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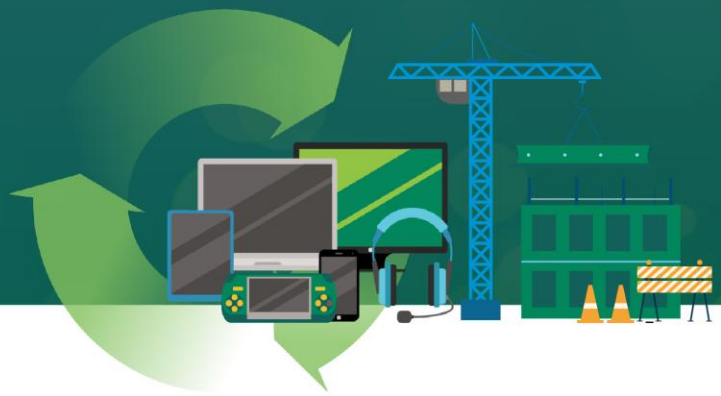
UNDP

Policy Review and Alignment of the Circular Economy with Environmental Regulations

– Publication Report



Executive Summary



Indonesia has established the circular economy as a strategic pillar of its National Long-Term Development Plan (RPJPN) 2025–2045, in line with the Golden Indonesia 2045 vision: "A Sovereign, Advanced, and Sustainable Indonesia." Under the Economic Transformation agenda, through the Green Economy framework, the circular economy is expected to strengthen national competitiveness, improve resource efficiency, reduce waste, and lower greenhouse gas (GHG) emissions to support the achievement of net-zero emissions. The National Circular Economy Roadmap and Action Plan 2025–2045 identifies five priority sectors: food, retail with a focus on plastic packaging, electronics, construction, and textiles. These sectors are expected to lead Indonesia's transition from a linear "Extract-Use-Dispose" model to a circular economic system.

Within the national development planning framework, the National Medium-Term Development Plan (RPJMN) 2025–2029 translates circular economy principles into the "Circular Economy Ecosystem" policy direction under National Priority 2. This framework focuses on three approaches: reducing resource consumption, extending the lifespan of products and materials, and strengthening recycling and recovery systems. Its strategic components include resource efficiency, the integration of eco-design, environmentally friendly product certification, circular material use rates, industrial recycling rates, and waste prevention. These measures reflect Indonesia's commitment to embedding circularity in industrial transformation and low-carbon development.

In the construction sector, the 9R principles of the circular economy have begun to be incorporated into sectoral regulations covering the entire building life cycle. These include (1) procurement, supported by Decree of the Head of the National Public Procurement Agency (LKPP) No. 157 of 2024 on Sustainable Procurement Guidelines; (2) construction and maintenance, as regulated by Minister of Public Works and Housing Regulation No. 21 of 2021 on Green Building Performance Assessment; and (3) demolition, as regulated by Minister of Public Works and Housing Regulation No. 18 of 2021 on Building Demolition.

Construction regulations are also linked to waste management policy through Government Regulation No. 27 of 2020, which classifies building demolition waste as specific waste and requires estate managers to prepare a demolition waste management plan before work begins. Although existing regulations incorporate circular economy principles, their implementation continues to face several challenges.

First, most obligations remain focused on meeting administrative requirements. For example, the Technical Demolition Plan is required for permitting purposes but does not establish performance targets for material reuse, recycling, or reductions in waste

sent to landfills. Public procurement systems have yet to incorporate circularity indicators, such as recycled content. Even where such criteria are applied, the range of eligible products remains limited.

Second, approaches such as design for disassembly, modular construction, and material passports have yet to be integrated into planning. Although materials such as steel, iron, cement, glass, and ceramics are covered by Green Industry Standards (SIH), incentives for producers to adopt these standards remain insufficient. Innovation and the availability of other circular materials are also too limited to meet construction needs across Indonesia.

Third, binding requirements remain largely confined to government projects through Building Information Modelling (BIM) and sustainable procurement, and to large buildings through Green Building requirements. Most construction activities, including renovation, routine demolition, and small and medium-sized private projects, fall outside this scope. Implementation in the private sector also depends on local government capacity to administer permits and oversee compliance.

Gender Equality and Social Inclusion (GESI) analysis is an important dimension of **circular economy implementation in the construction sector**, which accounted for approximately 9.82% of Gross Domestic Product in the third quarter of 2025 and is projected to become a major source of green jobs. The circular economy is estimated to create around 4.4 million new jobs by 2030, approximately 75% of which could be filled by women. However, this potential remains unrealised, as women account for only around 2% of Indonesia's construction workforce. This is well below the 11–12% recorded in the United States, where participation is supported by apprenticeships, mentoring, and structured career pathways. Women face structural barriers, including long working hours, a male-dominated workplace culture, and the risk of sexual harassment, despite contributing across the circular value chain, from planning for material efficiency to managing waste banks. Meanwhile, construction material recovery, including building demolition, scrap metal collection, and the trade in used components, continues to rely on informal workers, including women, who lack formal employment arrangements, social security, and occupational safety and health (OSH) protection. As a result, those who contribute most directly to material recovery are also among the most exposed to workplace accidents and hazardous materials. Nevertheless, several good practices demonstrate that inclusion can be embedded in institutional arrangements. Examples include the Ministry of Public Works' employment of women as daily workers in the construction of Sekolah Rakyat schools; construction competency certification for 17 persons with disabilities in Belitung Regency, in line with Law No. 8 of 2016; and the ILO-PAGE Indonesia forum's use of a Skills Needs Assessment to address the absence of competency standards for green construction workers. A just circular transition in construction therefore requires circularity indicators in public procurement and national monitoring to be accompanied by measurable inclusion indicators. These should cover women's participation, formalisation and OSH protection for informal workers, and access to training for persons with disabilities.

In the electronics sector, only seven regulations were identified as closely related to the product life cycle. These regulations incorporate some of the 9R principles across production, use and maintenance, and end-of-life management. They address the mandatory application of Indonesian National Standards (SNI) for household electronics (Minister of Industry Regulation No. 7 of 2025), consumer protection (Law No. 8 of 1999), the use of domestic components (Minister of Industry Regulation No. 35 of 2025), environmental protection and management (Government Regulation No. 22 of 2021), and the management of household waste, specific waste, and hazardous waste (Government Regulation No. 27

of 2020, Government Regulation No. 81 of 2012, Minister of Environment and Forestry Regulation No. 6 of 2021, and Minister of Environment and Forestry Regulation No. 9 of 2024). No relevant regulations were identified for the distribution stage. However, these policy instruments continue to operate separately within their respective sectors and have yet to establish an integrated system for electronic waste management across the value chain.

For producers, Indonesia's regulatory framework for electronic waste management does not yet impose specific Extended Producer Responsibility (EPR) requirements. Current obligations are limited to compliance with product standards and the management of waste generated by business activities. They do not cover product take-back, post-consumer collection, collection and recycling targets, or reporting on the number of products placed on the market. Eco-labelling requirements also remain limited. Furthermore, the market is dominated by assembly, distribution, and sales companies rather than Original Equipment Manufacturers (OEMs). Consequently, critical upstream decisions on circular design largely fall outside the control of domestic companies.

Local governments, meanwhile, are responsible for managing household electronic waste and reporting waste management performance through the National Waste Management Information System (SIPSN). However, this system has yet to be integrated with an EPR scheme. Gaps therefore persist in data on electronic waste generation, collection, and recycling, while a formal collection system connecting producers, local governments, and licensed operators has yet to be established. Electronic waste collection infrastructure has expanded, but recycling facilities remain underused, operating at only 15% of their potential capacity. As a result, most electronic waste continues to flow into the informal sector, which plays an important role in collection and material recovery but often manages residues and hazardous components in ways that do not meet environmental standards.

Indonesian regulations also distinguish between electronic waste classified as **specific waste containing hazardous and toxic substances (B3) and waste classified as hazardous waste**. Household electronic waste is managed through the general solid waste management system, while waste from production processes is classified as hazardous waste and requires management by licensed operators. This distinction leaves gaps in management arrangements, with no clear pathway directing electronic waste to appropriate treatment facilities.

Gender Equality and Social Inclusion (GESI) analysis is essential to circular economy implementation in the electronics sector because electronic waste collection, sorting, and dismantling in Indonesia remain dominated by informal activities involving women, young people, and low-income communities with limited skills and safety protection. A WHO report estimates that approximately 18 million children and adolescents and 12.9 million women worldwide may be exposed to health risks associated with informal e-waste recycling. A study in areas around Jakarta found heavy metal concentrations above applicable limits at informal e-waste processing sites, including lead at 3,653 mg/kg, cadmium at 3.4 mg/kg, and mercury at 15.2 mg/kg in soil, and manganese at 1.43 mg/L in water. Heavy metal levels in the hair of children living near these sites were two to seven times higher than those in the comparison area and were associated with poorer attention, executive functioning, and academic performance. Similar findings in Agbogbloshie, Ghana, confirmed contamination by polycyclic aromatic hydrocarbons in the breast milk of women living or working near e-waste processing sites. These findings indicate that risks extend beyond dismantling workers to women and children who live, trade, or provide care nearby. Protection must therefore cover workers' families and surrounding communities. The

participation of vulnerable groups should also extend beyond low-paid, high-risk collection work to higher-value activities such as repair, refurbishment, and reuse. Several good practices demonstrate the feasibility of this approach. These include the Coding Mama, Coding Difabel, and Solar Mama programmes in Indonesia's new capital, Nusantara (IKN), which had graduated 140 participants by the end of 2024; electronics repair training for persons with disabilities in Magelang City and Depok City; and Telkom's Eduvice Programme, which restores used devices for students in disadvantaged, frontier, and outermost areas (3T). EPR policies and e-waste infrastructure development should therefore incorporate inclusion indicators, accessible training, OSH protection, and the remediation of contaminated sites to ensure a safe and equitable circular transition in the electronics sector. Policy mapping and gap analysis show that circular economy implementation in Indonesia continues to face several fundamental challenges. These findings provide the basis for recommended strategies and action plans, both at the broader policy level and within the priority sectors of construction and electronics.

Three Main Challenges to Circular Economy Implementation: Construction Sector

- **Regulations are not yet oriented towards circular outcomes.** Implementation therefore remains dominated by administrative compliance.
- **The circular construction ecosystem remains underdeveloped.** Circular design has yet to be integrated into planning, while standards, incentives, and the availability of circular materials remain limited, constraining implementation.
- **Implementation coverage remains limited.** Binding obligations apply only to government projects and certain buildings, while implementation in private projects continues to depend on local government capacity to administer permits and oversee compliance.

Three Main Challenges to Circular Economy Implementation in Priority Sector:

- **Institutional governance lacks a clear structure, and policies remain fragmented**. The allocation of responsibilities, cross-sector coordination, and implementation capacity across ministries, agencies, and local governments are not yet sufficiently effective or sustained.
- **Market conditions and economic instruments remain inadequate.** Regulatory development has not been accompanied by sufficient economic instruments, financing, and incentives to encourage investment in, demand for, and use of circular materials.
- **Data, monitoring, and enforcement systems are not yet performance-based.** Data and reporting remain fragmented, while enforcement focuses more on administrative compliance than on circular economy outcomes.

Three Main Challenges to Circular Economy Implementation: Electronics Sector

- **The electronics sector lacks an EPR regulatory framework.** Implementation remains largely focused on downstream activities, such as waste management, without addressing responsibility throughout the product life cycle, including take-back, collection, and recycling.
- **Collection and material recovery systems remain fragmented.** Electronic waste management infrastructure is limited, informal actors play a dominant role, and management pathways do not effectively connect producers with treatment facilities.
- **Eco-design adoption and product innovation remain limited.** The absence of eco-design standards constrains innovation. Eco-labelling requirements remain minimal, while product design decisions largely fall outside the control of domestic businesses.

Strategy 1 Establish Clear Mandates, Institutional Responsibilities, and Circular Economy Targets

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
1.1	Strengthen the implementation of existing circular economy regulations before introducing new policy instruments	New circular economy regulations are not the immediate priority. The more pressing need is to clarify how existing regulations should be implemented within current governance arrangements, enabling implementation gaps to be clearly identified. **Gap to Address:** Responsibilities between central and local governments remain unclear, particularly in implementing the waste reduction roadmap under Minister of Environment and Forestry Regulation No. 75/2019. Under Article 18, reporting on producers' roadmaps should be integrated with local government monitoring. In practice, however, reports are submitted directly to the Ministry of Environment. **Supporting Policy Framework**: (1) Law No. 59/2024 on the National Long-Term Development Plan (RPJPN) 2025–2045, (2) Presidential Regulation No. 12/2025 on the National Medium-Term Development Plan (RPJMN) 2025–2029.				1. Ministry of Environment 2. Ministry of Public Works 3. Ministry of Industry 4. Ministry of Agriculture	• Coordinating Ministry for Economic Affairs • Coordinating Ministry for Food Affairs • Coordinating Ministry for Infrastructure and Regional Development • Ministry of Finance • Ministry of Trade • Ministry of National Development Planning/Bappenas • Ministry of Housing and Settlement Areas • Ministry of Tourism • National Food Agency • Local Governments
1.2	Set measurable circular economy targets with clear accountability in regional development plans, ministerial and agency strategic plans, and sectoral roadmaps	Develop standard circular economy indicators, supported by consistent measurement and reporting systems across levels of government, to inform planning and budgeting. **Gap to Address:** Indonesia's circular economy indicators cover the circular material input rate, resource efficiency, and the recycling rate. However, Regional Medium-Term Development Plans (RPJMD) still focus on the percentage of waste handled, placing greater emphasis on downstream waste management than on overall circular economy performance. **Supporting Policy and Standards Framework:** (1) Presidential Regulation No. 12/2025 on the National Medium-Term Development Plan (RPJMN) 2025–2029, (2) Minister of National Development Planning Regulation No. 10/2023 on Procedures for Preparing Ministerial and Agency Strategic Plans for 2025–2029, (3) Minister of Home Affairs Instruction No. 2/2025 on Guidelines for Preparing Regional Medium-Term Development Plans (RPJMD), (3) Circular Economy Roadmap and Action Plan 2025–2045, (4) ISO 59004:2024 on the circular economy.				1. Coordinating Ministry for Economic Affairs 2. Coordinating Ministry for Food Affairs 3. Coordinating Ministry for Infrastructure and Regional Development 4. Local Governments	• Ministry of National Development Planning/Bappenas • Ministry of Home Affairs • Ministry of Finance • Ministry of Administrative and Bureaucratic Reform • Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of Trade • Local Governments
1.3	Clarify institutional responsibilities and coordination mechanisms among ministries, agencies, and local governments	Clarify each institution's mandate, authority, and role in advancing the circular economy, and strengthen cross-sector coordination through effective institutional arrangements. **Gap to Address:** An integrated national team with a strong legal basis, such as a presidential regulation or decree, has yet to be established to coordinate circular economy efforts across sectors. At the local level, efforts also remain largely focused on downstream waste management and expanding service coverage. **Supporting Policy Framework:** (1) Law No. 59/2024 on the National Long-Term Development Plan (RPJPN) 2025–2045, (2) Presidential Regulation No. 12/2025 on the National Medium-Term Development Plan (RPJMN) 2025–2029, (3) Technical implementation is guided by applicable laws and regulations.				1. Coordinating Ministry for Economic Affairs 2. Coordinating Ministry for Food Affairs 3. Coordinating Ministry for Infrastructure and Regional Development	• Ministry of National Development Planning/Bappenas • Ministry of Home Affairs • Ministry of Finance • Ministry of Administrative and Bureaucratic Reform • Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of Trade • Local Governments

Strategy 2 Building Economic and Market Conditions to Adopt and Scale Circular Practices

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
2.1	**Expand the production and supply of circular products and services through product standards, stronger industrial capacity, and production incentives**	Expand domestic production of circular products and services by defining circular product criteria, extending Green Industry Standards and ecolabels to priority sectors, and providing fiscal and non-fiscal incentives for industries, including small and medium-sized enterprises, recyclers, and reuse service providers. These measures should align with the Domestic Content (TKDN) and Company Benefit Weight (BMP) schemes to ensure that domestic circular products meet public procurement requirements. The objective is to ensure the availability of affordable, high-quality, and accessible environmentally friendly products across Indonesia before circularity requirements are introduced into procurement systems. **Gap to Address:** Environmentally friendly products remain limited and concentrated in certain sectors and regions, particularly Java. In the construction sector, for example, the Green Industry Standard currently covers only five materials: iron, steel, cement, ceramics, and glass. Circular product criteria, including recycled content, recyclability, and service life, have not yet been standardised across sectors. The cost and complexity of green industry, ecolabel, and TKDN certification also create barriers for small and medium-sized enterprises and recyclers. In addition, the quality and continuity of secondary raw material supplies remain uncertain. These conditions limit the availability and selection of circular products for procurement across Indonesia, particularly outside Java. **Supporting Policy Framework:** Law No. 3/2014 on Industry, particularly Articles 77–83 on green industry; Law No. 20/2014 on Standardisation and Conformity Assessment; Government Regulation No. 46/2017 on Environmental Economic Instruments; Minister of Environment Regulation No. 2/2014 on the Use of Ecolabel Logos; Minister of Industry Regulations No. 51/M-IND/PER/6/2015 on Guidelines for Preparing Green Industry Standards, No. 39/2018 on Green Industry Certification Procedures, and No. 35/2025 on the Certification Requirements and Procedures for Domestic Content and Company Benefit Weight; and Minister of Environment and Forestry Regulation No. 75/2019 on the Roadmap for Waste Reduction by Producers.					• National Standardization Agency (BSN) • National Accreditation Committee (KAN) • Ministry of Industry • Ministry of Environment/Environmental Control Agency • Ministry of Finance • Ministry of Home Affairs • Ministry of Trade
2.2	**Strengthen sustainable public procurement through standards, certification, and market instruments to create demand for circular products and services**	Integrate circular economy standards and indicators into the public procurement system, from needs planning and technical specifications to product labelling in the Electronic Catalogue and bid evaluation criteria. This integration should be supported by market instruments, including minimum requirements, incentives, and preferences for circular products, so that public spending can generate stable and predictable demand for the industries developed under Action Plan 2.1. **Gap to Address:** Public procurement remains largely linear, while environmental requirements and circularity indicators, such as recycled content, recyclability, and reuse services, are still applied on a limited basis. Products certified under ecolabel and green industry schemes also lack dedicated markers in the Electronic Catalogue and Online Store, making them difficult for procurement agencies to identify. **Supporting Policy Framework:** Government Regulation No. 46/2017 on Environmental Economic Instruments, particularly Articles 34 and 37; Presidential Regulation No. 46/2025 on Public Procurement of Goods and Services; Minister of Environment and Forestry Regulation No. P.5/MENLHK/SETJEN/KUM.1/2/2019 on Procedures for Applying Environmental Labels in the Procurement of Environmentally Friendly Goods and Services; and LKPP Regulation No. 12/2021 on Guidelines for Public Procurement through Suppliers.				National Public Procurement Agency (LKPP)	• Financial Services Authority (OJK) • Ministry of Cooperatives and Small and Medium Enterprises • Ministry of Investment and Downstream Industry/Indonesia Investment Coordinating Board (BKPM) • Ministry of National Development Planning/Bappenas • Ministry of Environment/Environmental Control Agency • Ministry of Industry • National Banking Sector • Non-Bank Financial Institutions
2.3	**Improve access to finance and financial support for circular economy businesses**	Expand access to finance through financial instruments that reflect the characteristics of circular business models. These instruments should include fiscal incentives, broader green financing, and investment and guarantee mechanisms that reduce risk and improve the attractiveness of circular economy investments. Support should cover businesses of different sizes, including small and medium-sized industries, recyclers, reuse service providers, and similar enterprises.				Ministry of Finance	• Ministry of Environment/Environmental Control Agency • Ministry of Trade • Local Governments

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		Gap to Address: Existing fiscal incentives are not yet linked to circularity performance. For example, tax allowances under Government Regulation No. 78/2019 use criteria such as investment value, export orientation, and high employment generation. As a result, medium-sized recycling and reuse businesses may struggle to qualify despite their significant environmental contributions. Green financing also remains concentrated in the energy sector. Indonesia's Sustainable Finance Taxonomy, which began development in 2024, initially prioritised energy, while manufacturing, water supply, sanitation, and waste management are planned for later versions. Consequently, financial institutions lack technical criteria for classifying circular activities as green activities. Circular economy businesses also face limited access to credit because they are perceived as high risk. Their revenues depend on fluctuating secondary material prices, used materials generally cannot be used as collateral, and many downstream businesses do not have legal entity status and therefore cannot meet banking or People's Business Credit (KUR) requirements. **Supporting Policy Framework:** Law No. 32/2009 on Environmental Protection and Management; Law No. 4/2023 on Financial Sector Development and Strengthening; Government Regulations No. 46/2017 on Environmental Economic Instruments and No. 78/2019 on Income Tax Facilities for Investment in Certain Business Sectors and/or Regions; Minister of Finance Regulations No. 130/2020 on Corporate Income Tax Reduction Facilities and No. 153/2020 on Gross Income Deductions for Certain Research and Development Activities; Financial Services Authority Regulation No. 51/POJK.03/2017 on Sustainable Finance for Financial Institutions, Issuers, and Public Companies; and Financial Services Authority Regulation No. 18/2023 on the Issuance and Requirements of Sustainability-Based Debt Securities and Sukuk.					
2.4	**Strengthen collection, repair, recycling, and material recovery infrastructure, together with supply chains and industry partnerships**	Develop and expand circular economy infrastructure for collection, sorting, reuse, repair, recycling, and material recovery. Establish connections between circular material supply chains, from their sources to industrial users, through partnerships and public-private cooperation. This approach should ensure reliable upstream supply and sufficient downstream demand so that the infrastructure can operate sustainably. **Gap to Address:** Waste management remains focused on downstream handling and is not yet integrated from waste sources to industrial users. Some community-based facilities, such as TPS3R, have been built without assured markets for their outputs or adequate operating budgets. Their utilisation therefore declines after external assistance ends. Circular material supply chains also continue to depend on informal collector networks without quality standards or supply contracts. Industrial users consequently struggle to obtain secondary raw materials with consistent specifications and volumes and may return to virgin materials. Waste management ecosystems remain limited outside Java because recycling industries are concentrated on the island. Materials must therefore be transported between islands, and logistics costs that exceed material value reduce the economic viability of collection, particularly in eastern Indonesia. **Supporting Policy Framework:** Law No. 18/2008 on Waste Management; Government Regulations No. 81/2012 on Household and Household-like Waste Management, No. 27/2020 on Specific Waste Management, and No. 22/2021 on Environmental Protection and Management; Presidential Regulations No. 38/2015 on Public-Private Cooperation in Infrastructure Provision and No. 97/2017 on the National Policy and Strategy for Household and Household-like Waste Management; Minister of Public Works Regulation No. 03/PRT/M/2013 on Waste Management Infrastructure and Facilities; and Minister of Environment and Forestry Regulations No. 75/2019 on the Roadmap for Waste Reduction by Producers and No. 14/2021 on Waste Management through Waste Banks.				1. Ministry of Public Works 2. Ministry of Agriculture 3. Ministry of Industry 4. Local Governments	
2.5	**Design pilot projects that can be replicated and scaled through standardised implementation frameworks, clear institutional responsibilities, and long-term plans**	Use pilot projects in priority sectors or regions to test approaches, develop technical guidance, and establish circular economy implementation mechanisms. These pilots should also provide a basis for replication and scaling through capacity building and stakeholder coordination. Planning should identify the responsible ministry or agency from the outset, establish uniform indicators and monitoring protocols, and provide mechanisms for transferring funding from initial sources to central and local government budgets. **Gap to Address:** Pilot projects remain local, short term, and dependent on donor funding. Activities commonly end after one to three years without transferring management responsibilities to local governments, while national replication mechanisms remain undeveloped. Pilot outputs, such as operating procedures and training modules, often remain project reports because no responsible ministry or agency adopts them as official guidance. As a result, each region must redesign its own approach. The absence of standard technical guidance also creates differences in indicators and monitoring methods, making results difficult to compare or use as a basis for scaling. From a budgeting perspective, circular economy programmes do not yet have a dedicated nomenclature code under Minister of Home Affairs Regulation No. 90/2019. Local governments must integrate these activities into existing waste management or environmental programmes, making circular economy initiatives less				Ministry of National Development Planning/Bappenas	

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		visible in planning documents and more vulnerable to budget reductions during fiscal efficiency measures. **Supporting Policy Framework:** Law No. 25/2004 on the National Development Planning System; Law No. 23/2014 on Local Government; Law No. 59/2024 on the National Long-Term Development Plan 2025–2045; Government Regulation No. 12/2019 on Regional Financial Management; Presidential Regulations No. 97/2017 on the National Policy and Strategy for Household and Household-like Waste Management and No. 12/2025 on the National Medium-Term Development Plan 2025–2029; and Minister of Home Affairs Regulation No. 90/2019 on the Classification, Coding, and Nomenclature of Regional Development Planning and Finance.					

