change<sup>(8)</sup>. It also intends to develop circular economy strategies, looking at the entire lifecycle of products, waste prevention, modern waste management and recycling, reuse, repair, and re-manufacturing. In the Green Agenda, the Western Balkan countries agreed to make further progress in construction and maintenance of waste management infrastructure as well as implementing consumer-targeted initiatives to raise citizens’ awareness on waste, separate collection, and sustainable consumption<sup>(9)</sup>.

The entire region has about 16 million inhabitants, with Serbia being the most populous country (at 6.9 million inhabitants), while Montenegro is the smallest (at 0.63 million inhabitants).

The region has a population of 15.97 million inhabitants (inh) (2021) with a population decline of -2%. Serbia is the most populous country with a population of 6.9 million inhabitants, followed by Bosnia and Herzegovina (3.5 million), Albania (2.86 million), North Macedonia (2.08 million)<sup>(10)</sup>, and Montenegro (0.63 million) as of 2021 (see Figure 1).

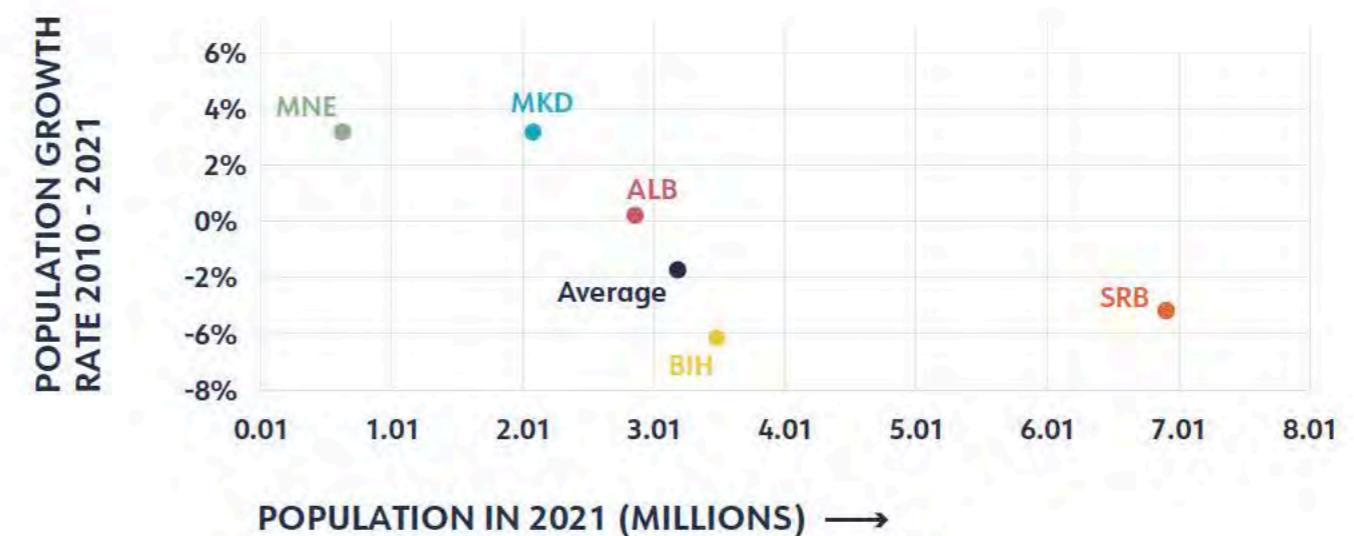
**The Western Balkan region has 16 million inhabitants as of 2021, with an overall declining population.**

North Macedonia and Montenegro have a population growth rate of 1%, while the other countries have registered declining demographics over the past decade.

The population of the region is on the decline with an average rate of -4% between 2020 and 2021. North Macedonia and Montenegro register a population growth rate of 1%, but the other countries have declining populations, with Bosnia and Herzegovina having the highest declining population rate of -6%, then Serbia (-5%) and Albania (-2%) (Figure 1). Population decline in the region is attributed to an aging population,

sinking birth rate, and emigration<sup>(11)</sup>. The region has seen rampant migration over the decades due to factors that include the breakup of Yugoslavia and the civil wars and economic hardships that followed<sup>(12)</sup>. Due to the region’s complicated history, citizens of a country can get passports from neighboring ‘mother countries’ to travel abroad. This is more likely when the ‘mother country’ belongs to the EU, since EU citizenship includes the right to work anywhere in the Union. For example, many Croatian passport holders working abroad are probably from Bosnia and Herzegovina, thus making it hard to determine the exact country of origin of a migrant from that claimed for economic and migration reasons<sup>(13)</sup>.

