UNIVERSITY OF SUSSEX | BUSINESS SCHOOL

Policy Brief

Title: EEE waste in Cyprus, pollution, and policy recommendations

SDG 3: Ensure healthy lives and promote wellbeing for all at all ages
Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
Briefing Option: Briefing Option 1
Country of focus: Cyprus

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1.0 Introduction

The following policy brief aims in ensuring healthy lives and promoting well-being for all at all ages in Cyprus and the prevention of Waste from Electrical and Electronic Equipment (WEEE) ending in landfills and polluting the air, water, and soil. The brief is targeting to promote the reduction in the number of deaths and illnesses by hazardous chemicals as well as reduce pollution and contamination of the air, water, and soil by 2030.

In the early stages of development, it is important to conserve the environment by enhancing the protection of natural resources on which the island's economy depends. Such activity requires the development of policies and actions that will ensure healthy lives and promote well-being for all ages (Van den Bergh et al., 2006). Some potential change includes the adoption of cleaner technology. However, cleaner technology is not diffusing on a rapid scale among firms and the society due to several reasons including the insufficient infrastructure to support such change, the underlying market structure, and the patterns of customer demand. The need of recognising the demand for radical change to enhance sustainable development is crucial (Smith et al., 2005).

There is a need for the Republic of Cyprus to examine, investigate and adopt powerful policies that would promote sustainable development and reduction of waste to reduce pollution. Understanding the need for policymaking can enhance the ratio and orientation of socio-technical change toward sustainable development. Alongside, the use and exploration of policy instruments can authorise transitions and politics to take place.

Policy instruments can generate higher-level mechanisms that dominate future development as well as other instruments in the area (Edmondson et al., 2019). Expanding policies to policy mixes allows the consideration of numerous socio-technical changes to be adopted to the system and result in powerful mechanisms that can influence policy processes that build further changes in policy mixes. Therefore, there is a need of adopting such policy instruments that may assist in encouraging the development of innovations that can deliver the target of reducing the number of deaths and illnesses by 2030 in Cyprus, due to hazardous chemicals.

2.0 Framing

Electrical and Electronic Equipment (EEE) waste is an ongoing and expanding pollution problem that is one of the fastest-growing worldwide issues. Given the presence of various toxic substances that can jeopardise

human health, well-being and increase illnesses as well as contaminate the environment if disposal protocols are not closely regulated and managed (Kiddee et al., 2013).

Incorrect management of e-waste reproduces several toxic substances that potentially harm the environment and human health by impacting the quality of water, air, and soil humans consume. The number of electronic devices going to waste has been continuously growing due to the issue factor that today's society is influenced by socio-technical change and the need for the society to adapt to today's demanding technological change. The ongoing development and advancement in smarter functionalities and technologies during the past few decades has caused a great number of electronic devices to be disposed (Kiddee et al., 2013). The lifespan of an EEE has been significantly shortened due to the advances in technology, compatibility, appealing consumer designs and investments in marketing. To be more specific, the average lifespan of a computer in 1992 was 4.5 years whereas in 2005 it decreased to 2 years and is constantly becoming shorter (Widmer et al., 2005). Such practices adopted by today's society result in a large volume of computers and EEE being disposed or exported to more evolved countries, causing several environmental issues (Bushehri, 2010).

Inadequate safeguards, policies, and imposition of the correct and safe disposal of e-waste have led to severe human and environmental damage. A diverse number of researchers have illustrated that toxic metals and polyhalogenated organics, such as polybrominated diphenyl ethers and polychlorinated biphenyls that are released from EEE waste can pose life-threatening risks to humans and the environment (Williams et al., 2008; Robinson, 2009). Such impacts include the pollution of the food chain due to contamination from toxic substances arising from the disposal and recycling processes, resulting in entering by-products in the food chain and being consumed by humans. Another impact includes workers, being directly impacted by the exposure to such hazardous substances (Chan et al., 2007, Xing et al., 2009).