Strategy 3 Developing Integrated Monitoring, Evaluation, and Enforcement Mechanisms

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
3.1	**Integrate circular economy reporting and monitoring into a single national platform**	Integrate existing circular economy reporting systems and databases from ministries, agencies, and local governments into a single national platform. The platform should collect, monitor, and evaluate circular economy performance through an integrated and interoperable system, supported by designated data custodians, data supervisors, and consistent indicator definitions across sectors. **Gap to Address:** Indonesia does not yet have an integrated national platform that consolidates circular economy data. As a result, data exchange and use remain limited. Data are distributed across systems with different owners, definitions, and reporting periods, including SIPSN for waste generation and waste management facilities, SIMBA for waste banks, producer reporting under Minister of Environment and Forestry Regulation No. 75/2019, SIINas for industrial data, and SIPD for regional planning and financial data. The legal basis for data integration already exists. Government Regulation No. 81/2012 requires waste management information to be connected through a single platform, while Minister of Environment and Forestry Regulation No. 6/2022 provides a basis for interoperability with SIPSN. However, indicator definitions remain inconsistent. Available data generally measure the proportion of waste managed, whereas circularity measurement requires systematic data on recycled content, reuse rates, and material flows between sectors. Circular economy data have also not yet been designated as priority data under the One Data Indonesia framework. Consequently, data custodians and data supervisors have not been formally appointed. **Supporting Policy Framework:** Law No. 14/2008 on Public Information Disclosure; Law No. 18/2008 on Waste Management; Law No. 27/2022 on Personal Data Protection; Government Regulation No. 81/2012 on Household and Household-like Waste Management, particularly Article 34(3); Government Regulation No. 71/2019 on the Operation of Electronic Systems and Transactions; Presidential Regulation No. 29/2014 on the Government Agency Performance Accountability System; Presidential Regulation No. 95/2018 on Electronic-Based Government; Presidential Regulation No. 39/2019 on One Data Indonesia; Presidential Regulation No. 132/2022 on the National Electronic-Based Government Architecture; Minister of Administrative and Bureaucratic Reform Regulation No. 53/2014 on Technical Guidelines for Performance Agreements, Performance Reporting, and the Review of Government Agency Performance Reports; Minister of Environment and Forestry Regulation No. 75/2019 on the Roadmap for Waste Reduction by Producers; Minister of Home Affairs Regulation No. 70/2019 on the Regional Government Information System; and Minister of Environment and Forestry Regulation No. 6/2022 on the National Waste Management Information System.				1. Coordinating Ministry for Economic Affairs 2. Coordinating Ministry for Food Affairs 3. Coordinating Ministry for Infrastructure and Regional Development	• Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of Home Affairs • Ministry of National Development Planning/Bappenas • Coordinating Ministry for Digital Affairs • Ministry of Public Works • Ministry of Housing and Settlement Areas • Local Governments

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
3.2	**Phase in compliance measures through incentives and disincentives once the circular economy ecosystem is ready**	Introduce performance-based incentives and disincentives gradually once the supporting circular economy ecosystem meets defined readiness benchmarks. The initial phase should prioritise incentives and performance recognition, followed by disincentives and administrative sanctions once adequate circular infrastructure, products, and services are available. The Corporate Environmental Performance Rating Programme (PROPER) can serve as an initial framework, with circularity indicators progressively expanded from the beyond-compliance level to basic compliance requirements. **Gap to Address:** Green regulatory obligations and targets are not yet supported by evenly distributed infrastructure. For example, Minister of Environment and Forestry Regulation No. 75/2019 sets a target for producers to reduce waste by up to 30% by 2029. However, limited collection and recycling facilities, particularly outside Java, make compliance difficult and may result in geographic limitations being treated as grounds for enforcement. A similar challenge affects source separation. Where separate collection and transport services are unavailable, separated waste is mixed again, reducing public confidence. PROPER already includes circular economy aspects under its Green and Gold ratings, such as resource efficiency, waste utilisation, Life Cycle Assessment, and eco-innovation. However, it does not yet cover basic compliance or actors such as small and medium-sized industries, recyclers, and reuse service providers. Its indicators also do not cover value-chain circularity, including recycled content, recyclability, and repairability. As a result, PROPER cannot yet serve as a national circularity indicator or a basis for fiscal incentives. At the local level, the incentive and disincentive mandates under Law No. 18/2008 and Government Regulation No. 46/2017 have also seen limited implementation, including through service charges based on the polluter pays principle. **Supporting Policy Framework:** Law No. 18/2008 on Waste Management, particularly Article 21 on incentives and disincentives; Law No. 32/2009 on Environmental Protection and Management, particularly Articles 42 and 43 on economic instruments and Articles 76–83 on administrative sanctions; Government Regulation No. 81/2012 on Household and Household-like Waste Management; Government Regulation No. 46/2017 on Environmental Economic Instruments; Government Regulation No. 5/2021 on Risk-Based Business Licensing; Government Regulation No. 22/2021 on Environmental Protection and Management; Minister of Environment and Forestry Regulation No. 75/2019 on the Roadmap for Waste Reduction by Producers; and Minister of Environment and Forestry Regulation No. 1/2021 on the Corporate Environmental Performance Rating Programme.				Ministry of Environment	• Ministry of Home Affairs • Ministry of Industry • Ministry of Public Works • Ministry of Housing and Settlement Areas • Indonesian National Police • Attorney General's Office of the Republic of Indonesia • Local Governments

Strengthening Circular Economy In Construction Sector



Strategy 1 Putting Existing Policy and Market Instruments into Practice for Circular Construction

This strategy strengthens implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by optimising existing regulatory and market instruments. Integrating circularity requirements into regulations and procurement will support prefabrication (Action 1.1), Building Information Modelling (BIM) (Action 1.2), sustainable construction principles (Action 1.3), environmentally labelled products (Action 3.1), and Green Industry Standards (Action 3.2). Material traceability from design through demolition will also support construction waste management (Action 2.2) and low-carbon buildings (Action 3.4).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
1.1	**Integrate circular construction requirements into building regulations and public procurement**	Integrate circular construction requirements into all public and private projects through existing building regulations. Circularity criteria, including recycled content, reuse, and recovery potential, should be incorporated from the procurement planning stage. This should cover contracts, technical specifications, bills of quantities (BoQ), and documentation requirements to ensure material traceability. Public procurement should serve as a market driver for circular products and practices. **Gap to Address:** A sustainable procurement framework is already in place under Presidential Regulation No. 46/2025, but it currently focuses on environmentally friendly products and domestic content rather than circularity criteria. Circularity requirements have not yet been incorporated into technical specifications, contracts, or bills of quantities. Tender evaluations still focus mainly on the lowest upfront cost, which places circular options at a disadvantage. Procurement contracts also do not consistently require material documentation. **Supporting Policy Framework:** (1) Government Regulation No. 22/2020 on the Implementing Regulation of Law No. 2/2017 on Construction Services, (2) Presidential Regulation No. 46/2025 on Public Procurement of Goods and Services, (3) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction, (4) LKPP Regulation No. 12/2021 on Guidelines for Public Procurement through Suppliers.				1. Ministry of Public Works 2. Ministry of National Development Planning/Bappenas 3. National Public Procurement Agency (LKPP) 4. Local Governments	• Ministry of Environment • State-Owned Enterprises Regulatory Agency (BP BUMN) • Ministry of Industry
1.2	**Establish targets, standards, and traceability systems for construction materials throughout the building life cycle, from design to demolition**	Integrate material targets, standards, and traceability systems throughout the building life cycle, from design for disassembly to demolition. This may include phased targets for material recovery and reuse, standardised traceability systems for national and local government assets (BMN/BMD), mandatory pre-demolition circularity audits, and the consolidation of technical indicators for BIM, prefabrication, green certification, carbon emissions, and construction waste into a single national monitoring framework. **Gap to Address:** Material recovery targets and standardised traceability systems have not yet been established. Existing demolition standards under Minister of Public Works and Housing Regulation No. 18/2021 focus on safety and waste disposal, without requiring pre-demolition audits or material recovery targets. The demolition of national and local government assets (BMN/BMD) is treated primarily as an asset write-off rather than a material recovery opportunity. Markets for used construction materials remain underdeveloped, while technical indicators are still managed separately without an integrated monitoring framework. **Supporting Policy Framework:** (1) Minister of Public Works and Housing Regulation No. 24/PRT/M/2008 on Guidelines for Building Maintenance and Care, (2) Minister of Public Works and Housing Regulation No. 22/PRT/M/2018 on the Construction of Government Buildings, (3) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction, (4)				1. Ministry of Public Works 2. Local Governments	• Ministry of Environment • Ministry of Housing and Settlement Areas • Ministry of Industry • State-Owned Enterprises Regulatory Agency (BP BUMN) • Ministry of National Development Planning/Bappenas

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		Minister of Public Works and Housing Regulation No. 18/2021 on Technical Guidelines for Building Demolition, (5) Related regulations on Building Information Modelling (BIM), green buildings, and construction waste management.					

Strategy 2 Strengthening Governance for Sustainable Construction

This strategy complements the policy direction of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by establishing a coordinating unit for circular construction. The unit will coordinate implementation across ministries, agencies, and local governments. Its establishment is expected to ensure that the various action plans are implemented in an integrated and mutually supportive manner.

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
2.1	**Strengthen institutional coordination by establishing a circular construction coordinating unit**	Establish a national coordinating unit responsible for guiding the implementation of circular construction while ensuring that the existing mandates of ministries and agencies remain effective. Coordination should focus on aligning policies and targets, implementation activities, and oversight across institutions. **Gap to Address:** Institutional mandates remain fragmented, with no single entity responsible for overall outcomes. The Ministry of Public Works oversees building standards, the Ministry of Environment oversees demolition waste and specific waste, the Ministry of Industry oversees recycled materials, and local governments oversee permits. Gaps arise at the points where these authorities interact. For example, responsibility for returning demolition materials to the supply chain remains unclear. Coordination has so far remained at the planning stage and has not yet been supported by binding authority across ministries, agencies, and local governments. **Supporting Policy Framework:** (1) Law No. 28/2002 on Buildings, (2) Government Regulation No. 39/2006 on Procedures for Monitoring and Evaluating the Implementation of Development Plans, (3) Government Regulation No. 16/2021 on the Implementing Regulation of Law No. 28/2002 on Buildings, (4) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction.				1. Coordinating Ministry for Economic Affairs 2. Coordinating Ministry for Food Affairs 3. Coordinating Ministry for Infrastructure and Regional Development	• Ministry of Housing and Settlement Areas • Ministry of Public Works • Ministry of Environment • Ministry of Industry • Ministry of Finance • Ministry of National Development Planning/Bappenas • State-Owned Enterprises Regulatory Agency (BP BUMN) • National Public Procurement Agency (LKPP) • Local Governments

Strategy 3 Strengthening Monitoring, Evaluation, and Data Systems for Circular Construction

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) through integrated reporting systems, indicators, and data. The reporting system will support monitoring of prefabrication (Action 1.1), energy and water intensity, recycled material content (Action 3.3), implementation of the Green Rating System (Action 3.5), and verification of construction waste management targets (Action 2.2) and low-carbon buildings (Action 3.4).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
3.1	**Shift monitoring from administrative reporting to measurable circularity indicators**	Apply consistent circularity indicators across ministries by adopting measurable technical parameters, including the Recycled Content Rate and Waste Diversion Rate, and incorporating them into technical regulations or planning documents. Support the system through digitalisation and the integration of the Building Management Information System (SIMBG) with the National Waste Management Information System (SIPSN) to ensure real-time traceability of material flows. Use circularity performance as a basis for financial decisions, including green loans and green bonds. **Gap to Address:** Reporting remains largely administrative and qualitative. SIMBG does not require information on recycled materials, while green building assessments rely on uploaded documents that are reviewed manually. National standards for recycled content and waste diversion rates have not yet been established, making figures difficult to compare across projects. Reporting channels also remain fragmented and do not adequately cover construction waste. SIPSN primarily covers household waste, while demolition waste does not have a dedicated reporting channel. As a result, materials cannot be traced throughout the full supply chain. **Supporting Policy Framework:** (1) Government Regulation No. 16/2021 on the Implementing Regulation of Law No. 28/2002 on Buildings, (2) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction.				Ministry of Public Works	• Ministry of Housing and Settlement Areas • Ministry of Environment • Ministry of National Development Planning/Bappenas • State-Owned Enterprises Regulatory Agency (BP BUMN) • Ministry of Industry • Local Governments

Strengthening Circular Economy In Electronics



Strategy 1 Developing and Implementing EPR Policy for Electronic Products

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by strengthening the regulatory framework for extended producer responsibility (EPR) in the electronics sector. It covers the establishment of EPR regulations for electronic products (Action 1.1) and the implementation of EPR for priority products (Action 1.2).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
1.1	**Establish a dedicated EPR regulation for electronic products**	Develop an EPR regulation specifically for electronic products. The regulation should define producer roles and responsibilities, collection and recycling targets, reporting mechanisms, financing arrangements, oversight, and enforcement. It will provide an integrated legal basis for national e-waste management. **Gap to Address:** Existing regulations cover only some aspects of e-waste management. Law No. 18/2008 establishes general producer responsibility, while Government Regulation No. 27/2020 classifies e-waste as specific waste containing hazardous and toxic substances. Once e-waste enters the hazardous waste management chain, Government Regulation No. 22/2021 and Minister of Environment and Forestry Regulation No. 6/2021 apply. However, these regulations do not establish a dedicated EPR scheme for electronics that defines product categories, take-back obligations, collection and recycling targets, producer financing, implementing organisations, reporting, verification, and sanctions for non-compliance. As a result, producer responsibility for post-consumer electronic products cannot yet be applied and enforced consistently. **Supporting Policy Framework:** (1) Law No. 18/2008 on Waste Management, (2) Government Regulation No. 81/2012 on Household and Household-like Waste Management, (3) Government Regulation No. 27/2020 on Specific Waste Management, (4) Government Regulation No. 22/2021 on Environmental Protection and Management, (5) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures and Requirements for Hazardous Waste Management No instrument currently provides specific regulation for EPR in electronic products. A dedicated regulation is therefore required.				Ministry of Environment	• Ministry of Industry • Ministry of National Development Planning/Bappenas • Ministry of Communication and Digital Affairs • Ministry of Home Affairs
1.2	**Implement EPR schemes for priority electronic products**	Apply EPR obligations to priority groups of electronic products through take-back, collection, treatment, and reporting systems, supported by progressive material recovery targets. Implementation should involve cooperation among producers, government institutions, and waste management operators. **Gap to Address:** No operational requirements currently oblige electronics producers to establish and finance systems for collecting post-consumer products. Producers are not yet required to provide take-back points, set collection targets based on the volume of products placed on the market, or ensure that collected e-waste is transferred to licensed treatment operators. As a result, consumers often sell used devices to informal collectors. These collectors may recover valuable components, while low-value or hazardous parts may not be managed safely. This situation contributes to low formal collection rates, unstable supplies for licensed treatment facilities, and weak traceability and producer accountability.				Ministry of Environment	• Ministry of Industry • Ministry of National Development Planning/Bappenas • Ministry of Communication and Digital Affairs • Ministry of Home Affairs • Local Governments • Licensed Hazardous and Toxic Waste Management Service Providers

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		Supporting Policy Framework: (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Government Regulation No. 22/2021 on Environmental Protection and Management, (3) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures and Requirements for Hazardous Waste Management. These regulations can provide a basis for managing e-waste and hazardous waste. However, a new implementing instrument, namely a dedicated electronics EPR regulation, is required.					
1.3	**Develop an integrated electronics EPR reporting system**	Develop a national reporting system that integrates producer registration, collection targets and results, transport, treatment, material recovery, and e-waste residues. The system should connect EPR reporting with related platforms, including SIPSN and SPEED, through common data standards, operator identification, and data exchange mechanisms. Reporting should include transfer records or digital manifests, verification procedures, and monitoring dashboards to ensure traceability of e-waste flows from producers to final treatment facilities. **Gap to Address:** E-waste data are currently reported separately through several systems that use different classifications. For example, household e-waste may be recorded in SIPSN as specific waste or waste managed by local governments. After being transferred to a licensed operator, the same material may be reported through SPEED as hazardous waste. At the same time, producers are not yet required to report collection and waste reduction volumes through an EPR mechanism. Without a common data exchange system, these records are difficult to connect and may be omitted, remain unverifiable, or be counted more than once. Existing reporting also rarely provides a complete account of the waste origin, quantity collected, transport and treatment operators, material recovery rate, and quantity of residues disposed of. This limits the government's ability to assess producer compliance, measure national EPR performance, and verify that e-waste reaches appropriate treatment facilities. **Supporting Policy Framework:** (1) Presidential Regulation No. 39/2019 on One Data Indonesia, (2) Presidential Regulation No. 95/2018 on Electronic-Based Government, (3) Government Regulation No. 27/2020 on Specific Waste Management, (4) Government Regulation No. 22/2021 on Environmental Protection and Management, (5) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures and Requirements for Hazardous Waste Management.				1. Ministry of Environment 2. Ministry of Industry	

Strategy 2 Developing Circular Economy Infrastructure

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by developing e-waste material recovery infrastructure for collection, sorting, treatment, and transfer to further processing facilities for refurbishment, remanufacturing, and recycling. It covers the expansion of e-waste material recovery facilities (Action 2.1), the integration of small and medium-sized industries, micro, small, and medium-sized enterprises, and informal operators into circular business ecosystems (Action 2.5), and research and development of recycling technologies (Action 2.6).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
2.1	**Establish temporary storage facilities for specific and hazardous waste (TPSSS-B3) across Indonesia**	Develop a network of Temporary Storage Facilities for Specific and Hazardous Waste (TPSSS-B3) at the provincial and district or city levels. These facilities will serve as primary temporary collection points for e-waste before it is transferred to licensed treatment facilities. **Gap to Address:** E-waste collection and consolidation facilities connected to licensed operators remain limited and unevenly distributed. Jakarta, for example, has drop boxes, collection services, consolidation warehouses, and regular transport to treatment partners. However, similar service chains are not yet widely available in other regions. As a result, e-waste in underserved areas lacks accessible formal channels for collection and efficient transfer to appropriate treatment facilities. **Supporting Policy Framework:** (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures for the				1. Ministry of Public Works 2. Local Governments 3. Hazardous and Toxic Waste Management Service Providers	• Ministry of Environment/Environmental Control Agency • Ministry of Home Affairs • Ministry of National Development Planning/Bappenas • Private Sector

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		Management of Hazardous and Toxic Waste, (3) Minister of Environment and Forestry Regulation No. 9/2024 on the Management of Waste Containing Hazardous and Toxic Substances and Hazardous and Toxic Waste.					
2.2	**Encourage the establishment of hazardous waste management service providers in underserved regions to strengthen the recovery of valuable materials**	Provide incentives and facilitate investment for hazardous waste collection, transport, and treatment service providers to expand their operations into regions that do not yet have access to e-waste management facilities. **Gap to Address:** Access to e-waste management services remains uneven across regions. Hazardous waste management service providers are still concentrated in Java, and their overall number remains limited. Regions located far from treatment centres must therefore bear higher costs for consolidation and transport across provinces or between islands. These conditions can lead to longer storage periods and make formal management channels less competitive than informal ones. **Supporting Policy Framework:** (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Government Regulation No. 22/2021 on Environmental Protection and Management, (3) Government Regulation No. 28/2025 on Risk-Based Business Licensing, (4) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures for the Management of Hazardous and Toxic Waste.				1. Ministry of Industry 2. Producer Associations 3. Local Governments 4. Hazardous and Toxic Waste Management Service Providers	• Ministry of Environment/Environmental Control Agency • Ministry of Home Affairs • Ministry of National Development Planning/Bappenas • Private Sector
2.3	**Develop integrated e-waste collection and treatment systems**	Establish scheduled collection services, drop-off points, consolidation centres, informal sector participation, and transport mechanisms integrated with formal treatment facilities to increase e-waste collection rates. **Gap to Address:** Formal e-waste collection remains low, while significant quantities continue to enter informal channels. Waste banks are generally not yet equipped to accept e-waste. Meanwhile, drop boxes, collection services, and transport to licensed treatment operators, as available in Jakarta, have not been provided consistently in other regions. Consequently, communities often rely on informal collectors, material flows remain unrecorded, and low-value or hazardous components may not be managed safely. **Supporting Policy Framework:** (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Government Regulation No. 22/2021 on Environmental Protection and Management, (3) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures for the Management of Hazardous and Toxic Waste, (4) Minister of Environment and Forestry Regulation No. 9/2024 on the Management of Waste Containing Hazardous and Toxic Substances and Hazardous and Toxic Waste, (5) Relevant local waste management regulations.				1. Local Governments 2. Hazardous and Toxic Waste Management Service Providers 3. Producer Associations	• Ministry of Environment/Environmental Control Agency • Ministry of Home Affairs • Ministry of Communication and Digital Affairs • Private Sector
2.4	**Advance research and recycling technology development**	Support research, innovation, and pilot projects for e-waste treatment and electronic material recovery technologies to improve efficiency, increase added value, and strengthen the competitiveness of the national recycling industry. **Gap to Address:** Domestic treatment technologies for complex electronic components remain limited. Manual dismantling generally recovers only iron, copper, and aluminium. Valuable metals in circuit boards are not yet recovered optimally, while hazardous components may not be handled safely. **Supporting Policy Framework:** (1) National Circular Economy Action Plan, (2) National Strategic Research Roadmap and Agenda 2026.				National Research and Innovation Agency (BRIN)	• Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of National Development Planning/Bappenas • Higher Education Institutions • Private Sector

