Circular Economic Utilization of E-Waste: International Experiences

Global Forum on Human Settlements and Sustainable Cities and Human Settlements, GFHS 2021

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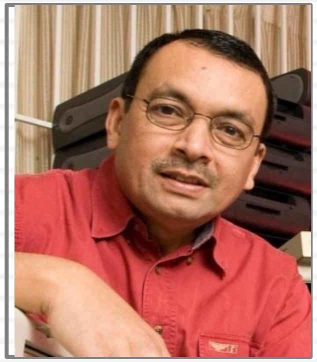

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Global E-waste Generation

- During 2019 world generated around 53 million tonnes (Mt) of E-waste
- Global e-waste generation to reach 111 Mt by 2050
- Only 17% formally collected and recycled
- Asian region produced the highest amount of e-waste (24.9 Mt or 46.5% of total)
- The top three Asia-Pacific countries with the highest e-waste generation in absolute quantities are China (10.1 Mt), India (3.2 Mt) and Japan (2.5 Mt)

Source: Global E-waste Monitor 2020 (UNU)

E-waste Facts

Region	Annual e-waste generation (Mt)	% of world e-waste generation	E-waste (kg/person)
Asia	24.9	46.5	5.6
Americas	13.1	24.4	13.3
Europe	12	22.4	16.2
Africa	2.9	5.4	2.5
Oceania	0.7	1.3	16.1

Problems Associated with E-waste

- Dangerous chemicals and metals from e-waste may leach into the environment
- Lead (Pb) - most significant concern
- Lead present in the solders used to make electrical connections on printed wire boards and Cathode Ray Tubes (CRTs)
- Mercury found in laptop computers and discharge lamps.
- Cadmium (found in chip resistors, CRTs)
- Brominated Flame Retardants (BFRs)

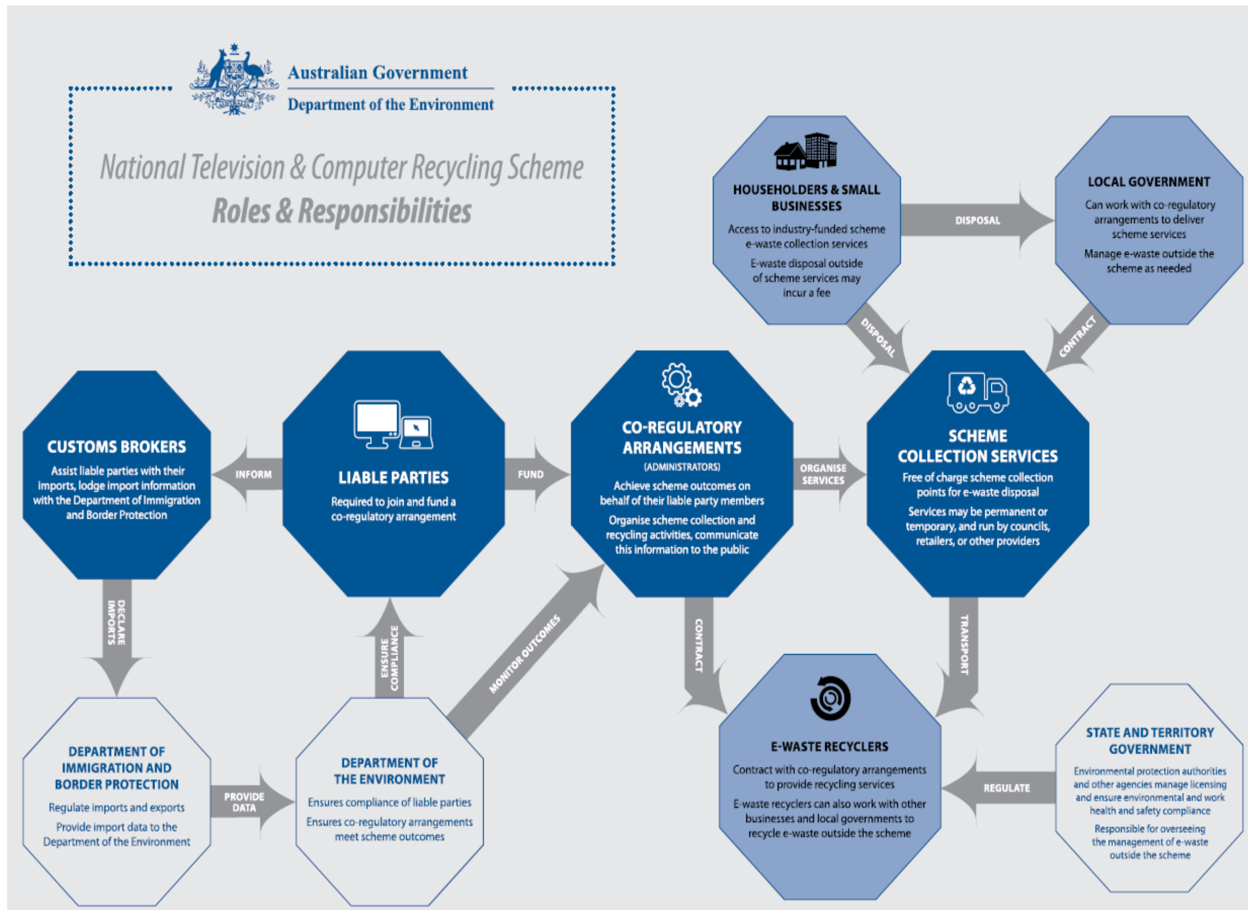
Opportunities Associated with E-waste

- One tonne of phone handsets contains 3.5kg of Ag, 340 g Au, 140g of Pd and 130 kg of Cu
- Electronics make up 80% of the world demand for indium (magnetic properties in hard disks), 50% of antimony (flame retardants), 30% of silver (contact, solders), 12% of gold (circuits)
- The UN estimates that the value of selected raw materials in e-waste amounts to USD 57 billion during 2019. Iron (24 billion USD), copper (11 billion USD), gold (9 billion USD), Aluminium (6 billion USD) are considered to be the highest value materials contained in e-waste (Forti et al. 2020).