Toxicity from e-waste has become a well-known social problem that requires immediate action to be taken to prevent further damage to human health. After some research in China, people that were living or working near e-waste recycling stations showed the existence of toxic substances in their blood, scalp hair, serum, and urine (Qu et al., 2007). This exploration emphasises the need for all governments and regulatory bodies to explore and adopt policies that will empower safer e-waste disposal as well as make people aware

of the need to re-use and recycle electronic devices.

3.0 Current Situation

Even though Cyprus provides high standards of well-being and healthy living, as proven by the performance indicators, establishing low rates of mortality as well as a high level of life expectancy, it can be crucial to maintain such rankings by applying further policies and practices to enhance the effective and safer WEEE management (Republic of Cyprus, 2021). On the other hand, as stated in the 'Second voluntary national review SDG' by the Republic of Cyprus (2021), the observed negative trend from 2010-2019 shows some attempts to be made in improving the air quality, however, it still appears to perform insufficiently relative to the EU.

As a member of the EU since 2004, Cyprus has adopted the 'WEEE and RoHS Directives' (2002/96/EC & 2002/95/EC) to its regulatory body. According to the WEEE Directive, all member states must adopt their own waste management plan on a national and local level. Additional monitoring and reporting systems must be maintained following the European guidelines and the waste management hierarchy pyramid (see figure-1) (Demosthenous, 2016, European Commission, 2022).

Figure-1 EU Management of Waste Pyramid, (European Commission, 2022)

Taking a closer look at the PC waste in Cyprus from year 2000 to 2010 as demonstrated in figure-2, we can observe a rapid increase due to the society's need to replace them every couple of years. Specifically, considering only the area of PC waste in Cyprus in 2010 it was found that 1,400 tones were disposed, resulting in air, water, and soil pollution affecting both the environment and human health (Kourmousis et al., 2011).

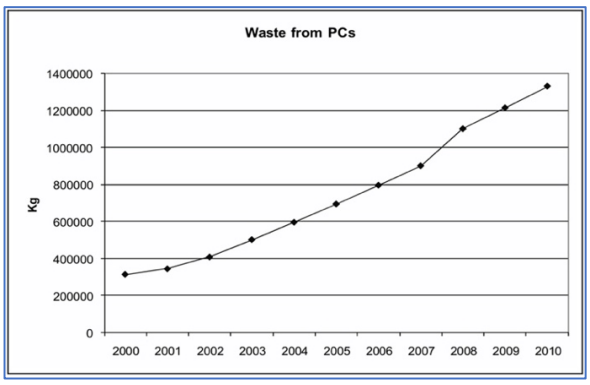

Figure-2 Waste from PCs in Cyprus, (Kourmousis et al., 2011)

Some of the most important remaining challenges in Cyprus include the need to maintain a high level of performance in

healthy living and empower environmental and sustainable attitudes to improve air quality (Republic of Cyprus, 2021). There is a need to increase monitoring and control over hazardous chemicals from products that are disposed of by people and not safely managed. Reducing, preventing, and controlling the pollution of the air, water, and soil by monitoring assessments and management of WEEE is considered essential and a pressing challenge in Cyprus. Such policies will increase the possibility of ensuring healthy lives, promoting well-being, and reducing the number of deaths by enhancing sustainable practices.

4.0 Theory and Evidence

Different governments and public agencies use policy instruments differently, to investigate the political nature of instrument options and related issues. Additionally, the process of exploring instruments enables the effective establishment of innovation policy, however, to successfully maintain sustainable development and enhance such innovation policies there is a need to design and formulate them into mixes. These mixes enable a more 'systemic' approach and assist in addressing the challenges of the innovation system as well as develop a collection of criteria for the selection and design process of the instruments that later formulate the innovation policy. Public organisations make use of policy instruments as powerful techniques to lead innovation processes. Policy instruments are important for promoting change and stimulating innovation by influencing the direct objectives of the innovation policy (Borrás and Edquist, 2013). It is important for the adoption of policy mixes including economic instruments and additional soft policy approaches to progress to a more circular economy. The circular economy focuses on an array of factors including the minimisation of waste through eco-design and the need for companies, organisations, and agencies to develop new business models where raw materials will be transformed back into production through new recycling techniques (Cesaro et al., 2018).