Strategy 3 Implementing Ecodesign and Product Innovation

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) through ecodesign and product innovation. It promotes the application of ecodesign principles to electronic products and electrical equipment (Action 3.2).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
3.1	**Use public procurement to support circular electronic products**	Use government purchasing power to create market demand for electronic products that meet criteria for repairability, reuse, and recycling. Apply ecodesign criteria to the procurement of refurbished electronics and incorporate them into sustainable procurement standards. **Gap to Address:** Public procurement does not yet apply specific and consistent circularity criteria to electronic products. For example, laptop procurement may specify technical requirements, domestic content (TKDN), and warranty periods, but it does not consistently assess battery replacement, spare part availability, repair services, service life, recycled content, or take-back at the end of the product's useful life. **Supporting Policy Framework:** (1) Presidential Regulation No. 16/2018 on Public Procurement of Goods and Services, as amended by Presidential Regulations No. 12/2021 and No. 46/2025, (2) LKPP Regulation No. 12/2021 on Guidelines for Implementing Public Procurement of Goods and Services through Suppliers. These instruments provide a general basis for sustainable procurement. However, specific technical criteria are still required for circular electronic products.				1. Ministry of Environment 2. National Public Procurement Agency (LKPP)	
3.2	**Promote eco design principles in electronic products**	Encourage producers to integrate eco design principles into the product design stage, including modularity, spare part availability, repairability, reuse, and recyclability. This should be supported by appropriate standards, ecolabels, and policy instruments. **Gap to Address:** No policy instrument specifically regulates the design of electronic products to support circularity. As a result, repairability, reuse, and recyclability remain limited. For example, batteries or components that are difficult to remove, the use of permanent adhesives, unavailable spare parts, and limited repair information may result in the replacement of an entire product when only one component is damaged. Such designs shorten product service life and make reuse and material recovery more difficult. **Supporting Policy Framework:** No specific policy instrument is currently available. A new instrument is required to establish ecodesign requirements, repairability indicators, spare part availability requirements, and recycling standards for electronic products.				Ministry of Industry	

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List of Abbreviations

Abbreviation	Full Form	Abbreviation	Full Form
3T	Disadvantaged, Frontier, and Outermost Areas	LCC	Life Cycle Costing
APBD	Regional Budget	LED	Light-Emitting Diode
APBN	State Budget	LKPP	National Public Procurement Agency
B3	Hazardous and Toxic	MEP	Mechanical, Electrical, and Plumbing
BIM	Building Information Modelling	OJK	Financial Services Authority
BKPM	Investment Coordinating Board	OSH	Occupational Safety and Health
BMN/BMD	State-Owned Assets/Regional-Owned Assets	PAGE	Partnership for Action on Green Economy
BMP	Company Benefit Weight	PRO	Producer Responsibility Organisation
BRIN	National Research and Innovation Agency	PROPER	Company Performance Rating Assessment Programme
BSN	National Standardization Agency	R0–R9	Circular Economy R-Strategies: Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, and Recover
BUMN	State-Owned Enterprise	RAN-ES	National Action Plan for the Circular Economy
C&D	Construction and Demolition	RPJMD	Regional Medium-Term Development Plan
CE	Circular Economy	RPJMN	National Medium-Term Development Plan
CFC-11	Chlorofluorocarbon-11	RPJPN	National Long-Term Development Plan
CRT	Cathode-Ray Tube	SIH	Green Industry Standard
CSR	Corporate Social Responsibility	SIMBA	Waste Bank Information System
ECI	Environmental Cost Indicator	SIMBG	Building Management Information System
EPC	Engineering, Procurement, and Construction	SIPD	Regional Government Information System
EPR	Extended Producer Responsibility	SIPSN	National Waste Management Information System
FLW	Food Loss and Waste	SNI	Indonesian National Standard
FPSS	Please verify: the abbreviation appears in the report but is not defined	SPEED	Please verify: the abbreviation appears in the report but is not defined
GESI	Gender Equality and Social Inclusion	TKDN	Domestic Component Level
GHG	Greenhouse Gas	TPA	Final Processing Site
GLI	Green Label Indonesia	TPS	Temporary Storage Site
IKN	Nusantara Capital City	TPS3R	Reduce, Reuse, and Recycle Waste Management Site
ILO	International Labour Organization	TPSSS-B3	Temporary Storage Facility for Hazardous and Toxic Waste
ISO	International Organization for Standardization	WEEE	Waste Electrical and Electronic Equipment
KAN	National Accreditation Committee	WHO	World Health Organization
KUR	People's Business Credit	WRI	World Resources Institute
LCA	Life Cycle Assessment		



01

Introduction

1.1 Background
1.2 Objectives
1.3 Methodology
1.4 Study Limitation

1. Introduction

1.1 Background

The circular economy (CE) has been established as a strategic pillar of national development in Indonesia's National Long-Term Development Plan (RPJPN) 2025–2045.[1] This commitment supports the Golden Indonesia 2045 vision of "A Sovereign, Advanced, and Sustainable Nusantara." As part of the Economic Transformation agenda and the Green Economy framework, the circular economy is expected to strengthen national competitiveness, improve resource efficiency, reduce waste leakage into the environment, and lower greenhouse gas (GHG) emissions in support of the net-zero emissions target.

The Indonesia Circular Economy Roadmap and Action Plan 2025–2045 identifies five priority sectors: food, retail and plastic packaging, electronics, construction, and textiles. These sectors are expected to lead the transition from the linear "take–make–dispose" model to a regenerative and sustainable economic system.[2]

The National Medium-Term Development Plan (RPJMN) 2025–2029 translates circular economy principles into the "Circular Economy Ecosystem" policy direction under National Priority 2. This framework emphasises three main policy approaches: reducing resource consumption, extending the useful life of products and materials, and strengthening recycling and resource recovery systems. Its strategic components include the adoption of resource efficiency, the integration of eco-design, environmentally friendly product certification, the use of circular materials as production inputs, industrial recycling rates, and waste prevention. These measures reflect Indonesia's efforts to mainstream circular economy practices in national industrial transformation and low-carbon development strategies.

Although Indonesia has made a national commitment to the circular economy, implementation remains fragmented and largely focused on downstream waste management. In the construction sector, circular economy practices have yet to be implemented effectively, particularly in communication and outreach, institutional and regulatory support, and financing schemes. The adoption of infrastructure and technology, as well as the management of relevant data, also remains limited. Existing regulations and the adoption of Building Information Modelling (BIM) represent initial progress. However, implementation remains fragmented and insufficient to drive the systematic adoption of circular principles across the sector.

The electronics sector, meanwhile, continues to face significant regulatory and infrastructure gaps, particularly due to the absence of a comprehensive Extended Producer Responsibility (EPR) regulation for electronic waste and limited eco-labelling requirements. The market is dominated by assembly, distribution, and sales companies rather than Original Equipment Manufacturers (OEMs). As a result, critical upstream decisions on circular product design largely fall outside the reach of domestic companies' policies. Although electronic waste collection infrastructure has expanded, recycling facilities remain underused, operating at only 15% of their potential capacity.[17] Consequently, most electronic waste continues to flow into the informal sector, which plays an important role in collection and material recovery. However, residues and hazardous components are often not managed in accordance with environmental standards.

Addressing these gaps is essential to move beyond a waste management approach towards a more comprehensive circular materials economy. This

[1] Government of Indonesia. (2024). Law No. 59 of 2024 on the National Long-Term Development Plan (RPJPN) 2025–2045.

[2] Ministry of National Development Planning/Bappenas. (2024). Indonesia Circular Economy Roadmap and National Action Plan 2025–2045.

policy review highlights the need to strengthen governance, harmonise regulations, develop financing mechanisms, improve infrastructure readiness, and promote collaboration among stakeholders to accelerate the implementation of the circular economy in Indonesia. These measures have the potential to deliver environmental, economic, and social benefits while supporting a greener and more sustainable development pathway.

1.2 Objectives

This study supports a systematic review of Indonesia's regulatory framework for implementing the circular economy. It assesses the framework through comprehensive regulatory mapping and analysis of priority sectors. Specifically, this report aims to:

1. **Review and map relevant environmental laws and regulations**, including laws, government regulations, presidential regulations, ministerial regulations, agency regulations, and regional regulations that address waste management and circular economy sectors. This review assesses the extent to which circular economy principles are reflected in Indonesia's regulatory framework.
2. **Conduct an in-depth policy analysis of the construction and electronics sectors** to identify regulatory overlaps and inconsistencies, gaps in the application of circular economy principles, and implementation barriers faced by stakeholders across the value chains of both sectors.
3. **Develop recommendations to improve regulatory alignment** and strengthen the ecosystem needed to support circular economy implementation in Indonesia.

1.3 Methodology

This study applies a systematic literature-based policy review and comparative analysis to assess the alignment of Indonesia's environmental laws and regulations with circular economy principles. The analysis uses the 9R Circular Economy Hierarchy (R0–R9) as its primary framework for evaluating regulatory support for circular economy implementation. It considers the relevance of regulatory provisions, their position within the legal hierarchy, and their contribution to enabling or constraining circular economy practices. The analysis also examines the following policy areas:

a) regulatory and institutional frameworks;
b) financing and incentives;
c) infrastructure and data availability;
d) communication, education, and awareness-raising; and
e) implementation actions and initiatives.

The study comprises two main components. First, a comprehensive policy review maps and analyses environmental laws and regulations, including laws, government regulations, presidential regulations, ministerial regulations, and regional regulations across the five priority sectors identified in the Circular Economy Roadmap. This analysis aims to identify cross-sectoral patterns, regulatory gaps, overlapping provisions, and policy inconsistencies.

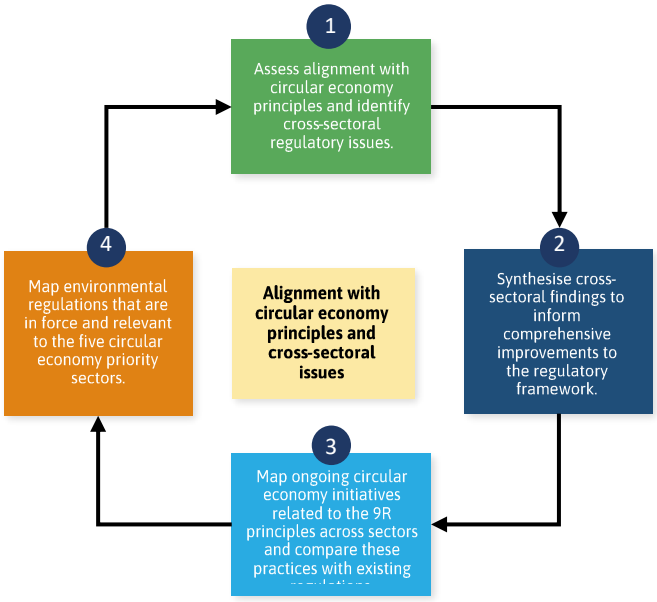


Figure 1 Methodological and analytical framework for a comprehensive policy review of the five circular economy sectors

Second, an in-depth analysis examines the construction and electronics sectors by reviewing regulations at each stage of their value chains. Case studies and stakeholder validation support this analysis and help identify the challenges to circular economy implementation.

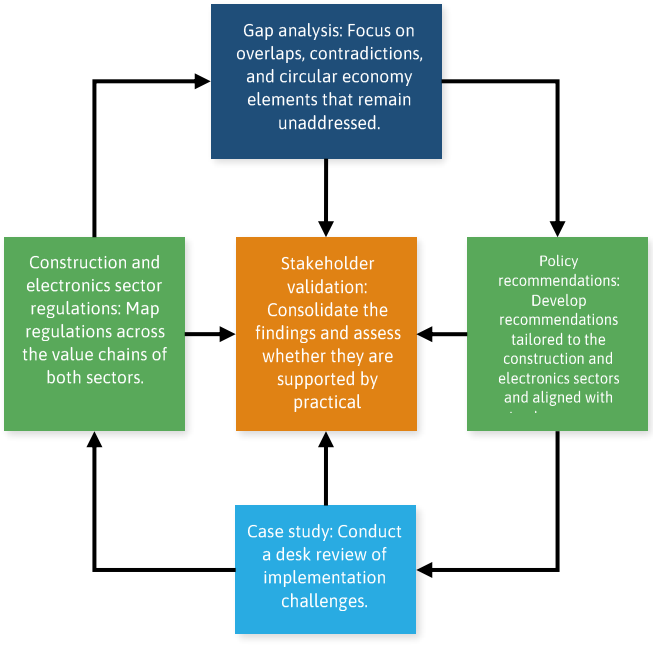


Figure 2 Methodological and analytical framework for an in-depth study of the construction and electronics sectors

The findings from both components inform policy recommendations to strengthen regulatory harmonisation and accelerate the adoption of the circular economy.

1.4 Study Limitations

Although the methodology is designed to provide a structured and systematic assessment of circular economy policy alignment, several limitations should be considered when interpreting the findings.

Regulations related to the circular economy are spread across multiple legal instruments and sources, largely because Indonesia does not yet have a dedicated regulation that comprehensively governs the circular economy. In addition, information on regional regulations varies in both completeness and accessibility.

The language used in many regulations is also broad and open to different interpretations. This may affect the consistency of assessments of their objectives, scope, and level of support for circular economy implementation.

This study focuses on formal regulations that are directly relevant to the circular economy. Voluntary initiatives and private sector practices are included only as illustrative examples and are not a primary focus of the analysis.

Accordingly, the findings primarily reflect the formal regulatory framework and documented practices. They do not provide a comprehensive assessment of enforcement effectiveness, compliance levels, or implementation outcomes on the ground.



02

Overview and Gap Analysis of Circular Economy Regulation Implementation in Indonesia

2.1 Circular Economy – Priority Sector
2.2 Circular Economy – Construction Sector
2.3 Circular Economy – Electronic Sector

2. Overview and Gap Analysis of Circular Economy Regulation Implementation in Indonesia

2.1 Circular Economy – Priority Sector

The circular economy is an approach to economic development that applies a systemic and sustainable perspective to resource management. It aims to minimise the extraction of primary resources, extend the useful life of products, and reintegrate the by-products of production and consumption into value chains.[3] The 9R Framework is used to support the development of circular economy policies and implementation strategies. It describes different levels of circularity and types of intervention in resource management. Lower-numbered R principles represent higher levels of circularity and are therefore prioritised in decision-making and the design of circular economic systems.

R0	Refuse	Avoid creating products that perform the same function when they are redundant.	Eliminate the use of single-use packaging and practices that rely on disposable construction materials.
R1	Rethink	Use products more intensively.	Business operators use digital platforms to facilitate the sharing of goods.
R2	Reduce	Improve production efficiency by using fewer materials.	Apply garment cutting patterns that reduce fabric waste in the garment industry.
R3	Reuse	Use products again while they remain fit for purpose, without changing their function.	Resell or donate wearable clothes through second-hand shops or donation channels for textiles, clothing, footwear, and accessories.
R4	Repair	Repair damaged products.	Repair electronic products at service centres.
R5	Refurbish	Restore used or old products, usually by renewing or updating them.	Reuse doors and windows from old buildings, as well as reclaimed timber, in new buildings.
R6	Remanufacture	Use components from old or non-functional products to make new products with the same function.	Process food waste into animal feed.
R7	Repurpose	Use a product that can no longer serve its original purpose for a different purpose.	Process plastic packaging into secondary raw material, such as plastic flakes, for use in producing new plastic packaging.
R8	Recycle	Process materials to produce the same type of material, at the same or a lower quality.	Recycle plastic packaging into secondary plastic material for use in producing new plastic packaging.
R9	Recover	Convert materials into energy.	Recover energy from plastic waste by producing refuse-derived fuel (RDF) or gas.

Figure 3 The 9R Circular Economy Framework

In recent years, policies related to the circular economy have developed across various sectors. The regulatory framework spans several levels of Indonesia's legal hierarchy, from laws and government regulations to ministerial and regional regulations. The identified circular economy regulations in Indonesia are mapped below.[4]

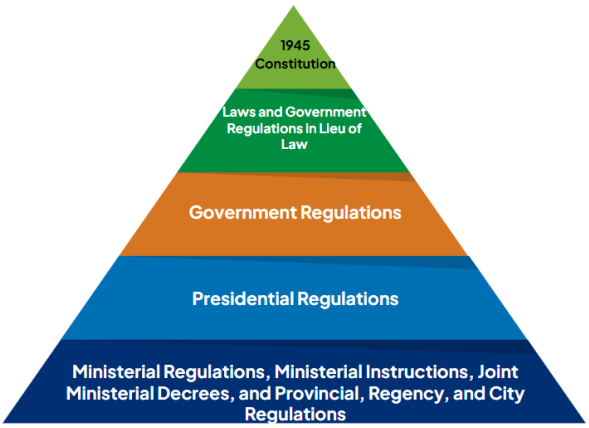


Figure 4 Hierarchy of Indonesia's Legal and Regulatory Framework

Level of Legal Framework	Food and Beverage	Textiles	Construction	Electronic	Retail (Plastic)
Laws	5	2	3	5	2
Government Regulations	9	1	4	4	2
Presidential Regulations	8	2	3	1	4
Ministerial Regulations	7	3	12	8	13
Provincial Regional Regulations	71	47	22	17	58

Figure 5 Identified Regulations Related to the Circular Economy

Laws and government regulations establish mandates, allocate responsibilities, and provide enforcement frameworks. Presidential, ministerial, and regional regulations generally translate these provisions into policy directions, technical standards, implementation procedures, and rules within sectoral or regional jurisdictions. The mapping in Figure 5 shows that Indonesia has a broad range of circular economy regulations, but they are spread across different levels of the legal hierarchy. The number of regulations in place does not necessarily ensure effective implementation. Most provisions are set out in ministerial and regional regulations, which

[3] Ministry of National Development Planning/National Development Planning Agency (Bappenas). (2024). Indonesia's circular economy roadmap and national action plan 2025–2045.

[4] Datta, A., Jones, H., & Febriany, V. (2011). The political economy of policy-making in Indonesia: Opportunities for improving the demand and use of knowledge (Technical Report).

have more limited legal standing and scope of authority. As a result, they cannot automatically fill gaps in mandates or clarify the allocation of responsibilities where higher-level regulations do not provide adequate direction.

If a law or government regulation does not clearly establish obligations, institutional arrangements, financing mechanisms, and the basis for enforcement, implementing regulations can only operate within the authority delegated to them. Conversely, when technical requirements are dispersed across multiple ministerial and regional regulations, implementation may vary between sectors and regions. This can lead to overlapping or unclear mandates, inconsistent operational standards, weak coordination between institutions, and uneven application of incentives, monitoring, and sanctions. The relationship between regulatory levels, their functions, and their binding force is illustrated below.

The 1945 Constitution — Serves as the highest legal foundation. All laws and regulations must be consistent with its principles.

Level of Regulation	Function	Legal Force
Law (UU)	Establishes legal mandates, rights, and obligations.	• Has the strongest binding force. • May explicitly provide for criminal and administrative penalties, incentives, and disincentives. • Provides the basis for implementing regulations, including Government Regulations and Regional Regulations.
Government Regulation (PP)	Implements laws by defining institutional responsibilities, compliance requirements, and enforcement mechanisms.	• Has strong binding force as an implementing regulation. • May provide for administrative penalties, incentives, and/or disincentives when authorised by law. **It cannot establish criminal penalties.** • Defines which authorities are responsible for enforcement, how enforcement is carried out, and the circumstances in which it applies.
Presidential Regulation (Perpres)	Sets national policy direction and coordination, including coordination across ministries and agencies.	• Has indirect binding force through the executive branch. • May establish policy incentives and disincentives, such as support programmes and prioritisation. **It cannot establish criminal penalties.** • Links policy objectives with planning and budgeting. Enforcement is generally non-punitive.
Ministerial Regulation (Permen)	Sets technical standards, procedures, reporting requirements, and compliance guidelines.	• Provides operational requirements and is binding only within the authority delegated to the minister. • May establish technical incentives or disincentives and administrative penalties when authorised. **It cannot establish criminal penalties.**
Provincial, Regency, and City Regional Regulation (Perda)	Regulates local matters within the mandate of national law.	• Directly binds businesses and local governments. • May impose criminal and administrative penalties, incentives, and disincentives. • Enforcement is carried out by local law enforcement officers.

Figure 6 Regulations in Indonesia and the Hierarchy of Their Legal Authority

Examples of enforcement challenges reflected in Indonesia's environmental and waste management regulations:



Figure 7 Examples of Enforcement Challenges

Several other key issues can be identified in the current implementation framework. **First, data and reporting systems remain fragmented and incomplete.** In some cases, they are not fully integrated across institutions or sectors. This limits the availability of comprehensive information for monitoring circular economy performance and evaluating policy effectiveness. In practice, data on industrial production and raw material use are reported through the National Industrial Information System (SIINas), while data on waste generation, reduction, and management are collected through the National Waste Management Information System (SIPSN). Data on trade, procurement, and hazardous and toxic waste (B3 waste) are managed through separate systems. Differences in coverage, classification, units of measurement, reporting periods, and verification methods make it difficult to link these data and track material flows from production and consumption through reuse, recycling, and final processing. As a result, the government lacks a comprehensive basis for calculating material circularity rates, monitoring progress towards circular economy targets, and evaluating policy effectiveness across sectors.

Second, enforcement activities tend to focus on procedural compliance, such as administrative reporting and certification requirements, rather than on actual circularity outcomes or environmental impacts. For example, a business may be considered compliant after submitting a roadmap and waste reduction report or obtaining a required certificate. However, such assessments are not always supported by verification of the quantity of materials actually reduced, reused, repaired, or recycled; the extent to which secondary materials replace primary

raw materials; the quality of recycled outputs; or the amount of residual waste still disposed of. Administrative compliance therefore does not necessarily demonstrate improved circularity performance or a measurable reduction in environmental impacts.

Third, differences in institutional capacity across ministries, local governments, the private sector, and community groups lead to inconsistent implementation and uneven enforcement across regions. Overlapping mandates and the absence of a dedicated institution with clear end-to-end accountability also create coordination challenges that can weaken policy effectiveness and slow implementation. For example, source-separated waste collection may work more effectively in regions with adequate budgets and staff, but face constraints in areas with limited capacity. Materials that have been collected may also fail to reach industry if coordination between local governments, waste managers, and industrial users is unclear. In such cases, recycling efforts may stop at the collection stage.

Implementation gaps are also evident in sectoral circular economy policies, particularly in producer responsibility, waste reduction targets, and reporting systems. Although obligations for producers and local governments have been established, policy instruments and data systems are not yet well integrated.

Existing mechanisms, such as LKPP's e-catalogue, show that product-related indicators such as the Domestic Component Level (TKDN) can be incorporated into procurement and information systems. This creates an opportunity to add circularity indicators, such as eco-labels[3] or percentage-based circularity metrics, to existing platforms and support monitoring and transparency. However, these mechanisms are not yet linked to a broader circularity reporting and monitoring framework. This limits the effectiveness of sustainable public procurement as both a policy instrument and a market incentive.

Consequently, despite the availability of various regulatory instruments, the lack of integrated data systems, harmonised indicators, and coordinated implementation mechanisms continues to limit the effectiveness of circular economy policies in Indonesia.