Figure 1. Demographic overview of the region per country. The 2021 population is shown on the x-axis, and the population growth rate from 2010 to 2021 is shown on the y-axis



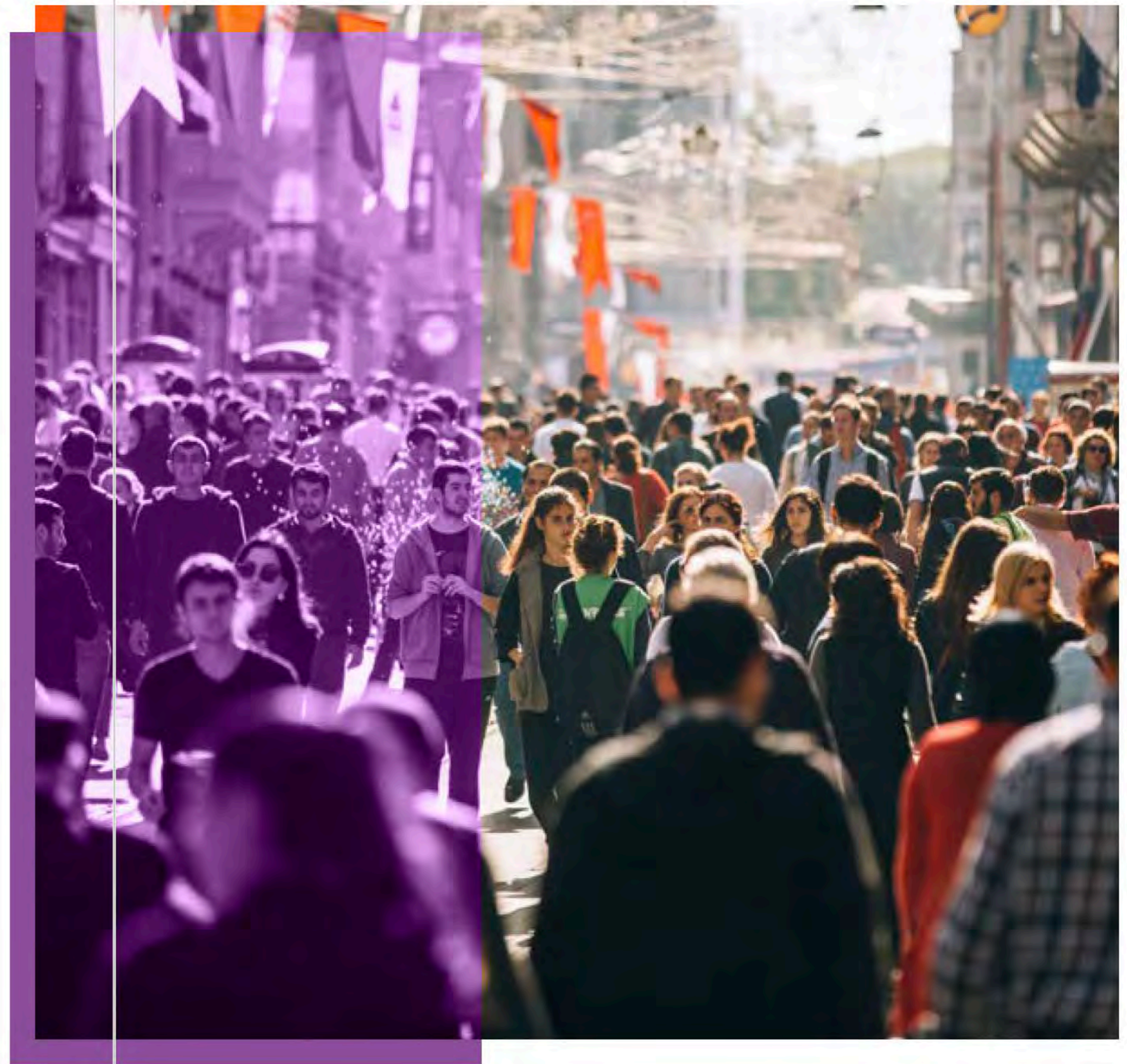


Though there is not much difference in purchasing power per inhabitant in the region, with nearly the entire population having access to electricity and internet, with access being between 72% and 81%; about 3% of the population is below the poverty line in three countries.

The region has socioeconomic development in line with the product purchasing power parity (PPP)<sup>(14)</sup>, varying from \$13,000 USD/year in Albania and Bosnia and Herzegovina to \$15,000 USD/year in North Macedonia and then to \$18,000 USD/year in Montenegro and Serbia (Figure 2). The entire region shows a growth of PPP, ranging from 29% to 37% (Figure 2). According to the World Bank classification, all five countries are upper-middle income countries<sup>(15)</sup>. Three of the five countries' populations live below the poverty line, according to available SDGs data for 2018: North Macedonia at 3.4%, Montenegro at 2.8%, and Serbia at 2.9%. All countries attained 100% population access to electricity in 2020, while for the same year, access to the internet hovered between 72% and 81% (Albania at 72%, Bosnia and Herzegovina at 73%, Montenegro and Serbia at 78%, and North Macedonia at 81%).

**The countries in the Western Balkan region have an average PPP of \$15,600 USD in 2021.**

Figure 2. Economic overview of the region. On the x-axis, PPP in 2021; on the y-axis, the PPP growth rate from 2010 to 2021



<sup>(14)</sup> The purchasing power parity (PPP) is an economic indicator that allows for comparing economic productivity and standards of living between different countries and locations. It can be used to adjust the gross domestic product (GDP).  
<sup>(15)</sup> New World Bank country classifications by income level: 2022-2023.