The only EEE management system currently in Cyprus operates through 'WEEE Cyprus' in collaboration with 'Green Dot Cyprus', two non-profit organisations that aim in managing and organising the W.E.E.E. system of the island as part of the 'WEEE Forum' (WEEE Cyprus, 2022). The incorrect handling of WEEE produces several hazardous substances and makes this waste a secondary material source that requires sustainable management strategies to be implemented (Rubin et al., 2014).

In the case of achieving the 3.9 target by 2030, the Republic of Cyprus needs to consider the adaptation and consideration of policy mixes

regarding e-waste. To be more specific the EU gave a new warning to the government for the incorrect use and application of the Landfill Directive (99/31/EC) (Angelis-Dimakis et al., 2022). The Landfill Directive emphasises that landfills must be classified into three categories: (1) hazardous waste, (2) non-hazardous waste including municipal waste and (3) inert waste. The disposal of all different types of waste in a single landfill is prohibited (Angelis-Dimakis et al., 2022; Hansen et al., 2002).

A concrete example of a powerful economic instrument is the application of incentive taxes. The government's negligence to adopt such instruments has enabled actors responsible for their negative impact on the ecosystem to benefit from not paying for their harmful activity (Hansen et al., 2002). A good policy mix example adopted in Israel in 2006, is the adoption of the 'Solid Waste Management Plan' (SWMP), where objectives were set to help in developing new instruments, namely, the Extended Producer Responsibility Scheme and economic instruments related to landfill taxes. Their initiative led to the stimulation of collecting and recycling household waste separately to handle the general waste as well as e-waste effectively. Additionally, Korea had successfully implemented a mix of instruments promoting the ban of untreated food waste ending in landfills and a ban on ocean disposal, together with the obligatory separate collection. Further, Korea had also signed several voluntary agreements with different national organisations to launch campaigns that would raise awareness of the related issues (OECD, 2019).

According to the OECD, many of their member states have set fees to prevent the complete end-of-life costs of goods including WEEE. The polluter is responsible for their harmful activity and is liable of paying for his pollution to the environment. Such principles create incentives to limit the impact of e-waste on human health, well-being, increase illnesses and the pollution of the air, water, and soil (OECD, 2019). To date, the Republic of Cyprus has not adopted any of the previously mentioned instruments and policy mixes, even though the EU has given several warnings to the government regarding landfill waste and pollution. Therefore, it is important to consider such aspects to end unnecessary pollution, harm to the environment and hazardous chemicals affecting the eco-system (Geissdoerfer et al., 2017).

5.0 Options facing the government

WEEE directive (Directive 2022/96/EC) was taken into force in February 2003, and its main aim was to increase recycling and/or re-use of WEEE. In 2012 the directive was revised to 2012/19/EC which was taken into force in Aug

2012. The revised directive aimed in increasing the target for collecting electronic devices from 2016 to 2019. Targets were based on the volume of imported EEE and the collected WEEE, instead of the WEEE weight collected divided by the population of Cyprus. The WEEE Directive focused on decreasing the amount of WEEE that ends in landfills and is not re-used or recycled. Additionally, the revised directive from the EU introduced the 'National Registry for Producers and Distributors' which was accountable for funding the member states for the collection and maintenance of the system (Demosthenous, 2016).

In order to re-use, reduce and recycle, it is required to move to a more circular economy approach, where the focus is on limiting waste, and transforming products into something new, rather than the traditional linear model where the society produces, consumes, and then disposes its goods. A large number of the population still perceives used products as poorly low quality. There is a need of making people aware of the available high-quality, although, second-hand products or equipment that are accessible, including the awareness of where they can be found (Demosthenous, 2016). According to the EU, at the top level of the hierarchy/pyramid is the goal of re-using, as it increases the probability of maximising the product recovery and ensuring the minimum use of resources. As stated in the WEEE Directive, member states can reach the target by implementing a scheme for collecting and increasing recycling at a national level over the preparation to re-use (Seyring et al., 2015).