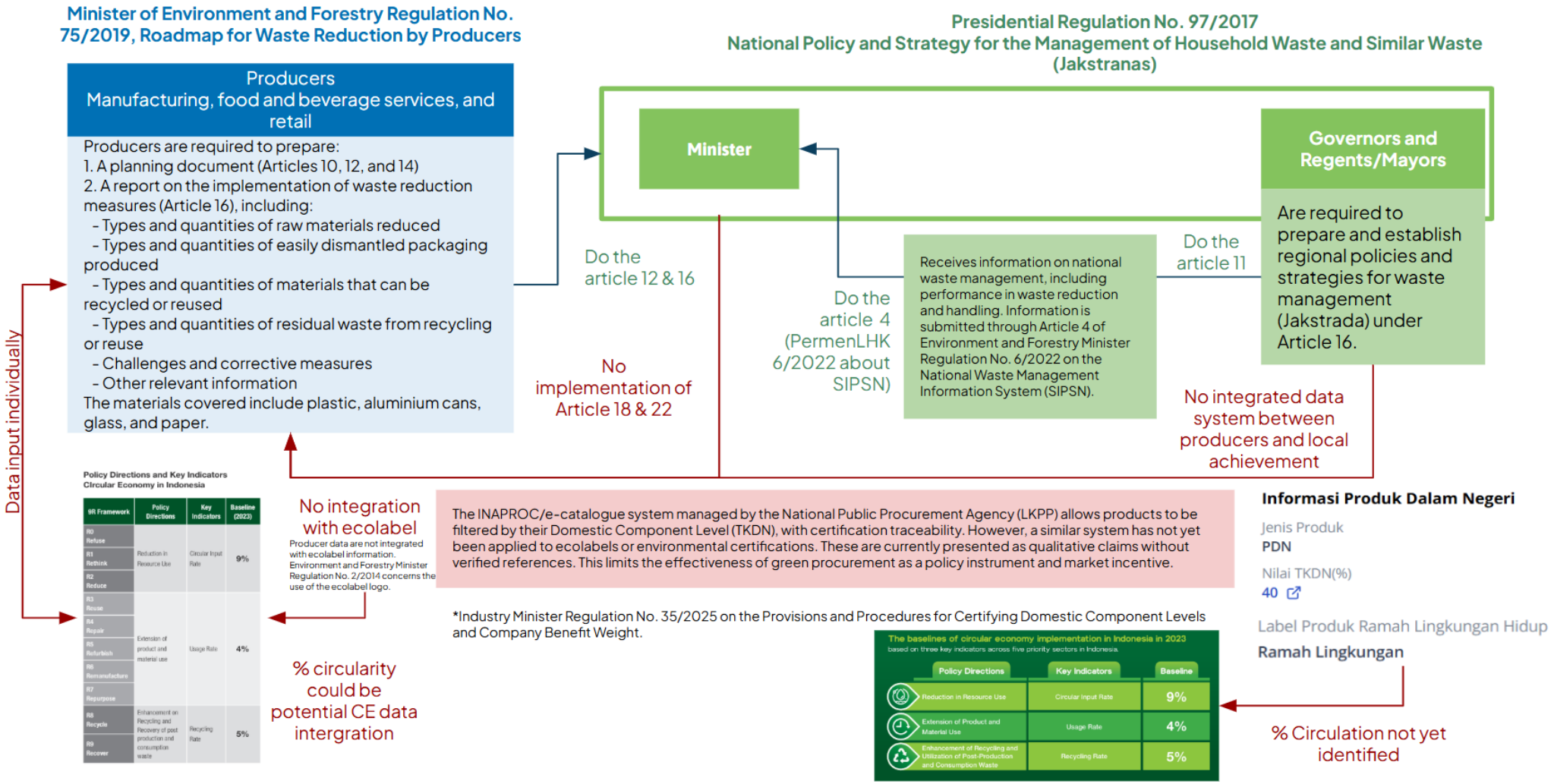


Figure 8 Overview and Gap Analysis of Circular Economy Regulations in Indonesia: General Case Study

Beyond governance, enforcement, and data challenges, circular economy implementation in Indonesia also faces broader market and economic barriers across sectors. In many cases, existing regulations introduce technical standards, roadmaps, or sustainability requirements but are not supported by adequate economic instruments, financing mechanisms, or market incentives to encourage the widespread adoption of circular practices. As a result, circular business models often remain less economically competitive than conventional linear models, particularly when initial investment costs are high and financial returns are uncertain.

Similar constraints exist in the electronics sector. Circular activities such as repair, refurbishment, remanufacturing, and advanced recycling face structural economic barriers. Processing and recovering secondary materials often costs more than using primary materials. Existing policies are not supported by adequate economic instruments, such as eco-modulated fees, recycled content requirements, or fiscal incentives that could improve the competitiveness of circular practices. Access to formal financing is also limited, particularly for small and medium-sized repair and refurbishment businesses. This restricts opportunities to upgrade technology and expand operations, leaving many circular activities small-scale or within the informal sector.

A similar challenge affects the management of electronic waste by local governments. Informal collectors often remove valuable components before the waste enters formal collection systems. Local governments are then left to manage low-value and hazardous residual waste while covering much of the collection and processing costs, with limited financial recovery.[7]

In the construction sector, for example, the market for secondary construction materials remains largely informal, while financial incentives for reuse, refurbishment, and the use of recycled materials are limited. Circular construction practices are also often perceived as increasing project costs because they require additional planning and selective demolition, and because the quality and consistency of recovered materials may be uncertain. Without stronger demand, particularly through public procurement, contractors and developers have limited incentives to invest in circular design approaches or alternative business models.[5,6]

In the textile sector, Minister of Industry Regulation No. 40 of 2022 on Green Industry Standards for Textile Finishing and Textile Fabric Printing includes financing indicators related to Corporate Social Responsibility (CSR). However, it does not introduce stronger instruments to promote consistent circular production.

Many companies continue to prioritise short-term efficiency and cost competitiveness over long-term investment in circular practices, whose financial returns remain uncertain. As a result, the circular economy transition in the textile sector still depends on voluntary initiatives by a small number of companies rather than comprehensive, mandatory change.

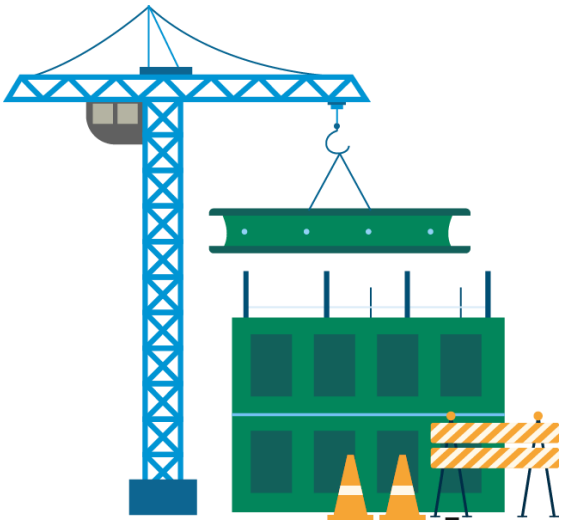
The retail sector faces similar challenges. The Green Industry Standard for the Plastic and Bioplastic Shopping Bag Industry, established under Minister of Industry Regulation No. 55 of 2020, requires compliance with technical and environmental standards. Compliance may require additional investment, operational changes, and certification costs. These added costs are often not matched by equivalent market benefits.

[5] Bappenas. (2024). Indonesia Circular Economy Roadmap and National Action Plan 2025–2045.
[6] Susilowati et al. (2025). Financing Models for Construction and Demolition Waste in Indonesia.
[7] Bappenas. (2026). Urgency Paper for the Preparation of a Ministerial Regulation on Extended Producer Responsibility for the Electrical and Electronic Equipment Sector in Indonesia.

Consumers' limited willingness to pay a premium, uneven enforcement of single-use plastic restrictions, and the absence of procurement mechanisms that favour sustainable products further weaken businesses' incentives to adopt circular economy practices. In practice, businesses that offer sustainable alternatives may be less competitive when cheaper conventional products remain widely available.

In the food sector, current systems tend to reinforce inefficiencies that contribute to food loss and waste (FLW). These include rejecting products that are safe to eat because of physical imperfections, as well as limited investment in redistribution systems, storage infrastructure, and food loss reduction technologies.

Organic farming and organic fertiliser production also often have higher operating costs than conventional systems because access to dedicated financing and fiscal incentives is limited. Demand for sustainable food products remains relatively low, as consumers tend to prioritise affordability over environmental considerations. [8] Without stronger market interventions, including well-targeted economic incentives, many circular food business models may continue to struggle to compete with conventional practices.



[8] Bappenas), WRI Indonesia, & Waste4Change. (2021). Study on Food Loss and Waste in Indonesia to Support the Implementation of the Circular Economy and Low-Carbon Development. Jakarta: Bappenas.

2.2 Circular Economy in Construction Sector

This study examines the construction sector as an ecosystem covering planning and procurement, construction, maintenance, and demolition. It focuses on applying circular economy principles across the construction ecosystem and its processes, rather than on specific product design or material engineering.

The regulatory mapping shows that various national and regional regulations support the application of circular economy principles in construction, particularly through rules on the management of specific waste streams.

Table 1 Hierarchy of Indonesia's Legal Framework for the Construction Sector

Level of the Indonesian Legal Framework	Number
Laws	3
Government Regulations	4
Presidential Regulations	3
Ministerial Regulations	11
Provincial Regulations	22

Foundational regulations, including Law No. 18 of 2008 on Waste Management, Law No. 32 of 2009 on Environmental Protection and Management, and Government Regulation No. 27 of 2020 on Specific Waste Management, provide a legal basis for waste management in general, including waste generated by construction and building demolition.

In addition to general waste management requirements, several regulations introduce more specific approaches to sustainable construction and green development. For example, Minister of Public Works and Housing Regulation No. 21 of 2021 on

Green Building Performance Assessment, which repealed Minister of Public Works and Housing Regulation No. 02/PRT/M/2015, governs the application of sustainability principles in building planning, construction, operation, and maintenance.[9] It provides comprehensive guidance on sustainable building practices, covering technical planning, construction, building use, and performance assessment for Green Building certification at the Pratama, Madya, or Utama level.

Government Regulation No. 14 of 2021 on Construction Services also governs the construction services sector in Indonesia. [10] It covers business licensing, certification, the responsibilities of construction service providers, supervision mechanisms, and the construction services information system. Although it does not explicitly adopt the circular economy concept, it provides a framework that supports sustainable construction through more efficient material use, waste reduction, stronger accountability, and improved governance of construction activities.

At the regional level, many provinces have begun incorporating principles aligned with the circular economy, particularly through waste management regulations. Many include provisions for applying the 3R approach, which means reducing, reusing, and recycling different types of waste, including construction waste. Some regions have adopted more specific construction regulations. For example, Jambi Governor Regulation No. 4 of 2023 on Special Policies for the Procurement of Construction Services aims to improve resource efficiency, strengthen local value chains, and support sustainable infrastructure development.

Another important example is Jakarta Governor Regulation No. 20 of 2024 on Building Management.[11] It governs building design and planning, land-use intensity, building height, green building requirements, the use of underground space, and the provision of basic infrastructure. The regulation supports sustainable construction through material efficiency, waste reduction, and more effective use of land and infrastructure, in line with circular economy principles.

In line with the Indonesia Circular Economy Roadmap and National Action Plan, applying circular economy principles in the construction sector covers the full 9R framework, from R0 (Refuse) to R9 (Recover). Implementation is generally grouped into three main stages: construction, maintenance, and building demolition. The product life cycle stages for Indonesia's construction sector, based on the 9R framework, are shown below.

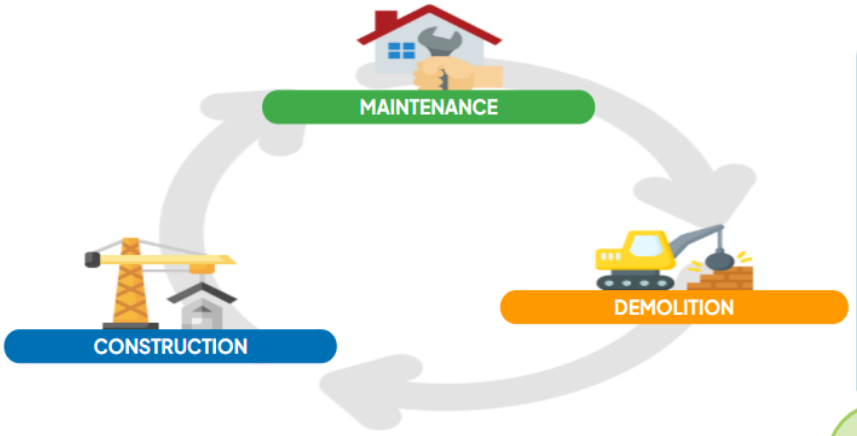
[9] Minister of Public Works and Housing Regulation No. 21 of 2021 on Green Building Performance Assessment.

[10] Government of Indonesia. (2021). Government Regulation No. 14 of 2021 on Construction Services.

[11] Jakarta Special Capital Region Provincial Government. (2024). Jakarta Governor Regulation No. 20 of 2024 on Building Planning Requirements.

POLICY SUMMARY

Overview: **Integration of Circular Economy 9R Principles (R0–R9) Across Construction, Maintenance, and Demolition Activities in Indonesia**



Procurement Stage
R0: Avoid the procurement of resource-intensive materials.
R1: *Apply Life Cycle Costing (LCC) principles in sustainable construction procurement*[11]
R2: Require material waste reduction analysis and reporting
R8: Establish minimum recycled content requirements in construction materials

Construction Stage
R2: Reduce construction waste generation[2,4,8]
R3: Encourage reuse and life extension of materials and components[2,4,8]
R8: Promote recycling of construction materials[2,4,8]
R9: Support recovery of materials and energy from construction waste streams[2,4,8]

Demolition Stage
R1: Retain products and components that remain functional and suitable for continued use[2,4,8]
R2: Minimise waste generation during demolition activities[1,2,6,8,10]
R3: Promote the reuse of materials and building components[2,3,4,6,7,8]
R8: Require recycling of demolition waste and recoverable materials[1,2,3,4,7,8,10]
R9: Recover residual materials for further use or processing[2,4,6,7]

Maintenance & Renovation Stage
R0: Avoid unnecessary replacement of resource-intensive materials
R1: Adapt underutilised spaces or building components for continued use[3]
R2: Reduce embodied environmental impacts associated with maintenance activities[6]
R3: Extend the service life of building components[6]
R4: Repair components and assets to restore their original functionality[3]
R5: Refurbish components using equivalent performance specifications[3]
R7: Repurpose buildings, spaces, or components for alternative functions[3,4,8]

Regulations: 1) Key Regulatory Frameworks Law No. 18/2008 on Waste Management.2) Government Regulation No. 27/2020: Management of Specific Waste; 3) Government Regulation No. 16/2021: Implementation of Law No. 28 of 2002 on Buildings; 4) Government Regulation No. 22/2021: Implementation of Environmental Protection and Management; 5) Ministry of Industry Regulation No. 39/2018: Procedures for Green Industry Certification (Green Industry Information System/SIH); 6) Ministry of Public Works and Housing Regulation No. 9/2021: Guidelines for Sustainable Construction Implementation; 7) Ministry of Public Works and Housing Regulation No. 18/2021: Building Demolition; 8) Ministry of Public Works and Housing Regulation No. 21/2021: Green Building Performance Assessment; 9) Ministry of Industry Regulation No. 46/2024: Green Industry Standards (SIH) for the Flat Glass Industry; 10) Ministry of Environment and Forestry Regulation No. 9/2024: Management of Waste Containing Hazardous and Toxic Materials and Hazardous and Toxic Waste; 11) Head of LKPP Decree No. 157/2024: Sustainable Procurement Guidelines.

Figure 9 Product Life Cycle Stages in Indonesia's Construction Sector Based on the 9R Framework

Table 2 Consolidated Overview of Circular Economy Implementation and Existing Policies in the Construction Sector

Hierarchy	Regulation	Relevant Provisions (Articles, Summary)	Policy Support	Alignment with Circular Economy 9R Principles	Examples of Circular Economy 9R Principle Implementation in Indonesia (Construction Sector)
Indonesia's Law	**Law No. 18 of 2008 on Waste Management**	Aticle 20: Waste reduction through restriction, reuse, and recycling. Article 22: Requirements for waste sorting, collection, processing, and final processing. Articles 14–15: Producer obligations, including product labelling and responsibility for managing packaging and/or products that are not readily biodegradable.	• Regulation and institutions: Establishes a strong national legal framework and clearly allocates roles and responsibilities among central and local governments, producers, estate managers, communities, and waste management operators. • Financing and incentives: Requires public financing through the State Budget (APBN) and Regional Budgets (APBD), and allows incentives or sanctions. Further technical requirements may be established through government or regional regulations. • Infrastructure and data: Requires waste management infrastructure and monitoring mechanisms. Local regulations are to provide more detailed requirements for data collection and reporting. • Communication, education, and awareness: Guarantees public access to information, participation, and education. Further implementation requirements may be established through government or regional regulations. • Actions and initiatives: Establishes binding obligations and time-bound targets, such as landfill reform, with operational details set out in implementing regulations.	R2 (Reduce): Minimise waste generation. R3 (Reuse): Reuse components that remain fit for purpose. R8 (Recycle): Recycle waste in accordance with applicable requirements. R9 (Recover): Recover value from waste through waste-to-energy or other recovery methods.	• Sorting construction waste at licensed facilities. • Reusing formwork, scaffolding, and structural steel on project sites. • Requiring recycling on large construction projects through take-back arrangements.
Govenment Regulation	**Government Regulation No. 27 of 2020 on Specific Waste Management**	Regulates "specific waste," including construction and demolition waste. Prioritises waste reduction, reuse, and recycling before final disposal. Requires dedicated sorting and handling for large or complex items, including bulky construction waste.	• Regulation and institutions: Establishes a governance framework for specific waste, including non-hazardous waste, disaster waste, bulky waste, and construction waste. It also clarifies the roles, procedures, and compliance obligations of government and stakeholders. • Financing and incentives: Allows funding through the APBN, APBD, and partnership arrangements. It also provides for cost recovery to support the collection, handling, and processing of specific waste. • Infrastructure and data: Requires dedicated facilities for the collection, transport, processing, and final management of specific waste, together with reporting and data systems to monitor performance. • Communication, education, and awareness: Encourages public information, awareness-raising, and community participation in managing and sorting specific waste streams. • Actions and initiatives: Requires structured management of specific waste, covering prevention, collection, temporary storage, processing, recovery, and environmentally sound final disposal.	**R3 (Reuse): Reuse pathways are permitted.** **R8 (Recycle): Recycling is prioritised.** **R9 (Recover): Recovery is permitted as the final stage.**	• Processing bulky demolition waste, such as concrete and bricks, at licensed recycling facilities, for example, in Jakarta and Surabaya. • Reusing bulky construction components, such as doors, beams, and window frames, through licensed salvage facilities.
Govenment Regulation	**Government Regulation No. 22 of 2021 on Environmental Protection and Management**	Article 461: Allows non-hazardous waste to be used as a substitute material in concrete and other construction products.	• Regulation and institutions: Implements environmental protection and management governance by detailing licensing, supervision, compliance, and enforcement requirements at all levels of government. • Financing and incentives: Supports environmental funding through the APBN, APBD, environmental funds, sanctions, compensation, and incentive mechanisms. • Infrastructure and data: Strengthens monitoring systems, environmental standards, and the integration of data and reporting for planning and compliance. • Communication, education, and awareness: Ensures public access to information and environmental education, and supports public participation in decision-making. • Actions and initiatives: Promotes prevention, control, recovery, and enforcement to support sustainable environmental management.	**R8 (Recycle): Use non-hazardous waste as a substitute material in construction.** **R9 (Recover): Recover energy and/or materials when recycling is not feasible.**	• Producing recycled aggregate for concrete and paving blocks from demolition waste. • Producing lightweight concrete using recycled fines from construction debris. • Producing soil conditioners from processed non-hazardous solid waste.
Govenment Regulation	**Government Regulation No. 16 of 2021 on the Implementation of Law No. 28 of 2002 on Buildings**	Establishes regulatory standards for building planning, design, construction, and maintenance. It incorporates sustainability principles into master plans and architectural design guidelines.	• Regulation and institutions: Provides technical and administrative procedures for building planning, permits, construction, and supervision by government and building owners. • Financing and incentives: Assigns funding responsibilities to building owners and allows cost recovery and efficiency measures to support regulatory compliance. • Infrastructure and data: Requires compliance with building standards and safe construction practices, together with documentation and reporting on building activities. • Communication, education, and awareness: Encourages outreach, guidance, and training to help stakeholders understand building regulations and compliance requirements. • Actions and initiatives: Requires safe building planning, construction, inspection, maintenance, and use throughout the building life cycle.	R1 (Rethink) and R7 (Repurpose): Adaptively reuse underused spaces and apply multifunctional building components. R4 (Repair): Provide guidance for repairing protected cultural heritage buildings. R5 (Refurbish): Carry out like-for-like refurbishment to preserve the character and function of cultural heritage buildings.	Improving architectural, material, structural, utility, and accessibility features while preserving the character and function of cultural heritage buildings. Repairing lightly damaged cultural features. Replacing severely damaged features with materials that match the original material, motif, pattern, and colour. Adding new functions or features to parts of cultural heritage buildings with lower heritage significance. Carrying out routine maintenance on all building components to extend their service life.
Govenment Regulation	**Government Regulation No. 22 of 2021 on Environmental Protection and Management**	Article 461: Allows non-hazardous waste to be used as a substitute material in concrete and other construction products.	• Regulation and institutions: Implements environmental protection and management governance by detailing licensing, supervision, compliance, and enforcement requirements at all levels of government. • Financing and incentives: Supports environmental funding through the APBN, APBD, environmental funds, fines, compensation, and incentive mechanisms. • Infrastructure and data: Strengthens monitoring systems, environmental standards, and integrated data and reporting for planning and compliance. • Communication, education, and awareness: Ensures public access to information and environmental education, and supports public participation in decision-making. • Actions and initiatives: Promotes prevention, control, recovery, and enforcement to support sustainable environmental management.	R8 (Recycle): Use non-hazardous waste as a substitute material in construction. R9 (Recover): Recover energy or materials when recycling is not feasible	• Producing recycled aggregate for concrete and paving blocks from demolition waste. • Producing lightweight concrete using fines from construction waste. • Producing soil conditioners from processed non-hazardous solid waste.
Ministry Regulation (Permen)	**Minister of Public Works and Housing Regulation No. 9 of 2021 on Guidelines for the Delivery of Sustainable Construction**	Requires resource-efficient construction practices, waste sorting at project sites, and consideration of the life cycle.	• Regulation and institutions: Provides national guidance and standards for sustainable construction and clarifies the roles and responsibilities of government, contractors, and project owners. • Financing and incentives: Allows financial support and creates opportunities for incentives to encourage the adoption of sustainable construction practices. • Infrastructure and data: Promotes resource-efficient technologies, life cycle-based planning, and monitoring of project environmental performance. • Communication, education, and awareness: Encourages information-sharing, training, and capacity-building to improve understanding and implementation.	R1 (Rethink) and R2 (Reduce): Apply resource-efficient design and consider the life cycle. R3 (Reuse) and R8 (Recycle): Reuse and recycle materials during construction.	• Use BIM-based material optimisation to reduce material residuals. • Sort recyclable construction materials at project sites. • Require material recovery plans in engineering, procurement, and construction (EPC) contracts for government projects.