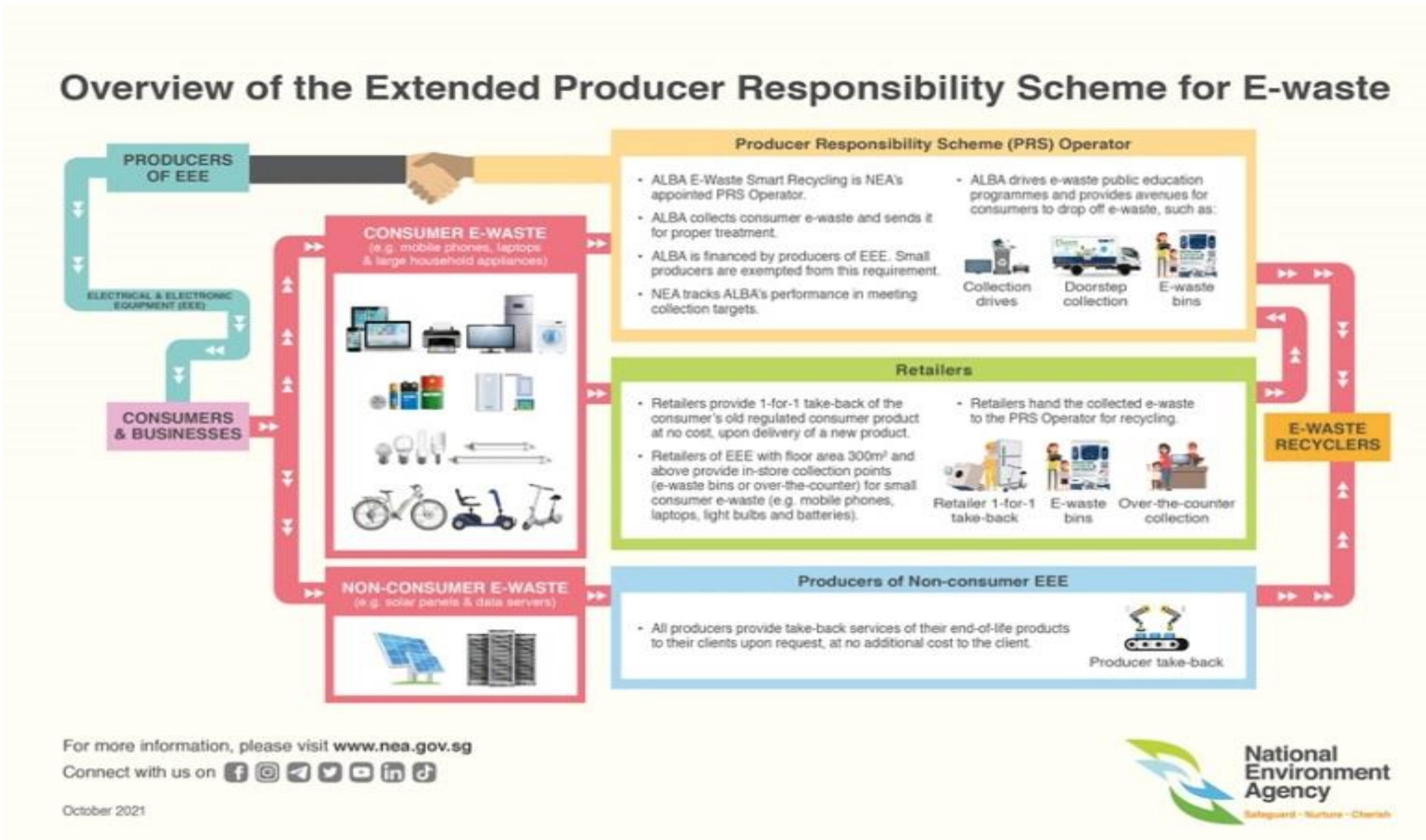
Circularity and E-waste

- Reduce and reuse
- Properly recycle with no harmful impacts on environment
- Design and manufacture electronic and electrical products with less toxic material inputs (design for environment)
- Effective product take back schemes towards circularity (Extended Producer Responsibility or EPR) EPR schemes make producers physically or financially responsible for the environmental impacts of their products throughout their life cycle.

Australian Example



Singapore Example



State of EPR Implementation

Full implementation of EPR Regulations	Partial or Draft EPR Regulations	No EPR Regulations
Australia, the People's Republic of China, India, Japan, Singapore, the Republic of Korea, Taiwan Province of China	Bangladesh, Cambodia, Indonesia, New Zealand, the Russian Federation, Thailand, Viet Nam Malaysia	Bhutan, Laos, Mauritius, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka

Way Forward – Connecting with SDG Targets

Elimination of hazardous substances during production of EEE, and during dismantling and processing of E-waste	3.9
Formalisation of the informal E-waste recycling sector to create decent working conditions and environmentally sound management of E-waste	8.3
Recognition of the informal E-waste sector and integrating into a formal waste management system thereby protecting their labour rights	8.8
Establishment of proper institutional infrastructures for collection, storage, transportation, recovery, treatment and disposal of E-waste in cities to reduce the adverse per capita environmental impacts due to unsound management of E-waste	11.6
Eliminate open dumping and open burning of E-waste and use of poor chemical processes to separate valuable materials in E-waste	12.4
Design EEE with circularity in mind to prevent E-waste generation at the end-of-life and implement EPR systems to achieve recycling of E-waste	12.5

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