Separate collection could be considered an essential requirement for increasing recycling and reusability of EEE in Cyprus. Separate waste collection streams with a high volume of goods and better quality, provide better recycling, repair, and reuse. Across the EU many of the member states have applied several practices and improvements in their policies that have been successfully implemented at a national level (Varbova, 2020). It is important to adjust and adopt such policies to ensure the meeting of the 3.9 target by 2030. As previously analysed, there is a need of applying policy mixes to the government's regulatory body. Some of the most important practices include:

- Understanding the benefits of separate waste collection through efficient collection schemes can conclude in reducing greenhouse gas emissions, decreasing litter, and providing environmental and economic enhancement along with opportunities for vulnerable members of the public and social enterprises.
- The collection infrastructure should be practical and accessible. Such action

requires a combination of door-to-door collection, available collection centres and collection points within a short distance at preeminent places (ex. Supermarkets, stores).

- The government should invest in providing and ensuring adequate infrastructure at a local level, and ensure that local stakeholders (including citizens, shops, businesses, and departments of the city) are involved in the collection strategy.
- Raise awareness, inform, and educate people on waste management, recycling schemes, separation of waste and the importance of doing so.
- Additionally, events, awards, campaigns and competitions in Schools and other education systems can assist in motivating and educating young people on sustainable development.
- The adoption of competitions such as the 'E-Waste Race' in the Netherlands has proven an impressive number of EEE being collected. During the 'Race', schools compete to collect as many used electronic devices as possible from their neighbourhood and are scored for the amount of EEE they collect. Once the race is completed the winner is announced and students are taken on a school trip for their accomplishment (E-Waste Race, 2022).
- Evaluate and determine the true cost of WEEE collection. The establishment of WEEE recycling is a conceivably good business case, therefore, the authorities could encourage businesses and organisations to include the WEEE collection in their business model under a recycling scheme.
- The improvement and investigation of other inducement schemes such as the 'WINPOL project', proposing the use of economic instruments, where landfill taxes were introduced to promote the transition towards a circular economy (Europa, 2021).
- Similarly, the PAYT (Pay-as-you-throw) scheme implemented in 20 areas in Cyprus for the reduction of general waste, could be adopted for e-waste. Allowing members of the public to recycle their EEE and get paid for their actions. Alternatively, people that recycle their devices (EEE) could be rewarded with limited or reduced annual waste bills/taxes.
- Fines and taxes (Economic instrument) to be paid for each electronic device thrown away and not recycled.

6.0 Conclusion

The analysis and consideration of WEEE as well as its safe disposal is an essential activity that all governments should invest in. As a member of the EU, Cyprus has been given

several warnings regarding landfill management. Therefore, one of the first policies that should be applied should be landfill and disposal taxes to end such harmful activity, having as a concrete example the 'WINPOL' project. Further, the government in collaboration with 'WEEE Cyprus' and 'Green dot' should implement a PAYT Scheme for the safer management of e-waste to prevent water, air, and soil pollution from toxic substances. Additionally, the consideration and adaptation of policy mixes including economic instruments and soft policy approaches as previously examined that will promote a circular economy are crucial.

In order to develop an efficient management system that promotes sustainable development and practices, it is required that all stakeholders including operators, the government, consumers, and the recycling industry to be involved in the process (Tanskanen, 2013).

Therefore, it is needed to adapt, adjust, and maintain policies that will empower sustainable development and promote such innovations to meet the predefined target (target 3.9) as well as move towards a circular economy. By adopting the policy mixes and policy instruments previously explained, Cyprus will be able to meet the goals and regulations set by the European Commission as well as maintain the high standards of healthy living. Importantly, the government should provide a scheme where companies, organisations and agencies will be enforced to carry out campaigns for the education and awareness of people on the importance of EEE safe disposal and management as well as the harm they can produce to the environment and the eco-system including human health. Adopting such instruments and policies will involve all stakeholders and assist in maintaining a safer environment as well as minimising pollution from WEEE.

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