Hierarchy	Regulation	Relevant Provisions (Articles, Summary)	Policy Support	Alignment with Circular Economy 9R Principles	Examples of Circular Economy 9R Principle Implementation in Indonesia (Construction Sector)
			• Actions and initiatives: Provides practical guidance on applying sustainability principles from planning and construction through operation and post-construction.		
Ministry Regulation (Permen)	**Minister of Public Works and Housing Regulation No. 21 of 2021 on Green Building Performance Assessment**	Promotes material efficiency, modularity, and waste minimisation in building design and procurement.	• Regulation and institutions: Establishes national technical standards and requirements for green buildings, with clear obligations for developers and building owners. • Financing and incentives: Allows local governments to introduce incentives to promote compliance and improve environmental performance. • Infrastructure and data: Requires resource-efficient design, energy and water efficiency systems, and monitoring of building operational performance. • Communication, education, and awareness: Encourages guidance, outreach, and technical capacity-building to support understanding and proper implementation. • Actions and initiatives: Requires the phased application of green building criteria during planning, construction, operation, and maintenance.	R0 (Refuse) and R2 (Reduce): Reduce embodied impacts and resource use. R3 (Reuse) and R4 (Repair): Extend the service life of building components.	• Apply modular and prefabricated building systems to reduce waste, as seen in commercial projects in Jakarta and Bali. • Extend the service life of façade and mechanical, electrical, and plumbing (MEP) components through repair and retrofit.
Ministry Regulation (Permen)	**Minister of Industry Regulation No. 39 of 2018 on Procedures for Green Industry Certification**	**Article 4: Requires a description of the production process and mapping of process flows.** **Appendix: Requires the identification and management of inputs, outputs, waste, emissions, and resource use as part of the Green Industry Standard (SIH) certification requirements.**	• Regulation and institutions: Establishes mandatory procedures for Green Industry Certification, including registration, assessment, and government verification. • Financing and incentives: Supports industrial compliance through potential incentives, recognition, and facilitation for certified companies. • Infrastructure and data: Requires production process documentation, material flow mapping, and reporting as part of SIH certification assessment. • Communication, education, and awareness: Promotes information on the benefits of certification, guidance, and capacity-building for industry. • Actions and initiatives: Requires resource efficiency, environmental management, and continual improvement to meet SIH requirements.	R1 (Rethink): Identify resource-use hotspots to improve process efficiency and circularity.	Some Indonesian building material producers that have adopted the Ministry of Industry-endorsed SIH have Environmental Product Declarations (EPDs) or clearly documented production flow diagrams.
Ministry Regulation (Permen)	**Minister of Industry Regulation No. 46 of 2024 on Green Industry Standards for the Flat Glass Industry**	**The appendix:** • Defines reuse and recycling, and requires at least 15% recycled material content, a minimum waste reuse or recycling rate of 50%, and packaging that is 100% reusable or recyclable • Encourages efficient use of raw and auxiliary materials to reduce costs and environmental impact • Regulates the management of non-hazardous waste, including its reduction, handling, transport, and recovery, covering common industrial waste streams	• Regulation and institutions: Establishes mandatory, industry-specific SIH requirements for flat glass, including compliance and verification mechanisms administered by the Ministry of Industry. • Financing and incentives: Supports companies through potential recognition, facilitation, and incentives for businesses that obtain SIH certification. • Infrastructure and data: Requires production documentation, material flow mapping, and monitoring of energy and resource efficiency. • Communication, education, and awareness: Promotes information-sharing, guidance, and industry training on compliance and good practices. • Actions and initiatives: Requires environmental management, resource efficiency, and continual improvement in flat glass production.	R1 (Rethink): Optimise raw and auxiliary material use to reduce costs and environmental impacts. R2 (Reduce): Minimise the use of virgin materials and the generation of non-hazardous waste. R3 (Reuse): Reuse 100% of packaging and ensure that at least 50% of production waste is recycled. R8 (Recycle): Use at least 15% recycled raw materials, ensure all packaging is recyclable, and recycle at least 50% of waste.	Around two companies are in the process of obtaining SIH certification from the Ministry of Industry, indicating early but growing adoption in the sector.
Ministry Regulation (Permen)	**Minister of Environment and Forestry Regulation No. 9 of 2024 on the Management of Waste Containing Hazardous and Toxic Substances and Hazardous and Toxic Waste**	**The appendix lists packaging waste containing hazardous and toxic substances or classified as hazardous and toxic waste that is relevant to construction, including:** • Used paint containers • Used thinner containers • Used wood cleaner containers	• Regulation and institutions: Ministers, governors, and regents or mayors are required to provide FPSS facilities within their respective areas of authority. They may work with licensed business entities to provide these facilities. • Infrastructure and data: Provides an application form for registering TPSSS-B3 facilities. • Communication, education, and awareness: Provides guidance on managing FPSS and TPSSS-B3 facilities. • Actions and initiatives: Waste records must be reported at least once a year. FPSS reports are submitted through the National Waste Management Information System. TPSSS-B3 reports are submitted to the head of the regional agency responsible for waste management, which then enters the data into the national system.	R0 (Refuse): Choose products with environmentally friendly chemical labels. R1 (Rethink): Choose products with clear instructions for use, storage, and post-use management. R8 (Recycle): Choose recyclable goods and products, and process waste into raw materials or useful products.	Reject conventional paint with a strong odour and use paint free of volatile organic compounds (VOCs). Many paint brands have received Green Label Indonesia (GLI) certification.

The construction stage includes procurement and construction activities. Circular economy principles are applied by improving resource efficiency and reducing waste. R1 (Rethink) can be applied through Life Cycle Costing (LCC) in sustainable construction procurement, while R2 (Reduce) involves using materials, energy, and water efficiently and optimising design and construction methods. R3 (Reuse), R8 (Recycle), and R9 (Recover) involve reusing materials, using recycled materials, and recovering materials and energy from construction waste.

At the maintenance stage, circular economy principles help extend building life, maintain asset functionality, and reduce demand for new resources. R1 (Rethink) and R2 (Reduce) involve optimising the use of space and building components and reducing the environmental impacts of maintenance. R3 (Reuse), R4 (Repair), and R5 (Refurbish) involve reusing, repairing, and renovating building components. R7 (Repurpose) supports adapting the function of spaces and buildings without resource-intensive new construction.

At the demolition stage, circular economy principles aim to minimise waste and maximise the recovery of value from building materials and components. R1 (Rethink) and R2 (Reduce) involve retaining usable components and reducing demolition waste. R3 (Reuse) supports the reuse of building materials and components, R8 (Recycle) covers the recycling of demolition waste, and R9 (Recover) involves recovering materials or residual value from waste that cannot be reused.

Indonesia's regulatory framework provides a foundation for developing a circular economy in the construction sector. Regulations such as Minister of Public Works and Housing Regulation No. 18 of 2021 on Building Demolition, Minister of Public Works and Housing Regulation No. 9 of 2021 on Sustainable Construction, Minister of Public Works and Housing Regulation No. 21 of 2021 on Green Building Performance Assessment, and Government Regulation No. 27 of 2020 on Specific Waste Management incorporate principles aligned with the circular economy. They promote construction and demolition waste management, resource efficiency, the use of environmentally friendly materials, and sustainable construction practices throughout the building life cycle.

From the perspective of development actors, including building owners, contractors, and project implementers, existing regulations require construction waste management and the application of sustainability principles throughout project activities. These obligations include preparing construction and demolition plans that reduce waste, applying the 3R principles including recovery, using environmentally friendly materials, and monitoring and managing environmental impacts.

Central and local governments, including environmental and public works agencies, are responsible for managing specific waste, including construction and demolition waste. They are also responsible for reporting and monitoring, in coordination with development actors and relevant ministries and agencies.

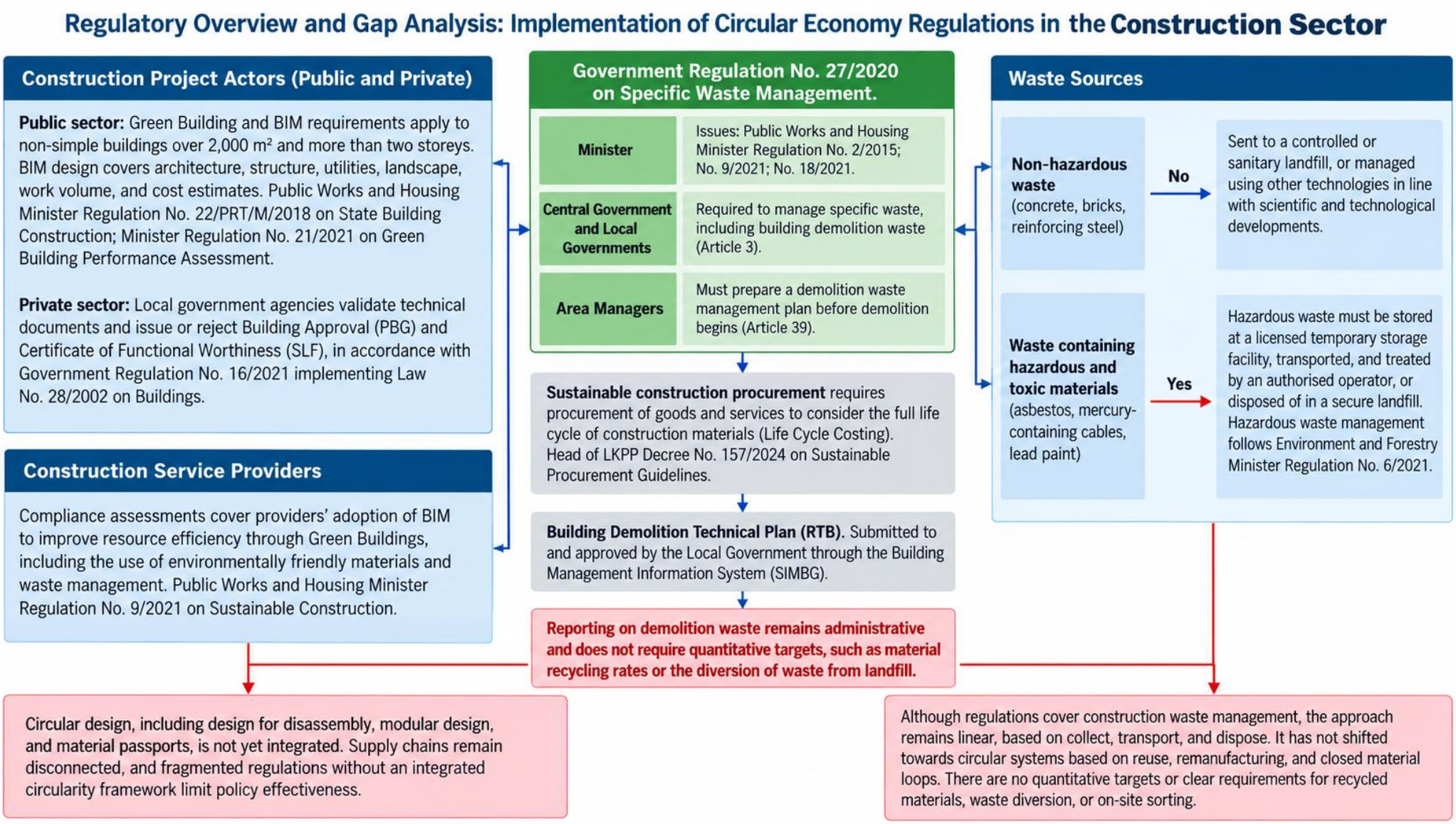


Figure 10 Overview and Gap Analysis of Circular Economy Regulations in Indonesia's Construction Sector

Despite the availability of various regulatory instruments, major gaps remain in the implementation of the circular economy in Indonesia's construction sector. An integrated circular system has yet to be established across the value chain.

Existing regulations focus on project implementation and waste management, with a continued emphasis on meeting administrative requirements. They do not yet fully support a comprehensive, integrated circular economy that prioritises material recirculation, closed-loop resource flows, and life cycle optimisation. As a result, regulations remain oriented towards a "collect, transport, and dispose" approach. Requirements for material reuse, remanufacturing, refurbishment, and material circulation within closed-loop systems remain limited.

Public procurement systems also lack quantitative targets and circularity indicators, such as recycling rates, targets for diverting waste from final disposal sites, minimum recycled content requirements, and mandatory on-site waste sorting. Although sustainable procurement principles have begun to be incorporated, implementation is not yet fully directed towards measurable circular economy outcomes.

Important circular design approaches, such as design for disassembly, modular construction systems, and material passports, are also not widely reflected in existing regulations. In addition, the construction supply chain remains fragmented, with limited connections between waste generators, recyclers, material suppliers, and end users of recycled materials. Although Green Industry Standards (SIH) have been established for some construction materials, including steel, iron, cement, glass, and ceramics, incentives for their adoption remain inadequate. The supply of other circular materials is also too limited to meet broader construction demand.

Binding mandates remain limited to government projects, mainly through Building Information Modelling (BIM) and sustainable procurement, and to large buildings subject to Green Building requirements. Most construction activities, including renovation, routine demolition, and small and medium-sized private projects, are not covered. Implementation in the private sector also depends on the capacity of local governments to administer permits and conduct oversight.



2.3 Circular Economy in the Electronics Sector

Regulatory mapping indicates that Indonesia's electronics sector is supported by a relatively comprehensive legal framework, ranging from national laws to regional regulations.

Table 3 Hierarchy of Indonesia's Legal Framework for the Electronics Sector

Level of the Indonesian Legal Framework	Number
Laws	5
Government Regulations	4
Presidential Regulations	1
Ministerial Regulations	8
Regional Regulations	17

At the national level, the regulatory framework for developing a circular economy includes Law No. 18 of

2008 on Waste Management, Law No. 32 of 2009 on Environmental Protection and Management, Government Regulation No. 27 of 2020 on Specific Waste Management, and Minister of Environment and Forestry Regulation No. 75 of 2019 on Extended Producer Responsibility. The latter also relates to the circular economy but does not address the electronics sector. The National Medium-Term Development Plan (RPJMN) 2025–2029 has also begun to incorporate circular economy issues into the national sustainable development agenda. However, the analysis shows that circular economy implementation in the electronics sector still faces several challenges.

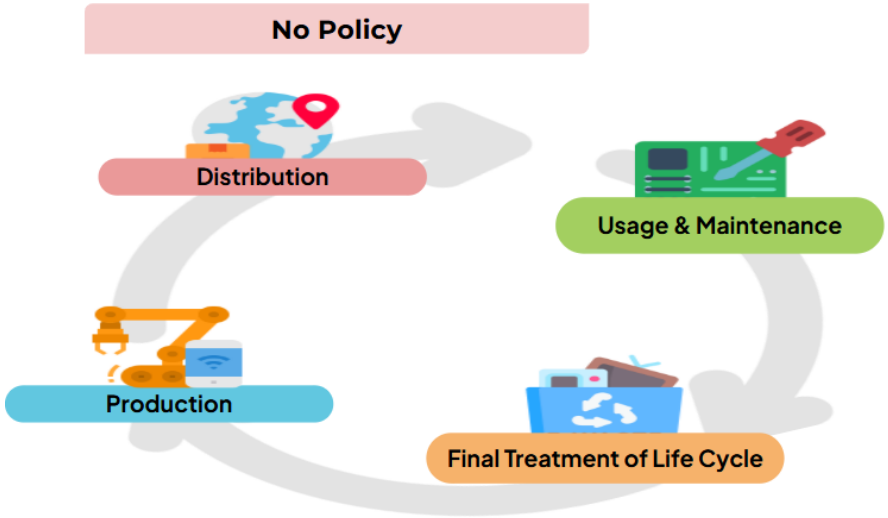
Existing regulations generally focus on waste management in general and hazardous and toxic waste (B3 waste). Regulations specifically covering electronic waste (e-waste) and circular value chains in the electronics sector remain limited. Policies on sustainable product design, take-back systems, electronics recycling standards, recycled material use, and post-consumer product recovery obligations have yet to be fully integrated into a single national policy framework.

Implementation readiness also varies across regions. Several regions, including Jakarta, Bandung City, Bali, and Denpasar City, have introduced waste management regulations that provide some support for e-waste management. However, most regional regulations focus on household waste management and plastic waste reduction. They do not specifically address e-waste management or circular economy practices in the electronics sector.

Implementation challenges also concern institutional arrangements, enforcement, recycling infrastructure, data integration, and coordination among ministries and government agencies. E-waste management is currently spread across several policy areas, including environmental management, industry, trade, and local government. Stronger policy harmonisation is therefore needed.

POLICY SUMMARY

Integration of the 9R Circular Economy Principles (R0–R9) in the Electronics Sector



R0: Avoid or substitute the use of hazardous and toxic materials (B3) and unnecessary components[5,4]
R1: Design products in accordance with applicable standards and energy-efficiency requirements[7]
R2: Minimise the use of materials and energy
R7: Reuse domestic components and secondary production products[5,4,8]
R8: Recycle production waste[5,4], and use recycled outputs as domestic raw materials[8]
R9: Recovering energy/materials from production waste[5,4]

R3: Enable reuse through resale and redistribution
R4: Provide after-sales services[1], including repair services and domestically available spare parts[8] to extend product lifespan
R5: Refurbish products to extend their useful life[1]
R6: Remanufacture products using recovered components[1]
R7: Repurpose products for alternative uses[5,4]

R8: Recycle through licensed electronic waste and hazardous and toxic waste treatment facilities[3,5,4,6] The informal sector may participate in waste collection, but not in dismantling or further processing.
R9: Recover valuable materials and energy from waste[2,1,4,6]

Regulations:
1. Law No. 8/1999: Consumer Protection
2. Government Regulation No. 81/2012: Management of Household Waste and Waste Similar to Household Waste
3. Government Regulation No. 27/2020: Management of Specific Waste
4. Government Regulation No. 22/2021: Environmental Protection and Management
5. Ministry of Environment and Forestry Regulation No. 6/2021: Procedures for Hazardous and Toxic Waste Management
6. Ministry of Environment and Forestry Regulation No. 9/2024: Management of Hazardous and Toxic Waste
7. Ministry of Industry Regulation No. 7/2025: Mandatory Application of SNI for Household Electronics
8. Ministry of Industry Regulation No. 35/2025: Provisions and Procedures for Certification of Domestic Component Level and Company Benefit Weight

Figure 11 Product Life Cycle Stages in Indonesia's Electronics Sector Based on the 9R Principles

Table 4 Consolidated Overview of Circular Economy Implementation and Existing Policies in the Electronics Sector

Hierarchy	Regulation	Relevant Provisions (Articles, Summary)	Policy Support	Alignment with Circular Economy 9R Principles	Examples of Circular Economy 9R Principle Implementation in Indonesia (Electronic Sector)
Indonesia's Law	**Law No. 8 of 1999 on Consumer Protection**	Article 4: Consumers have the right to comfort, security, safety, accurate information, and compensation for losses. Article 7: Businesses must provide accurate information, ensure product quality, and provide after-sales services. Article 8: Businesses are prohibited from trading goods that fail to meet standards or do not match their stated condition.	• Regulation and institutions: Protects consumers' rights to product safety and quality, accurate information, and after-sales services. • Financing and incentives: Encourages warranties and repair services to strengthen consumer confidence. • Infrastructure and data: Supports the development of repair service networks and product information systems. • Communication, education, and awareness: Promotes transparent information about product condition, quality, and warranties. • Actions and initiatives: Supports the development of safe and reliable markets for repaired, refurbished, and remanufactured products.	R4 (Repair): Extend product life through repair services. R5 (Refurbish): Recondition used products for reuse in accordance with defined quality standards. R6 (Remanufacture): Recover and recondition components and products to meet quality and safety standards.	• Sale of refurbished laptops and smartphones with warranties (R5). • Official service centre networks that provide repairs and component replacement (R4). • Reconditioning electronic devices for reuse by institutions or businesses (R6).
Government Regulation	**Government Regulation No. 27 of 2020 on Specific Waste Management**	Regulates "specific waste," including items requiring special handling. It prioritises waste reduction, reuse, and recycling before disposal, and requires dedicated collection and handling for large or complex items, including large electronic devices.	• Regulation and institutions: Provides a legal basis for managing specific waste that requires special handling, including large and complex waste streams. It establishes a priority order of reduction, reuse, recycling, and recovery before disposal. • Financing and incentives: Allows the government and operators to share the costs of specific waste management. Funding responsibilities are largely assigned to local governments and licensed service providers. • Infrastructure and data: Requires licensed facilities and dedicated handling and processing for specific waste streams, including dismantling and material recovery from large electronic equipment. • Communication, education, and awareness: Supports public information and institutional awareness of waste categories and the special handling required for complex waste streams. • Actions and initiatives: Establishes circular pathways for specific waste by requiring sorting, controlled dismantling, and recovery before final disposal. This enables reuse and recycling options for large electronic products.	R3 (Reuse): Reuse pathways are permitted. R8 (Recycle): Recycling is prioritised. R9 (Recover): Recovery is permitted as the final stage.	• Sorting and dismantling large electronic equipment, such as televisions and refrigerators, at licensed facilities (R3). • Recovering copper, aluminium, and plastics from large electronic equipment (R8). • Recovering metals and materials from CRT and LED units (R9).
Government Regulation	**Government Regulation No. 22 of 2021 on Environmental Protection and Management**	Covers hazardous and non-hazardous waste, including e-waste. Articles 80–92 set out procedures for the recovery, recycling, and utilisation of hazardous waste. They prioritise recovery, recycling, and utilisation before final disposal, following the sequence of utilisation, processing, and landfilling.	• Regulation and institutions: Consolidates environmental management requirements for hazardous and non-hazardous waste. It sets out procedures for utilisation, recycling, recovery, and final disposal, prioritising these options before landfilling. • Financing and incentives: Strengthens the polluter-pays principle by requiring waste generators to fund hazardous and non-hazardous waste management, supporting sustainable financing for environmental performance. • Infrastructure and data: Requires licensed facilities, technical standards, monitoring systems, and reporting mechanisms for waste utilisation, recycling, and recovery. These requirements strengthen traceability and regulatory oversight of formal e-waste processing. • Communication, education, and awareness: Promotes transparency and accountability through waste management reporting, public access to information, and reporting obligations for waste management activities. • Actions and initiatives: Formalises controlled waste utilisation, remanufacturing, repurposing, recycling, and recovery of e-waste components under environmental safeguards.	R2 (Reduce): Requires pollution prevention. R3 (Reuse): Allows controlled reuse of hazardous waste. R6 (Remanufacture): Supports cartridge remanufacturing. R7 (Repurpose): Allows components to be safely repurposed. R8 (Recycle): Prioritises recycling. R9 (Recover): Enables energy and material recovery.	• Formal dismantling of e-waste as part of hazardous waste management (R8). • Recovery of metals from printed circuit boards (PCBs), including gold, silver, and palladium, at licensed hazardous waste facilities (R9). • Reuse of electronic components classified as non-hazardous waste (R3). • Reuse of printer cartridges through regulated hazardous waste utilisation (R6).
Government Regulation	**Government Regulation No. 81 of 2012 on the Management of Household Waste and Household-Like Waste**	Articles 10–19: Waste reduction through the 3R approach, meaning reduce, reuse, and recycle. Articles 20–28: Waste management, including sorting, collection, transport, processing, and final processing.	• Regulation and institutions: Establishes the roles and responsibilities of central and local governments in household waste management, including 3R measures and waste handling systems. • Financing and incentives: Encourages public funding through the APBN and APBD, as well as cost-sharing mechanisms for waste services. It also allows incentives for community-based 3R initiatives. • Infrastructure and data: Requires waste management infrastructure, including sorting facilities, collection systems, temporary storage facilities (TPS), and final processing facilities (TPA), supported by local reporting systems. • Communication, education, and awareness: Encourages public participation through education, outreach, and awareness-raising on proper waste reduction and management. • Actions and initiatives: Implements 3R practices through community-based systems, such as TPS 3R facilities, source separation, and local waste management programmes.	R2 (Reduce): Limit waste generation. R3 (Reuse): Encourage reuse. R8 (Recycle): Establish recycling systems.	• Some TPS 3R facilities handle small amounts of e-waste (R3, R8). • Source separation can enable reuse and recycling (R2, R3).

Hierarchy	Regulation	Relevant Provisions (Articles, Summary)	Policy Support	Alignment with Circular Economy 9R Principles	Examples of Circular Economy 9R Principle Implementation in Indonesia (Electronic Sector)
Ministry Regulation	**Minister of Environment and Forestry Regulation No. 6 of 2021 on Procedures and Requirements for Hazardous and Toxic Waste Management**	Sets out procedures and requirements for managing hazardous waste, including reduction, storage, collection, transport, utilisation, processing, and disposal.	• Regulation and institutions: Establishes detailed technical and administrative requirements across the hazardous waste life cycle, from reduction and storage through collection, transport, utilisation, processing, and disposal. It clarifies the oversight roles of operators and environmental authorities and assigns responsibilities. • Financing and incentives: Applies the polluter-pays principle by requiring hazardous waste generators to cover management costs, supporting sustainable financing for hazardous waste management. • Infrastructure and data: Requires licensed facilities, standardised storage, documentation and traceability systems, technical training, and transport procedures to ensure safe and controlled hazardous waste management. • Communication, education, and awareness: Requires operator training, technical guidance, and information-sharing on safe hazardous waste handling. • Actions and initiatives: Enables circular economy practices through strictly regulated hazardous waste utilisation, material substitution, energy recovery, and material recovery under environmental safeguards.	R0 (Refuse): Substitute hazardous materials with non-hazardous alternatives. R1 (Rethink): Chemical use requires approval. R3 (Reuse): Enable safe remanufacturing. R8 (Recycle) and R9 (Recover): Use hazardous waste as an alternative source of energy and raw materials.	• Licensed hazardous waste collection operators, including e-waste operators (R1). • E-waste collection initiatives at running events (R2). • Samsung take-back programmes and new products incorporating recovered materials (R2, R6, R8).
Ministry Regulation	**Minister of Environment and Forestry Regulation No. 9 of 2024 on the Management of Waste Containing Hazardous and Toxic Substances and Hazardous and Toxic Waste**	Article 3: Requires hazardous waste reduction and management. Articles 5–7: Requires hazardous waste reduction through restrictions, recycling, and reuse. Articles 9–17: Covers sorting, collection, transport, processing, and disposal. Appendix 2: Sets out hazardous waste management arrangements through FPSS and TPSS B3 facilities.	• Regulation and institutions: Establishes detailed standards and obligations for hazardous waste management, including restrictions, reuse, recycling, sorting, collection, transport, processing, and disposal, supported by government oversight and enforcement. • Financing and incentives: Requires businesses to bear hazardous waste management costs and provides financing mechanisms to support management and compliance. • Infrastructure and data: Requires collection points, sorting facilities, temporary storage locations, standardised hazardous waste management procedures, and reporting systems. • Communication, education, and awareness: Requires outreach, education, and community engagement to raise awareness of hazardous waste risks and proper management practices. • Actions and initiatives: Enables circular economy pathways for hazardous waste reduction, reuse, recycling, and recovery under strict controls and structured redistribution mechanisms.	R2 (Reduce): Limit waste generation. R3 (Reuse): Allow the recovery and reuse of some components. R8 (Recycle): Support recycling efforts.	• Jakarta has 14 collection points for city- and district-level e-waste management (R2). • Digital monitoring initiatives for e-waste management (R2). • E-waste recycling operations in the Bekasi area (R8). • Electronics manufacturing (R0). • Resale of used electronics through gold auctions (R3).
Ministry Regulation	**Minister of Industry Regulation No. 7 of 2025 on the Mandatory Application of Indonesian National Standards for Household Electronics**	Requires household electronics to comply with Indonesian National Standards (SNI) during import, production, and/or distribution.	• Regulation and institutions: Requires SNI compliance for household electronics throughout the supply chain, with oversight and certification by the authorised authorities. • Financing and incentives: Requires producers and importers to cover SNI certification and compliance costs, supporting product quality standards. • Infrastructure and data: Establishes testing, certification, and labelling procedures, as well as reporting and monitoring systems for compliance of electronic products on the market. • Communication, education, and awareness: Promotes transparency and consumer awareness through SNI labels on household electronics. • Actions and initiatives: Applies circular economy principles by enforcing minimum product quality and safety standards, extending product life and reducing premature e-waste.	R0 (Refuse), R1 (Rethink), and R2 (Reduce): Support the production and distribution of SNI-certified electronic products.	SNI labels on household appliances such as refrigerators, irons, and washing machines (R0).
Ministry Regulation	**Minister of Industry Regulation No. 35 of 2025 on Procedures for Certifying Domestic Component Levels and Company Benefit Weights**	Regulates the calculation, verification, and certification of the Domestic Component Level (TKDN) for industrial goods and services, as well as the assessment of Company Benefit Weight (BMP). The regulation is an instrument for increasing the use of domestic raw materials, components, labour, technology, and industrial capabilities.	• Regulation and institutions: Establishes procedures for calculating, verifying, and issuing certificates, as well as oversight and sanctions related to TKDN and BMP. It also sets certification requirements through verification bodies and provides a dedicated mechanism for small industries. • Financing and incentives: Gives companies that use domestic components, invest, employ local workers, and conduct research and development in Indonesia added value and market opportunities. TKDN certification also supports access for domestic products in government procurement. • Infrastructure and data: Encourages documentation of the origin of raw materials and components, production processes, labour, and production costs as a basis for TKDN calculation and verification. Certification information and TKDN values are managed through the national industrial information system. • Communication, education, and awareness: Increases transparency about local content through TKDN values and certificates, and informs government, businesses, and product users about domestic production capacity. • Actions and initiatives: Supports domestic supply chains and local manufacturing capacity. In the context of the circular economy, the policy could help encourage the production of electronics using local components, ensure spare parts are available, and build domestic repair and after-sales service capacity.	R7 (Repurpose): Recognises domestic components and secondary products used as inputs in manufacturing. They may count towards TKDN if they meet domestic origin and verification requirements. R4 (Repair): Strengthens domestic spare parts supply chains, repair capacity, and after-sales services.	Reusing domestic electronic components or secondary products from manufacturing as inputs in new electronic products, subject to domestic origin and verification requirements

Circular economy principles in Indonesia's electronics sector can be applied throughout the product life cycle: production, distribution, use and maintenance, and end-of-life management. The approach adopts the 9R principles (R0–R9), which emphasise resource efficiency, longer product life, and material recovery to reduce waste generation and environmental impacts. Seven regulations closely related to the electronics product life cycle were identified:

- Government Regulation No. 27 of 2020 on Specific Waste Management.
- Government Regulation No. 81 of 2012 on the Management of Household Waste and Household-Like Waste.
- Minister of Environment and Forestry Regulation No. 6 of 2021 on Procedures for Hazardous and Toxic Waste Management.
- Minister of Industry Regulation No. 7 of 2025 on the Mandatory Application of SNI for Household Electronics.
- Law No. 8 of 1999 on Consumer Protection.
- Government Regulation No. 22 of 2021 on Environmental Protection and Management.
- Minister of Environment and Forestry Regulation No. 9 of 2024 on the Management of Waste Containing Hazardous and Toxic Substances and Hazardous and Toxic Waste.
- One additional regulation relevant to electronic products: Minister of Industry Regulation No. 35 of 2025 on Procedures for Certifying Domestic Component Levels and Company Benefit Weights.

These regulations incorporate some 9R principles into the production, use and maintenance, and end-of-life stages. No relevant regulations were identified for the distribution stage.

At the production stage, circular economy measures focus on reducing hazardous material use (R0), encouraging more efficient and standardised product design (R1), reducing raw material and energy consumption (R2), using components and secondary products (R7), recycling production waste (R8), and recovering energy and materials from production waste (R9). This indicates that circular practices are beginning to be integrated from the earliest stages of the electronics production chain. Regulations aligned with the 9R principles at this stage include Minister of Environment and Forestry Regulation No. 6 of 2021 and Government Regulation No. 22 of 2021, which support R0 and R7–R9; Minister of Industry Regulation No. 7 of 2025, which relates to R1; and Minister of Industry Regulation No. 35 of 2025, which relates to R7 and R8.

At the use and maintenance stage, circular economy measures aim to extend product life through reuse and redistribution (R3), after-sales services and repair (R4), refurbishment (R5), remanufacturing (R6), and repurposing products (R7). These principles aim to reduce e-waste by keeping product value in the economy for as long as possible. Relevant regulations include Minister of Environment and Forestry Regulation No. 6 of 2021, Law No. 8 of 1999, Government Regulation No. 22 of 2021, and Minister of Industry Regulation No. 35 of 2025.

At the end-of-life stage, the main focus is recycling (R8) and recovering valuable materials (R9). Regulations require e-waste to be managed at licensed hazardous waste facilities. In practice, however, the informal sector continues to play a major role in e-waste collection, and some collected waste is not managed adequately. This indicates that Indonesia's e-waste management system needs to be strengthened, particularly by formalising collection pathways, expanding advanced processing capacity, and making better use of recovered recycled materials. Relevant regulations generally address downstream management. The source identifies five regulations covering 9R principles at this stage: Government Regulation No. 27 of 2020, Government Regulation No. 81 of 2012, Minister of Environment and Forestry Regulation No. 6 of 2021, Minister of Industry Regulation No. 7 of 2025, Law No. 8 of 1999, Government Regulation No. 22 of 2021, and Minister of Environment and Forestry Regulation No. 9 of 2024.

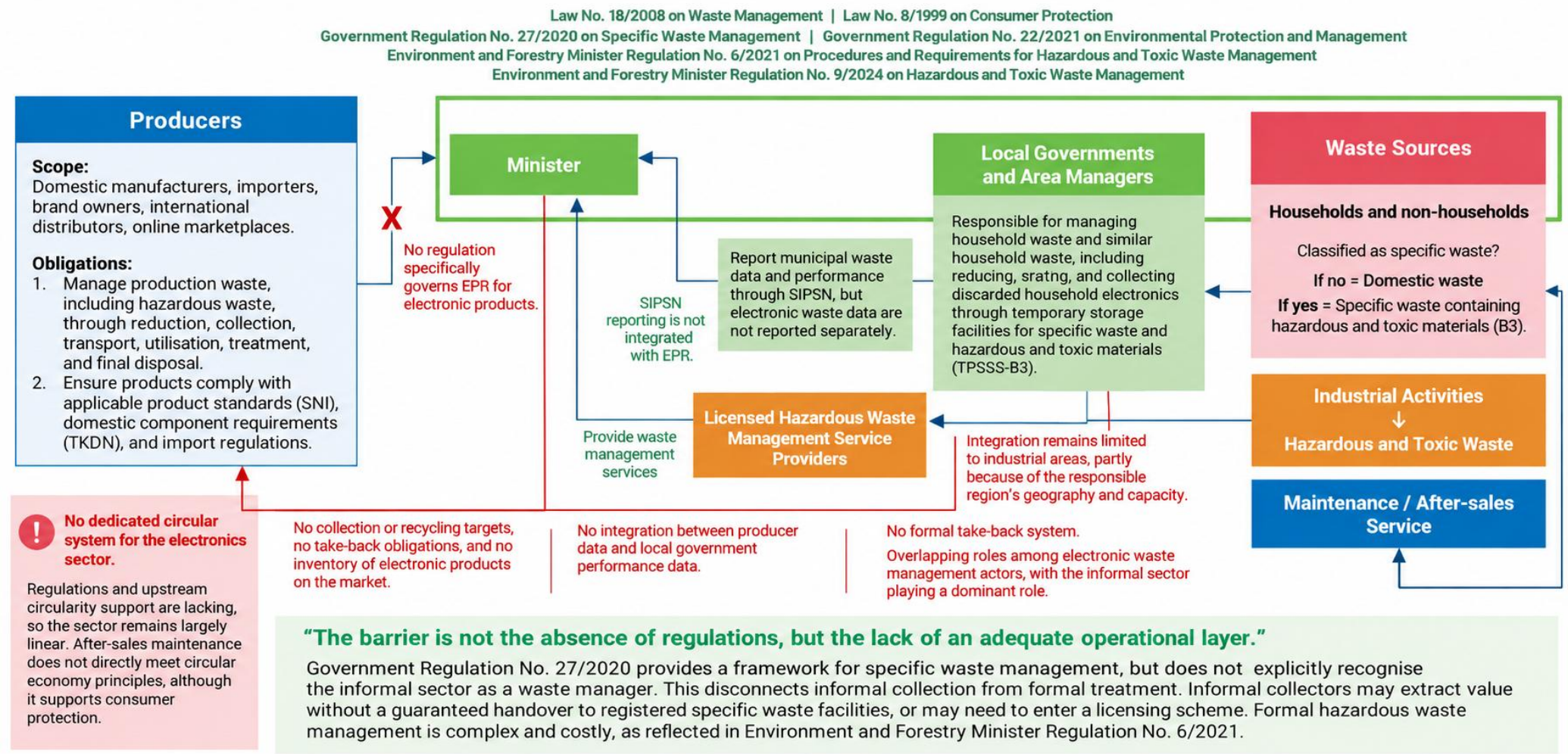


Figure 12 Overview and Gap Analysis of Circular Economy Regulations in Indonesia's Electronics Sector

Mapping of e-waste management pathways shows that Indonesia has several relevant regulations covering electronic products, waste management, environmental protection, hazardous waste management, and consumer protection. Producers must meet product standards[12], import requirements, and various environmental requirements. Local governments are also responsible for managing household and specific waste, while the central government collects waste management performance data through the National Waste Management Information System (SIPSN). However, these instruments operate separately and have yet to form an integrated e-waste management system from upstream to downstream.

There is no regulation that specifically requires the electronics sector to apply eco-design and Extended Producer Responsibility (EPR). Current producer obligations focus on meeting product standards and managing waste generated by business activities. They do not cover product take-back, post-consumer collection, or e-waste collection and recycling targets. Electronic product inventories are also not integrated for environmental responsibility purposes, and producers are not required to report the number of products placed on the market. This makes it difficult to estimate e-waste generation and assess management performance nationwide.

At the local level, local governments are responsible for managing household and specific waste containing hazardous substances, including e-waste from households and other sources. They must also report waste management performance through SIPSN. However, there is no mechanism linking local waste management data and results with producer responsibility.[13] As a result, local government e-waste collection systems are not integrated with EPR schemes or producer take-back systems.

At the national level, SIPSN monitors waste management performance at both local and national levels. However, it focuses on general waste data and does not include dedicated e-waste reporting or integration with EPR systems. In contrast, hazardous waste management, including collection and transport, is reported through SPEED, the Digital Reporting and Evaluation System managed by the Ministry of Environment. Minister of Environment and Forestry Regulation No. 6 of 2021 also requires hazardous waste to be transported by business-licensed carriers and documented through Festronik.

As a result, e-waste data remain spread across separate systems and are not connected. The available data therefore do not provide a complete picture of e-waste flows, collection and recycling rates, or the contributions of different stakeholders. The lack of integration between systems is a major gap in establishing e-waste traceability and measuring management performance and producer contributions under EPR.

A further gap concerns e-waste collection. There is no integrated formal collection system connecting producers, local governments, and licensed waste managers. Consequently, most e-waste continues to flow into the informal sector. Informal actors play an important role in collection, repair, reuse, and the recovery of economically valuable materials. However, residues and hazardous components are often processed further without meeting applicable environmental standards.[14]

Indonesia's regulatory framework also distinguishes between two categories of electronic waste: specific

[12] Law No. 3 of 2014 on Industry; Minister of Industry Regulation No. 7 of 2025 on the Mandatory Application of Indonesian National Standards (SNI) for Household Electronics; and Minister of Trade Regulation No. 21 of 2025 on the Policy and Regulation of Imports of Electronic and Telematics Goods.

[13] Ministry of Environment and Forestry of the Republic of Indonesia. (2024). National Waste Management Information System (SIPSN): Producer Portal.

[14] Mairizal, A. Q., Sembada, A. Y., Tse, K. M., & Rhamdhani, M. A. (2021). Electronic waste generation, economic values, distribution map, and possible recycling system in Indonesia. Journal of Cleaner Production, 293, 126096. https://doi.org/10.1016/j.jclepro.2021.126096 .

waste containing hazardous substances and hazardous waste. Household e-waste and similar waste are generally classified as specific waste and managed through the general waste system up to an intermediate facility. If the waste meets the criteria for hazardous waste, it must then be managed in accordance with hazardous waste requirements. Waste generated by electronics manufacturing processes is classified as hazardous waste and requires special permits. This distinction leaves a gap between management pathways, meaning that e-waste does not always have a clear route to an appropriate treatment facility.

The main challenge in e-waste management in Indonesia is therefore not simply the absence of regulations. The operational systems needed to connect all actors in the management chain are also missing. Key barriers include the lack of a dedicated circular system for the electronics sector, the absence of national e-waste collection and recycling targets, the lack of an integrated electronic product inventory, weak data integration between central and local governments, and the absence of formal mechanisms linking producers with local waste management systems. These gaps hinder the development of an effective and sustainable management system.

A more integrated transition system is therefore needed to link general waste management with the management of electronic waste classified as hazardous. This should include stronger formal collection schemes, the involvement of informal sector actors, and the development of more inclusive and sustainable e-waste management infrastructure.



03

Policy Recommendations

3.1 Circular Economy – Priority Sector
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3. Policy Recommendations

This chapter sets out policy recommendations to strengthen the implementation of the circular economy in Indonesia. They are based on the policy review and gap analysis of the five priority sectors identified in the National Circular Economy Roadmap and Action Plan 2025–2045, with a particular focus on construction and electronics.

The chapter has three sections: (1) general policy recommendations for advancing the circular economy across priority sectors; (2) recommendations for the construction sector, with good practice from the Netherlands as a reference; and (3) recommendations for the electronics sector, also supported by good practice from the Netherlands.

3.1 Circular Economy in Priority Sectors

(General Recommendations)

The policy review and gap analysis show that the main challenge to strengthening the circular economy in Indonesia is not the absence of regulations. Rather, policy mandates, institutional responsibilities, market readiness, implementation capacity, and enforcement mechanisms remain poorly integrated. The circular economy policy framework is largely in place through the National Long-Term Development Plan (RPJPN) 2025–2045 and is being implemented through the National Medium-Term Development Plan (RPJMN) 2025–2029. However, implementation remains administrative and project-based, and is not yet systematically connected to the support ecosystem needed to scale circular practices across the five priority sectors: food, retail, with a focus on plastic packaging, electronics, construction, and textiles.

In this context, the circular economy in priority sectors can be strengthened through four connected strategies that progressively build the support ecosystem for long-term implementation and enforcement.

Strategy 1. Establish Clear Mandates, Institutional Responsibilities, and Circular Economy Targets

Responsibility for implementing the circular economy is currently spread across ministries, agencies, and local governments, without integrated operational targets, coordination, or accountability. The first priority is to make better use of existing regulations, including Law No. 59/2024 on the RPJPN 2025–2045 and Presidential Regulation No. 12/2025 on the RPJMN 2025–2029, before developing new instruments. The main problem is fragmented implementation and unclear responsibilities between central and local government, rather than a lack of regulations.

Circular economy targets should be measurable and incorporated into Regional Medium-Term Development Plans (RPJMDs), ministry and agency strategic plans (Renstra K/L), and sectoral roadmaps. Indicators and reporting standards should be aligned across levels of government, drawing on Minister of National Development Planning Regulation No. 10/2023, Minister of Home Affairs Instruction No. 2/2025, the Circular Economy Roadmap 2025–2045, and ISO 59004:2024. This is necessary because existing targets remain focused mainly on downstream activities.

Responsibilities and inter-agency coordination also need to be clarified. This could include establishing a legally mandated national coordination team through a Presidential Decree or Presidential Regulation, as Indonesia does not yet have a national circular economy coordinator.

Strategy 1 Establish Clear Mandates, Institutional Responsibilities, and Circular Economy Targets

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
1.1	**Strengthen the implementation of existing circular economy regulations before introducing new policy instruments**	New circular economy regulations are not the immediate priority. The more pressing need is to clarify how existing regulations should be implemented within current governance arrangements, enabling implementation gaps to be clearly identified. **Gap to Address:** Responsibilities between central and local governments remain unclear, particularly in implementing the waste reduction roadmap under Minister of Environment and Forestry Regulation No. 75/2019. Under Article 18, reporting on producers' roadmaps should be integrated with local government monitoring. In practice, however, reports are submitted directly to the Ministry of Environment. **Supporting Policy Framework**: (1) Law No. 59/2024 on the National Long-Term Development Plan (RPJPN) 2025–2045, (2) Presidential Regulation No. 12/2025 on the National Medium-Term Development Plan (RPJMN) 2025–2029.				5. Ministry of Environment 6. Ministry of Public Works 7. Ministry of Industry 8. Ministry of Agriculture	• Coordinating Ministry for Economic Affairs • Coordinating Ministry for Food Affairs • Coordinating Ministry for Infrastructure and Regional Development • Ministry of Finance • Ministry of Trade • Ministry of National Development Planning/Bappenas • Ministry of Housing and Settlement Areas • Ministry of Tourism • National Food Agency • Local Governments
1.2	**Set measurable circular economy targets with clear accountability in regional development plans, ministerial and agency strategic plans, and sectoral roadmaps**	Develop standard circular economy indicators, supported by consistent measurement and reporting systems across levels of government, to inform planning and budgeting. **Gap to Address:** Indonesia's circular economy indicators cover the circular material input rate, resource efficiency, and the recycling rate. However, Regional Medium-Term Development Plans (RPJMD) still focus on the percentage of waste handled, placing greater emphasis on downstream waste management than on overall circular economy performance. **Supporting Policy and Standards Framework:** (1) Presidential Regulation No. 12/2025 on the National Medium-Term Development Plan (RPJMN) 2025–2029, (2) Minister of National Development Planning Regulation No. 10/2023 on Procedures for Preparing Ministerial and Agency Strategic Plans for 2025–2029, (3) Minister of Home Affairs Instruction No. 2/2025 on Guidelines for Preparing Regional Medium-Term Development Plans (RPJMD), (3) Circular Economy Roadmap and Action Plan 2025–2045, (4) ISO 59004:2024 on the circular economy.				5. Coordinating Ministry for Economic Affairs 6. Coordinating Ministry for Food Affairs 7. Coordinating Ministry for Infrastructure and Regional Development 8. Local Governments	• Ministry of National Development Planning/Bappenas • Ministry of Home Affairs • Ministry of Finance • Ministry of Administrative and Bureaucratic Reform • Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of Trade • Local Governments
1.3	**Clarify institutional responsibilities and coordination mechanisms among ministries, agencies, and local governments**	Clarify each institution's mandate, authority, and role in advancing the circular economy, and strengthen cross-sector coordination through effective institutional arrangements. **Gap to Address:** An integrated national team with a strong legal basis, such as a presidential regulation or decree, has yet to be established to coordinate circular economy efforts across sectors. At the local level, efforts also remain largely focused on downstream waste management and expanding service coverage. **Supporting Policy Framework:** (1) Law No. 59/2024 on the National Long-Term Development Plan (RPJPN) 2025–2045, (2) Presidential Regulation No. 12/2025 on the National Medium-Term Development Plan (RPJMN) 2025–2029, (3) Technical implementation is guided by applicable laws and regulations.				4. Coordinating Ministry for Economic Affairs 5. Coordinating Ministry for Food Affairs 6. Coordinating Ministry for Infrastructure and Regional Development	• Ministry of National Development Planning/Bappenas • Ministry of Home Affairs • Ministry of Finance • Ministry of Administrative and Bureaucratic Reform • Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of Trade • Local Governments

Strategy 2. Build an Economic and Market Ecosystem to Support Implementation and Scale Up Circular Practices

Circular business models continue to face high start-up costs, limited access to finance, uncertain market demand, and inadequate supporting infrastructure. These conditions make them less competitive than conventional alternatives.

Three main actions are needed. First, strengthen sustainable public procurement by incorporating circular standards and indicators into procurement systems, in line with Presidential Regulation No. 46/2025 and National Public Procurement Agency Regulation No. 12/2021. Second, improve access to finance for circular economy businesses through fiscal incentives and green financing. Existing schemes remain focused largely on the energy sector, while circular businesses often struggle to obtain credit, as reflected in Financial Services Authority Regulations No. 51/2017 and No. 18/2023. Third, strengthen collection, repair, and recycling infrastructure, as well as supply chains linking resource recovery to end-use industries, particularly outside Java, in line with Public Works and Housing Minister Regulation No. 03/2013, Environment and Forestry Minister Regulation No. 14/2021, and Government Regulation No. 22/2021.

Market-shaping instruments, such as recycled-content requirements and eco-modulated fees, should be introduced gradually in line with the readiness of the wider ecosystem.

Strategy 2 **Building Economic and Market Conditions to Adopt and Scale Circular Practices**

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
2.1	**Expand the production and supply of circular products and services through product standards, stronger industrial capacity, and production incentives**	Expand domestic production of circular products and services by defining circular product criteria, extending Green Industry Standards and ecolabels to priority sectors, and providing fiscal and non-fiscal incentives for industries, including small and medium-sized enterprises, recyclers, and reuse service providers. These measures should align with the Domestic Content (TKDN) and Company Benefit Weight (BMP) schemes to ensure that domestic circular products meet public procurement requirements. The objective is to ensure the availability of affordable, high-quality, and accessible environmentally friendly products across Indonesia before circularity requirements are introduced into procurement systems. **Gap to Address:** Environmentally friendly products remain limited and concentrated in certain sectors and regions, particularly Java. In the construction sector, for example, the Green Industry Standard currently covers only five materials: iron, steel, cement, ceramics, and glass. Circular product criteria, including recycled content, recyclability, and service life, have not yet been standardised across sectors. The cost and complexity of green industry, ecolabel, and TKDN certification also create barriers for small and medium-sized enterprises and recyclers. In addition, the quality and continuity of secondary raw material supplies remain uncertain. These conditions limit the availability and selection of circular products for procurement across Indonesia, particularly outside Java. **Supporting Policy Framework:** Law No. 3/2014 on Industry, particularly Articles 77–83 on green industry; Law No. 20/2014 on Standardisation and Conformity Assessment; Government Regulation No. 46/2017 on Environmental Economic Instruments; Minister of Environment Regulation No. 2/2014 on the Use of Ecolabel Logos; Minister of Industry Regulations No. 51/M-IND/PER/6/2015 on Guidelines for Preparing Green Industry Standards, No. 39/2018 on Green Industry Certification Procedures, and No. 35/2025 on the Certification Requirements and Procedures for Domestic Content and Company Benefit Weight; and Minister of Environment and Forestry Regulation No. 75/2019 on the Roadmap for Waste Reduction by Producers.					• National Standardization Agency (BSN) • National Accreditation Committee (KAN) • Ministry of Industry • Ministry of Environment/Environmental Control Agency • Ministry of Finance • Ministry of Home Affairs • Ministry of Trade
2.2	**Strengthen sustainable public procurement through standards, certification, and market instruments to create demand for circular products and services**	Integrate circular economy standards and indicators into the public procurement system, from needs planning and technical specifications to product labelling in the Electronic Catalogue and bid evaluation criteria. This integration should be supported by market instruments, including minimum requirements, incentives, and preferences for circular products, so that public spending can generate stable and predictable demand for the industries developed under Action Plan 2.1. **Gap to Address:** Public procurement remains largely linear, while environmental requirements and circularity indicators, such as recycled content, recyclability, and reuse services, are still applied on a limited basis. Products certified under ecolabel and green industry schemes				National Public Procurement Agency (LKPP)	• Financial Services Authority (OJK) • Ministry of Cooperatives and Small and Medium Enterprises • Ministry of Investment and Downstream Industry/Indone

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		also lack dedicated markers in the Electronic Catalogue and Online Store, making them difficult for procurement agencies to identify. **Supporting Policy Framework:** Government Regulation No. 46/2017 on Environmental Economic Instruments, particularly Articles 34 and 37; Presidential Regulation No. 46/2025 on Public Procurement of Goods and Services; Minister of Environment and Forestry Regulation No. P.5/MENLHK/SETJEN/KUM.1/2/2019 on Procedures for Applying Environmental Labels in the Procurement of Environmentally Friendly Goods and Services; and LKPP Regulation No. 12/2021 on Guidelines for Public Procurement through Suppliers.					sia Investment Coordinating Board (BKPM) • Ministry of National Development Planning/Bappenas • Ministry of Environment/Environmental Control Agency • Ministry of Industry • National Banking Sector • Non-Bank Financial Institutions
2.3	**Improve access to finance and financial support for circular economy businesses**	Expand access to finance through financial instruments that reflect the characteristics of circular business models. These instruments should include fiscal incentives, broader green financing, and investment and guarantee mechanisms that reduce risk and improve the attractiveness of circular economy investments. Support should cover businesses of different sizes, including small and medium-sized industries, recyclers, reuse service providers, and similar enterprises. **Gap to Address:** Existing fiscal incentives are not yet linked to circularity performance. For example, tax allowances under Government Regulation No. 78/2019 use criteria such as investment value, export orientation, and high employment generation. As a result, medium-sized recycling and reuse businesses may struggle to qualify despite their significant environmental contributions. Green financing also remains concentrated in the energy sector. Indonesia's Sustainable Finance Taxonomy, which began development in 2024, initially prioritised energy, while manufacturing, water supply, sanitation, and waste management are planned for later versions. Consequently, financial institutions lack technical criteria for classifying circular activities as green activities. Circular economy businesses also face limited access to credit because they are perceived as high risk. Their revenues depend on fluctuating secondary material prices, used materials generally cannot be used as collateral, and many downstream businesses do not have legal entity status and therefore cannot meet banking or People's Business Credit (KUR) requirements. **Supporting Policy Framework:** Law No. 32/2009 on Environmental Protection and Management; Law No. 4/2023 on Financial Sector Development and Strengthening; Government Regulations No. 46/2017 on Environmental Economic Instruments and No. 78/2019 on Income Tax Facilities for Investment in Certain Business Sectors and/or Regions; Minister of Finance Regulations No. 130/2020 on Corporate Income Tax Reduction Facilities and No. 153/2020 on Gross Income Deductions for Certain Research and Development Activities; Financial Services Authority Regulation No. 51/POJK.03/2017 on Sustainable Finance for Financial Institutions, Issuers, and Public Companies; and Financial Services Authority Regulation No. 18/2023 on the Issuance and Requirements of Sustainability-Based Debt Securities and Sukuk.				Ministry of Finance	• Ministry of Environment/Environmental Control Agency • Ministry of Trade • Local Governments
2.4	**Strengthen collection, repair, recycling, and material recovery infrastructure, together with supply chains and industry partnerships**	Develop and expand circular economy infrastructure for collection, sorting, reuse, repair, recycling, and material recovery. Establish connections between circular material supply chains, from their sources to industrial users, through partnerships and public-private cooperation. This approach should ensure reliable upstream supply and sufficient downstream demand so that the infrastructure can operate sustainably. **Gap to Address:** Waste management remains focused on downstream handling and is not yet integrated from waste sources to industrial users. Some community-based facilities, such as TPS3R, have been built without assured markets for their outputs or adequate operating budgets. Their utilisation therefore declines after external assistance ends. Circular material supply chains also continue to depend on informal collector networks without quality standards or supply contracts. Industrial users consequently struggle to obtain secondary raw materials with consistent specifications and volumes and may return to virgin materials. Waste management ecosystems remain limited outside Java because recycling industries are concentrated on the island. Materials must therefore be transported between islands, and logistics costs that exceed material value reduce the economic viability of collection, particularly in eastern Indonesia. **Supporting Policy Framework:** Law No. 18/2008 on Waste Management; Government Regulations No. 81/2012 on Household and Household-like Waste Management, No. 27/2020 on Specific Waste Management, and No. 22/2021 on Environmental Protection and Management; Presidential Regulations No. 38/2015 on Public-Private Cooperation in Infrastructure Provision and No. 97/2017 on the National Policy and Strategy for Household and Household-like Waste Management; Minister of Public Works Regulation No. 03/PRT/M/2013 on Waste Management Infrastructure and Facilities; and Minister of Environment and Forestry Regulations No. 75/2019 on the Roadmap for Waste Reduction by Producers and No. 14/2021 on Waste Management through Waste Banks.				5. Ministry of Public Works 6. Ministry of Agriculture 7. Ministry of Industry 8. Local Governments	
2.5	**Design pilot projects that can be replicated and scaled through**	Use pilot projects in priority sectors or regions to test approaches, develop technical guidance, and establish circular economy implementation mechanisms. These pilots should also provide a basis for				Ministry of National Development	

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
	standardised implementation frameworks, clear institutional responsibilities, and long-term plans	replication and scaling through capacity building and stakeholder coordination. Planning should identify the responsible ministry or agency from the outset, establish uniform indicators and monitoring protocols, and provide mechanisms for transferring funding from initial sources to central and local government budgets. **Gap to Address:** Pilot projects remain local, short term, and dependent on donor funding. Activities commonly end after one to three years without transferring management responsibilities to local governments, while national replication mechanisms remain undeveloped. Pilot outputs, such as operating procedures and training modules, often remain project reports because no responsible ministry or agency adopts them as official guidance. As a result, each region must redesign its own approach. The absence of standard technical guidance also creates differences in indicators and monitoring methods, making results difficult to compare or use as a basis for scaling. From a budgeting perspective, circular economy programmes do not yet have a dedicated nomenclature code under Minister of Home Affairs Regulation No. 90/2019. Local governments must integrate these activities into existing waste management or environmental programmes, making circular economy initiatives less visible in planning documents and more vulnerable to budget reductions during fiscal efficiency measures. **Supporting Policy Framework:** Law No. 25/2004 on the National Development Planning System; Law No. 23/2014 on Local Government; Law No. 59/2024 on the National Long-Term Development Plan 2025–2045; Government Regulation No. 12/2019 on Regional Financial Management; Presidential Regulations No. 97/2017 on the National Policy and Strategy for Household and Household-like Waste Management and No. 12/2025 on the National Medium-Term Development Plan 2025–2029; and Minister of Home Affairs Regulation No. 90/2019 on the Classification, Coding, and Nomenclature of Regional Development Planning and Finance.				Planning/Bappenas	

Strategy 3. Develop Integrated Monitoring, Evaluation, and Enforcement Mechanisms

Circular economy reporting remains fragmented, indicators are not standardised, and monitoring focuses on administrative compliance rather than circular economy outcomes.

The first step is to integrate reporting systems and databases from ministries, agencies, and local governments into a single interoperable national platform. Relevant regulations include Presidential Regulations No. 29/2014, No. 39/2019, and No. 95/2018, as well as Minister for Administrative and Bureaucratic Reform Regulation No. 53/2014 and Minister of Home Affairs Regulation No. 70/2019.

The second step is to introduce compliance measures gradually through performance-based incentives and disincentives, in line with Law No. 32/2009 and Government Regulation No. 5/2021. These measures should be applied once the support ecosystem and implementation capacity are in place. Enforcement introduced too early could create resistance and economic burdens without delivering meaningful improvements in circularity.

Strategy 3 **Developing Integrated Monitoring, Evaluation, and Enforcement Mechanisms**

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
3.1	**Integrate circular economy reporting and monitoring into a single national platform**	Integrate existing circular economy reporting systems and databases from ministries, agencies, and local governments into a single national platform. The platform should collect, monitor, and evaluate circular economy performance through an integrated and interoperable system, supported by designated data custodians, data supervisors, and consistent indicator definitions across sectors. **Gap to Address:** Indonesia does not yet have an integrated national platform that consolidates circular economy data. As a result, data exchange and use remain limited. Data are distributed across systems with different owners, definitions, and reporting periods, including SIPSN for waste generation and waste management facilities, SIMBA for waste banks, producer reporting under Minister of Environment and Forestry Regulation No. 75/2019, SIINas for industrial data, and SIPD for regional planning and financial data.				1. Coordinating Ministry for Economic Affairs 2. Coordinating Ministry for Food Affairs 3. Coordinating Ministry for Infrastructure and Regional Development	• Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of Home Affairs • Ministry of National Development Planning/Bappenas • Coordinating Ministry for Digital Affairs

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		The legal basis for data integration already exists. Government Regulation No. 81/2012 requires waste management information to be connected through a single platform, while Minister of Environment and Forestry Regulation No. 6/2022 provides a basis for interoperability with SIPSN. However, indicator definitions remain inconsistent. Available data generally measure the proportion of waste managed, whereas circularity measurement requires systematic data on recycled content, reuse rates, and material flows between sectors. Circular economy data have also not yet been designated as priority data under the One Data Indonesia framework. Consequently, data custodians and data supervisors have not been formally appointed. **Supporting Policy Framework:** Law No. 14/2008 on Public Information Disclosure; Law No. 18/2008 on Waste Management; Law No. 27/2022 on Personal Data Protection; Government Regulation No. 81/2012 on Household and Household-like Waste Management, particularly Article 34(3); Government Regulation No. 71/2019 on the Operation of Electronic Systems and Transactions; Presidential Regulation No. 29/2014 on the Government Agency Performance Accountability System; Presidential Regulation No. 95/2018 on Electronic-Based Government; Presidential Regulation No. 39/2019 on One Data Indonesia; Presidential Regulation No. 132/2022 on the National Electronic-Based Government Architecture; Minister of Administrative and Bureaucratic Reform Regulation No. 53/2014 on Technical Guidelines for Performance Agreements, Performance Reporting, and the Review of Government Agency Performance Reports; Minister of Environment and Forestry Regulation No. 75/2019 on the Roadmap for Waste Reduction by Producers; Minister of Home Affairs Regulation No. 70/2019 on the Regional Government Information System; and Minister of Environment and Forestry Regulation No. 6/2022 on the National Waste Management Information System.					• Ministry of Public Works • Ministry of Housing and Settlement Areas • Local Governments
3.2	**Phase in compliance measures through incentives and disincentives once the circular economy ecosystem is ready**	Introduce performance-based incentives and disincentives gradually once the supporting circular economy ecosystem meets defined readiness benchmarks. The initial phase should prioritise incentives and performance recognition, followed by disincentives and administrative sanctions once adequate circular infrastructure, products, and services are available. The Corporate Environmental Performance Rating Programme (PROPER) can serve as an initial framework, with circularity indicators progressively expanded from the beyond-compliance level to basic compliance requirements. **Gap to Address:** Green regulatory obligations and targets are not yet supported by evenly distributed infrastructure. For example, Minister of Environment and Forestry Regulation No. 75/2019 sets a target for producers to reduce waste by up to 30% by 2029. However, limited collection and recycling facilities, particularly outside Java, make compliance difficult and may result in geographic limitations being treated as grounds for enforcement. A similar challenge affects source separation. Where separate collection and transport services are unavailable, separated waste is mixed again, reducing public confidence. PROPER already includes circular economy aspects under its Green and Gold ratings, such as resource efficiency, waste utilisation, Life Cycle Assessment, and eco-innovation. However, it does not yet cover basic compliance or actors such as small and medium-sized industries, recyclers, and reuse service providers. Its indicators also do not cover value-chain circularity, including recycled content, recyclability, and repairability. As a result, PROPER cannot yet serve as a national circularity indicator or a basis for fiscal incentives. At the local level, the incentive and disincentive mandates under Law No. 18/2008 and Government Regulation No. 46/2017 have also seen limited implementation, including through service charges based on the polluter pays principle. **Supporting Policy Framework:** Law No. 18/2008 on Waste Management, particularly Article 21 on incentives and disincentives; Law No. 32/2009 on Environmental Protection and Management, particularly Articles 42 and 43 on economic instruments and Articles 76–83 on administrative sanctions; Government Regulation No. 81/2012 on Household and Household-like Waste Management; Government Regulation No. 46/2017 on Environmental Economic Instruments; Government Regulation No. 5/2021 on Risk-Based Business Licensing; Government Regulation No. 22/2021 on Environmental Protection and Management; Minister of Environment and Forestry Regulation No. 75/2019 on the Roadmap for Waste Reduction by Producers; and Minister of Environment and Forestry Regulation No. 1/2021 on the Corporate Environmental Performance Rating Programme.				Ministry of Environment	• Ministry of Home Affairs • Ministry of Industry • Ministry of Public Works • Ministry of Housing and Settlement Areas • Indonesian National Police • Attorney General's Office of the Republic of Indonesia • Local Governments

3.2 Circular Economy in the Construction Sector

As with the broader implementation of the circular economy, the main challenge to advancing circular construction in Indonesia is not the lack of regulations. It is the limited integration and operationalisation of existing policies across the building life cycle. Indonesia has a relatively broad regulatory framework covering waste management, green buildings, sustainable construction, environmental protection, and industrial standards. However, the framework remains fragmented and tends to focus on environmental compliance and waste management. It does not yet fully support the development of a circular built environment.

Circularity is not yet sufficiently integrated into building design, material selection, procurement systems, demolition practices, or material recovery mechanisms. As a result, material traceability remains limited, and systems for managing construction and demolition (C&D) waste remain fragmented.

Based on the policy review and gap analysis, circular construction in Indonesia can be strengthened through three connected strategies.

Strategy 1. Putting Existing Policy and Market Instruments into Practice for Circular Construction

The first strategy is to integrate circular construction requirements into public and private projects through existing building regulations. It also calls for circular economy criteria to be included in public procurement from the planning stage, including in contracts, Bills of Quantity (BoQs), and material documentation. This would help track material sources, recycling potential, reuse, and recovery throughout the project life cycle.

At present, life-cycle approaches remain limited, regulations are not applied consistently, and tendering and BoQs focus mainly on initial costs. There is also no standard for material documentation to support transparency in recycling and recovery.

Relevant policy instruments include Government Regulation No. 22/2020 on the Implementation of Law No. 2/2017 on Construction Services; Public Works and Housing Minister Regulation No. 9/2021 on Guidelines for Sustainable Construction; Presidential Regulation No. 46/2025 on Government Procurement of Goods and Services, particularly Article 19(4); and National Public Procurement Agency Regulation No. 12/2021. It should be noted that this procurement framework does not explicitly establish green procurement. Instead, it covers the broader area of sustainable procurement of goods and services.

The second action is to establish targets, standards, and tracking systems for construction materials throughout the building life cycle, from design to demolition. This would involve setting phased targets for material recovery and reuse, improving the traceability of state and regional assets, introducing pre-demolition circularity audits, and consolidating technical indicators into a comprehensive national monitoring framework. These indicators could include Building Information Modelling (BIM), prefabrication, green certification, carbon footprints, and construction waste management.

There are currently no clear material recovery targets, no standardised traceability system, and no mandatory circularity audits. Demolition regulations focus on removal rather than recovery, and the market for reused materials remains underdeveloped.

Relevant policy instruments include Public Works and Housing Minister Regulation No. 9/2021; Public Works and Housing Minister Regulation No. 18/2021 on Technical Guidelines for Building Demolition; Public Works

and Housing Minister Regulation No. 22/PRT/M/2018 on the Construction of State Buildings; and Public Works and Housing Minister Regulation No. 24/PRT/M/2008 on Guidelines for Building Maintenance and Upkeep.

Strategy 2. Strengthening Governance for Sustainable Construction

The second strategy is to improve institutional coordination by appointing a national coordinating unit for circular construction. This unit would guide implementation across sectors while ensuring that existing ministry and agency responsibilities continue to be fulfilled. Coordination should focus on aligning policies, targets, implementation, and oversight across institutions.

There is currently no strong coordination mechanism or clear leadership for implementing the circular economy across the construction sector. No circular construction team or coordinator has been established.

Relevant policy instruments include Law No. 28/2002 on Buildings; Government Regulation No. 39/2006 on Procedures for Monitoring and Evaluating the Implementation of Development Plans; Government Regulation No. 16/2021 on the Implementation of Law No. 28/2002 on Buildings; and Public Works and Housing Minister Regulation No. 9/2021 on Guidelines for Sustainable Construction.

Strengthening governance is intended to improve coordination, not centralise authority. Responsibilities for buildings, waste management, industrial standards, and environmental oversight are spread across ministries and levels of government. A coordinating unit with a clear mandate could help align indicators, targets, and reporting systems across ministries, local governments, and licensing, permitting, and certification systems, without requiring a major institutional restructuring.

Strategy 3. Strengthening Monitoring, Evaluation, and Data Systems for Circular Construction

The third strategy is to shift monitoring away from administrative reporting towards measurable circularity indicators. This requires consistent indicators across ministries and measurable technical parameters, such as the Recycled Content Rate and Waste Diversion Rate, incorporated into technical regulations or planning documents.

Digital systems should support this approach by integrating the Building Management Information System (SIMBG) with the National Waste Management Information System (SIPSN), enabling material flows to be tracked in real time. Circularity performance could then inform financing decisions, including green loans and green bonds.

Current reporting is largely administrative and qualitative. It does not require quantitative data, such as material tonnage or the percentage of materials recovered. There are also no standard methods for calculating circularity metrics, such as recycled content or waste diversion rates. Existing data systems are not integrated, so material flows cannot be tracked from end to end across projects and industries.

Relevant policy instruments include Government Regulation No. 16/2021 on the Implementation of Law No. 28/2002 on Buildings and Public Works and Housing Minister Regulation No. 9/2021 on Guidelines for Sustainable Construction. National standards for measurable indicators and methods to assess circularity in construction have not yet been developed or made mandatory.



Strengthening Circular Economy In Construction Sector

Strategy 1 Putting Existing Policy and Market Instruments into Practice for Circular Construction

This strategy strengthens implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by optimising existing regulatory and market instruments. Integrating circularity requirements into regulations and procurement will support prefabrication (Action 1.1), Building Information Modelling (BIM) (Action 1.2), sustainable construction principles (Action 1.3), environmentally labelled products (Action 3.1), and Green Industry Standards (Action 3.2). Material traceability from design through demolition will also support construction waste management (Action 2.2) and low-carbon buildings (Action 3.4).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
1.1	**Integrate circular construction requirements into building regulations and public procurement**	Integrate circular construction requirements into all public and private projects through existing building regulations. Circularity criteria, including recycled content, reuse, and recovery potential, should be incorporated from the procurement planning stage. This should cover contracts, technical specifications, bills of quantities (BoQ), and documentation requirements to ensure material traceability. Public procurement should serve as a market driver for circular products and practices. **Gap to Address:** A sustainable procurement framework is already in place under Presidential Regulation No. 46/2025, but it currently focuses on environmentally friendly products and domestic content rather than circularity criteria. Circularity requirements have not yet been incorporated into technical specifications, contracts, or bills of quantities. Tender evaluations still focus mainly on the lowest upfront cost, which places circular options at a disadvantage. Procurement contracts also do not consistently require material documentation. **Supporting Policy Framework:** (1) Government Regulation No. 22/2020 on the Implementing Regulation of Law No. 2/2017 on Construction Services, (2) Presidential Regulation No. 46/2025 on Public Procurement of Goods and Services, (3) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction, (4) LKPP Regulation No. 12/2021 on Guidelines for Public Procurement through Suppliers.				1. Ministry of Public Works 2. Ministry of National Development Planning/Bappenas 3. National Public Procurement Agency (LKPP) 4. Local Governments	• Ministry of Environment • State-Owned Enterprises Regulatory Agency (BP BUMN) • Ministry of Industry
1.2	**Establish targets, standards, and traceability systems for construction materials throughout the building life cycle, from design to demolition**	Integrate material targets, standards, and traceability systems throughout the building life cycle, from design for disassembly to demolition. This may include phased targets for material recovery and reuse, standardised traceability systems for national and local government assets (BMN/BMD), mandatory pre-demolition circularity audits, and the consolidation of technical indicators for BIM, prefabrication, green certification, carbon emissions, and construction waste into a single national monitoring framework. **Gap to Address:** Material recovery targets and standardised traceability systems have not yet been established. Existing demolition standards under Minister of Public Works and Housing Regulation No. 18/2021 focus on safety and waste disposal, without requiring pre-demolition audits or material recovery targets. The demolition of national and local government assets (BMN/BMD) is treated primarily as an asset write-off rather than a material recovery opportunity. Markets for used construction materials remain underdeveloped, while technical indicators are still managed separately without an integrated monitoring framework. **Supporting Policy Framework:** (1) Minister of Public Works and Housing Regulation No. 24/PRT/M/2008 on Guidelines for Building Maintenance and Care, (2) Minister of Public Works and Housing Regulation No. 22/PRT/M/2018 on the Construction of Government Buildings, (3) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction, (4) Minister of Public Works and Housing Regulation No. 18/2021 on Technical Guidelines for Building Demolition, (5) Related regulations on Building Information Modelling (BIM), green buildings, and construction waste management.				1. Ministry of Public Works 2. Local Governments	• Ministry of Environment • Ministry of Housing and Settlement Areas • Ministry of Industry • State-Owned Enterprises Regulatory Agency (BP BUMN) • Ministry of National Development Planning/Bappenas

Strategy 2 Strengthening Governance for Sustainable Construction

This strategy complements the policy direction of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by establishing a coordinating unit for circular construction. The unit will coordinate implementation across ministries, agencies, and local governments. Its establishment is expected to ensure that the various action plans are implemented in an integrated and mutually supportive manner.

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
2.1	**Strengthen institutional coordination by establishing a circular construction coordinating unit**	Establish a national coordinating unit responsible for guiding the implementation of circular construction while ensuring that the existing mandates of ministries and agencies remain effective. Coordination should focus on aligning policies and targets, implementation activities, and oversight across institutions. **Gap to Address:** Institutional mandates remain fragmented, with no single entity responsible for overall outcomes. The Ministry of Public Works oversees building standards, the Ministry of Environment oversees demolition waste and specific waste, the Ministry of Industry oversees recycled materials, and local governments oversee permits. Gaps arise at the points where these authorities interact. For example, responsibility for returning demolition materials to the supply chain remains unclear. Coordination has so far remained at the planning stage and has not yet been supported by binding authority across ministries, agencies, and local governments. **Supporting Policy Framework:** (1) Law No. 28/2002 on Buildings, (2) Government Regulation No. 39/2006 on Procedures for Monitoring and Evaluating the Implementation of Development Plans, (3) Government Regulation No. 16/2021 on the Implementing Regulation of Law No. 28/2002 on Buildings, (4) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction.				1. Coordinating Ministry for Economic Affairs 2. Coordinating Ministry for Food Affairs 3. Coordinating Ministry for Infrastructure and Regional Development	• Ministry of Housing and Settlement Areas • Ministry of Public Works • Ministry of Environment • Ministry of Industry • Ministry of Finance • Ministry of National Development Planning/Bappenas • State-Owned Enterprises Regulatory Agency (BP BUMN) • National Public Procurement Agency (LKPP) • Local Governments

Strategy 3 Strengthening Monitoring, Evaluation, and Data Systems for Circular Construction

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) through integrated reporting systems, indicators, and data. The reporting system will support monitoring of prefabrication (Action 1.1), energy and water intensity, recycled material content (Action 3.3), implementation of the Green Rating System (Action 3.5), and verification of construction waste management targets (Action 2.2) and low-carbon buildings (Action 3.4).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
3.1	**Shift monitoring from administrative reporting to measurable circularity indicators**	Apply consistent circularity indicators across ministries by adopting measurable technical parameters, including the Recycled Content Rate and Waste Diversion Rate, and incorporating them into technical regulations or planning documents. Support the system through digitalisation and the integration of the Building Management Information System (SIMBG) with the National Waste Management Information System (SIPSN) to ensure real-time traceability of material flows. Use circularity performance as a basis for financial decisions, including green loans and green bonds. **Gap to Address:** Reporting remains largely administrative and qualitative. SIMBG does not require information on recycled materials, while green building assessments rely on uploaded documents that are reviewed manually. National standards for recycled content and waste diversion rates have not yet been established, making figures difficult to compare across projects. Reporting channels also remain fragmented and do not adequately cover construction waste. SIPSN primarily covers household waste, while demolition waste does not have a dedicated reporting channel. As a result, materials cannot be traced throughout the full supply chain. **Supporting Policy Framework:** (1) Government Regulation No. 16/2021 on the Implementing Regulation of Law No. 28/2002 on Buildings, (2) Minister of Public Works and Housing Regulation No. 9/2021 on Guidelines for Sustainable Construction.				Ministry of Public Works	• Ministry of Housing and Settlement Areas • Ministry of Environment • Ministry of National Development Planning/Bappenas • State-Owned Enterprises Regulatory Agency (BP BUMN) • Ministry of Industry • Local Governments

BENCHMARK

Circular Construction Procurement in the Netherlands as a Reference for Implementation

As a reference for Strategy 1, which integrates circularity criteria into public procurement, and Strategy 3, which strengthens material indicators and traceability, practice in the Netherlands shows how layered audits and environmental cost indicators can be incorporated into construction procurement.

The "layered building" approach divides a building into layers with different service lives. These range from furnishings, or "stuff," with a lifespan of 5 to 15 years; the space plan, 5 to 20 years; building services, 5 to 30 years; the building envelope, or "skin," 30 to 60 years; the structure, 60 to 200 years; and the site, which lasts more than 200 years.

This approach encourages buildings to remain in use for longer. It focuses not only on new construction but also on maintaining the value of existing buildings, keeping materials and components in use for as long as possible, and designing spaces that can be adapted to changing needs.

At the end of a building's life, the approach also supports construction waste solutions. These include identifying reuse potential and demolition sites early, carrying out selective deconstruction to recover materials, sorting and processing waste for recycling, and refurbishing or repairing building equipment and components for reuse.

For procurement, the Netherlands uses the Environmental Cost Indicator (ECI). In construction tenders, bidders submit both a financial price in euros and an ECI score representing environmental costs in euros. The government then applies a virtual evaluation discount based on the ECI score. A lower ECI score results in a larger discount during evaluation and increases the bidder's chance of winning the contract. This discount applies only to tender evaluation and does not affect the actual payment. Contractors are paid the original contract price, so the discount affects the selection of the winning bid rather than the amount paid.

The ECI score is calculated in three steps. **First,** the life-cycle impacts of a product are assessed using Life Cycle Assessment (LCA), from raw materials and production to transport, use, and disposal. **Second,** each environmental impact is converted into a shadow price in euros, such as euros per kilogram of CO_2 emissions or toxic substances. **Third,** all monetised environmental impacts are added together. Examples include €0.05 per kg of CO_2 equivalent for global warming and €30.00 per kg of CFC-11 equivalent for ozone depletion.

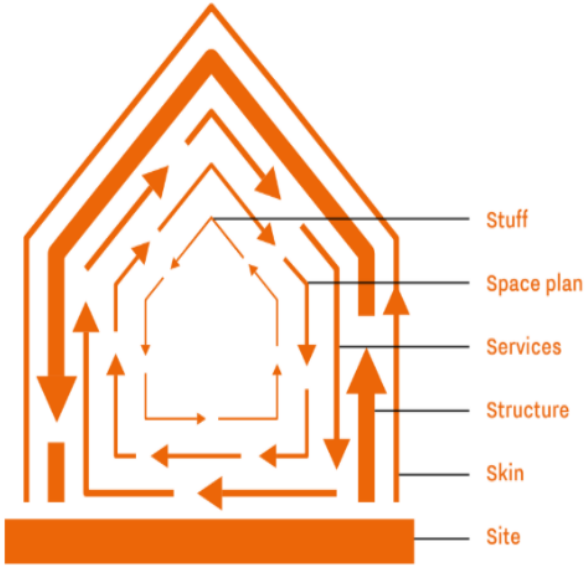
A lower ECI score indicates a smaller environmental impact and stronger circular performance. This makes environmentally responsible designs more competitive in tenders, rather than selecting bids solely on the basis of the lowest price.

Integration of Layered Audits

Building layers and their average lifespans

- Furnishings (Stuff): 5–15 years
- Space plan: 5–20 years
- Building services: 5–30 years
- Building envelope (Skin): 30–60 years
- Structure: 60–200 years
- Site: more than 200 year

Figure: Building layers and the average lifespan of each layer.



Extending Building Lifespans *(Lifespan extension)*

- Focus not only on constructing new buildings, but also on maintaining the value of existing ones.
- Keep building materials and components in use for as long as possible within the building's value system.
- Design buildings to allow for renewal and adaptation, such as changes to the use of space.
- Apply the "layered building" concept: retain the structure while allowing other elements, such as interiors and installations, to be replaced or adapted

Construction Waste Solutions *(End-of-life solutions)*

- Identify opportunities for material reuse and suitable demolition sites.
- Carry out selective deconstruction to recover materials.
- Process waste through sorting, recycling, and material treatment.
- Refurbish or repair building equipment and components for reuse.

Figure 13 Integration of Layered Audits and the Environmental Cost Indicator (ECI) in Circular Construction Procurement in the Netherlands

Source: Netherlands Enterprise Agency (Rijksdienst voor Ondernemend Nederland), 2025.

Environmental Cost Indicator (ECI)

In the Netherlands, construction tenderers submit both a financial bid in euros and an ECI score, which represents environmental costs in euros. The government applies a virtual evaluation discount based on the score:

- A lower ECI score results in a larger evaluation discount.
- A larger discount improves the tenderer's chance of winning the contract.
- The discount applies to bid evaluation only. It does not reduce the actual payment.

Sustainability directly improves competitiveness.

Contractors Are Encouraged to:

- Use recycled and low-carbon materials.
- Reduce the use of virgin natural resources.
- Design for durability, reuse, and modularity.

In a tender, a lower ECI score gives the contractor a virtual price discount. This makes environmentally responsible designs more competitive, rather than favouring the lowest bid alone.

How the ECI Works

1. Assess a product's impacts throughout its life cycle using Life Cycle Assessment (LCA), from raw material extraction and production to transport, use, and disposal.
2. Convert each impact into a monetary value, or shadow price, in euros. Examples include euros per kilogram of CO_2 emissions or toxic emissions.
3. Add the monetised impacts to produce a single ECI score in euros.

Lower ECI = lower environmental damage better circular performance

Example of Environmental Cost Indicators for a Product

Impact Category	Unit	Weighting Factor (€/unit)
Global warming	kg CO_2-eq	0,05 €
Ozone depletion	kg CFC-11-eq	30,00 €

Example: Two Contractors Submit Bids for a Road Project

Contractor	Real Price	ECI Value	ECI Price Discount	Evaluation Price
A	€1,000,000	500	€50,000	€950,000
B	€980,000	600	€0	€980,000

The Discount:

- **Applies to evaluation only, not to the actual payment.**
- **Does not change the contract price paid to the contractor.**
- **Affects which contractor wins the tender, not the amount paid**

Figure 14 Overview of the Environmental Cost Indicator (ECI), 2019.

Source: Environmental Cost Indicator (ECI) Overview (2019) by Ecochain

This practice offers a useful reference for developing tender evaluation criteria that include circularity indicators, as set out in Strategy 1. It can also inform the development of measurable parameters such as the Recycled Content Rate and Waste Diversion Rate, as proposed in Strategy 3.

Applying a similar approach in Indonesia would require adequate LCA data for domestic construction materials and sufficient capacity within the National Public Procurement Agency (LKPP) to manage an evaluation system based on environmental costs.

3.3 Circular Economy in the Electronics Sector

The main challenge in managing electronic waste in Indonesia is not the absence of regulations, but the lack of adequate operational mechanisms and system integration. Several structural challenges overlap in this sector. These include the absence of a comprehensive Extended Producer Responsibility (EPR) framework for electronic waste, limited ecolabelling requirements, and a market dominated by assembly companies and traders rather than lead producers. As a result, domestic policy has limited influence over key upstream decisions on circular product design. Although material recovery infrastructure is beginning to develop, recycling facilities remain significantly underused and operate well below their potential capacity.

Based on the policy review and gap analysis, the circular economy in the electronics sector can be strengthened through three connected strategies.

Strategy 1. Developing and Implementing EPR Policy for Electronic Products

The first strategy is to develop EPR regulations specifically for electronic products. These should define producers' roles and responsibilities, collection and recycling targets, reporting mechanisms, financing, and systems for monitoring and enforcement. This would provide an integrated legal basis for managing electronic waste nationally. Indonesia currently lacks a comprehensive and integrated EPR framework for electronics, so new policy instruments are required.

The second action is to apply EPR obligations to priority groups of electronic products. This would involve phased implementation of take-back, collection, treatment, reporting, and material recovery targets. Producers, government, and waste managers should work together to address low collection rates and weak accountability for electronic waste. Adequate policy support and instruments are not yet in place.

Strategy 2. Developing Circular Economy Infrastructure

The second strategy focuses on developing infrastructure to support a circular economy for electronics through four actions.

First, establish a network of Temporary Storage Facilities for Specific Waste and Hazardous and Toxic Materials (TPSSS-B3) at provincial and district or municipal levels. These facilities would serve as temporary collection points for electronic waste before it is sent to licensed treatment facilities. The limited availability of temporary storage remains a major constraint.

Relevant policy instruments include Government Regulation No. 27/2020 on the Management of Specific Waste; Environment and Forestry Minister Regulation No. 6/2021 on Procedures for Managing Hazardous and Toxic Waste; and Environment and Forestry Minister Regulation No. 9/2024 on the Management of Waste Containing Hazardous and Toxic Materials and Hazardous and Toxic Waste.

Second, encourage the establishment of hazardous waste management service providers in underserved areas by offering incentives and making investment easier for providers of hazardous waste collection, transport, and treatment services. This would expand access to electronic waste management facilities in areas that currently lack them.

Relevant policy instruments include Government Regulation No. 27/2020; Government Regulation No. 22/2021 on the Implementation of Environmental Protection and Management; Environment and Forestry Minister Regulation No. 6/2021; and Government Regulation No. 28/2025 on the Implementation of Risk-Based Business Licensing.

Third, develop electronic waste collection and treatment systems through scheduled collection, drop-off points, consolidation centres, engagement with informal sector workers, and transport arrangements linked to formal treatment facilities. These measures would address low formal collection rates and the loss of electronic materials from the formal system.

Relevant policy instruments include Government Regulation No. 27/2020; Government Regulation No. 22/2021; Environment and Forestry Minister Regulations No. 6/2021 and No. 9/2024; and local regulations on waste management.

Fourth, support recycling research and technology development through research, innovation, and pilot projects on the treatment and recovery of electronic materials. This would improve efficiency, value creation, and the competitiveness of the national recycling industry. Limited treatment technology and the underuse of high-value materials remain key constraints.

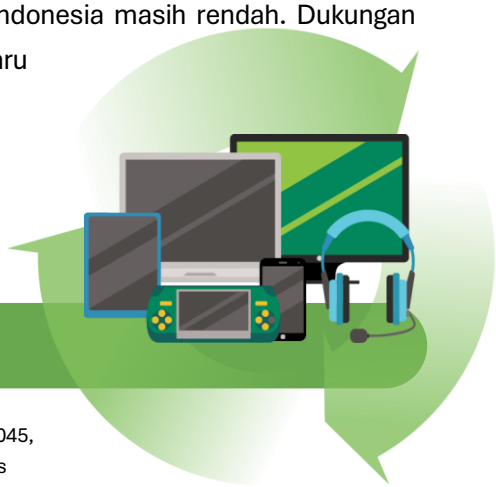
Policy support for this action can be drawn from the National Circular Economy Action Plan and the National Strategic Research Agenda and Roadmap 2026.

Strategy 3. Implementasi Ekodesain dan Inovasi Produk

Strategi ketiga mendorong **pengadaan pemerintah yang mendukung produk elektronik sirkular**, dengan memanfaatkan daya beli pemerintah untuk menciptakan permintaan pasar terhadap produk elektronik yang memenuhi kriteria kemudahan perbaikan (repairability), penggunaan kembali, dan daur ulang, melalui penerapan kriteria ekodesain dalam pengadaan elektronik rekondisi dan penerapan standar pengadaan berkelanjutan. Regulasi pengadaan saat ini belum mengatur secara spesifik persyaratan desain sirkular produk elektronik, sehingga potensi pengadaan sebagai instrumen pembentuk pasar belum dioptimalkan. Dukungan kebijakan untuk langkah ini mencakup Peraturan Presiden No. 16 Tahun 2018 sebagaimana diubah dengan Peraturan Presiden No. 12 Tahun 2021 dan Peraturan Presiden No. 46 Tahun 2025 tentang Pengadaan Barang/Jasa Pemerintah, serta Peraturan LKPP No. 12 Tahun 2021, meskipun kerangka pengadaan ini belum mengarah pada pengadaan hijau secara eksplisit.

Langkah kedua adalah mendorong penerapan prinsip ekodesain pada produk elektronik, yaitu mendorong produsen mengintegrasikan prinsip modularitas, ketersediaan suku cadang, kemudahan perbaikan, penggunaan kembali, dan daur ulang sejak tahap desain produk, didukung oleh standar, ekolabel, dan instrumen kebijakan yang memadai. Sampai saat ini belum tersedia

instrumen kebijakan yang secara spesifik mengatur desain produk elektronik untuk mendukung sirkularitas, sehingga tingkat repairability, reuse, dan recyclability produk elektronik di Indonesia masih rendah. Dukungan kebijakan untuk langkah ini juga belum tersedia dan memerlukan instrumen baru



Strengthening Circular Economy In Electronics

Strategy 1 Developing and Implementing EPR Policy for Electronic Products

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by strengthening the regulatory framework for extended producer responsibility (EPR) in the electronics sector. It covers the establishment of EPR regulations for electronic products (Action 1.1) and the implementation of EPR for priority products (Action 1.2).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
1.1	**Establish a dedicated EPR regulation for electronic products**	Develop an EPR regulation specifically for electronic products. The regulation should define producer roles and responsibilities, collection and recycling targets, reporting mechanisms, financing arrangements, oversight, and enforcement. It will provide an integrated legal basis for national e-waste management. **Gap to Address:** Existing regulations cover only some aspects of e-waste management. Law No. 18/2008 establishes general producer responsibility, while Government Regulation No. 27/2020 classifies e-waste as specific waste containing hazardous and toxic substances. Once e-waste enters the hazardous waste management chain, Government Regulation No. 22/2021 and Minister of Environment and Forestry Regulation No. 6/2021 apply. However, these regulations do not establish a dedicated EPR scheme for electronics that defines product categories, take-back obligations, collection and recycling targets, producer financing, implementing organisations, reporting, verification, and sanctions for non-compliance. As a result, producer responsibility for post-consumer electronic products cannot yet be applied and enforced consistently. **Supporting Policy Framework:** (1) Law No. 18/2008 on Waste Management, (2) Government Regulation No. 81/2012 on Household and Household-like Waste Management, (3) Government Regulation No. 27/2020 on Specific Waste Management, (4) Government Regulation No. 22/2021 on Environmental Protection and Management, (5) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures and Requirements for Hazardous Waste Management No instrument currently provides specific regulation for EPR in electronic products. A dedicated regulation is therefore required.	■			Ministry of Environment	• Ministry of Industry • Ministry of National Development Planning/Bappenas • Ministry of Communication and Digital Affairs • Ministry of Home Affairs
1.2	**Implement EPR schemes for priority electronic products**	Apply EPR obligations to priority groups of electronic products through take-back, collection, treatment, and reporting systems, supported by progressive material recovery targets. Implementation should involve cooperation among producers, government institutions, and waste management operators. **Gap to Address:** No operational requirements currently oblige electronics producers to establish and finance systems for collecting post-consumer products. Producers are not yet required to provide take-back points, set collection targets based on the volume of products placed on the market, or ensure that collected e-waste is transferred to licensed treatment operators. As a result, consumers often sell used devices to informal collectors. These collectors may recover valuable components, while low-value or hazardous parts may not be managed safely. This situation contributes to low formal collection rates, unstable supplies for licensed treatment facilities, and weak traceability and producer accountability. **Supporting Policy Framework:** (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Government Regulation No. 22/2021 on Environmental Protection and Management, (3) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures and Requirements for Hazardous Waste Management. These regulations can provide a basis for managing e-waste and hazardous waste. However, a new implementing instrument, namely a dedicated electronics EPR regulation, is required.		■	■	Ministry of Environment	• Ministry of Industry • Ministry of National Development Planning/Bappenas • Ministry of Communication and Digital Affairs • Ministry of Home Affairs • Local Governments • Licensed Hazardous and Toxic Waste Management Service Providers

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
1.3	**Develop an integrated electronics EPR reporting system**	Develop a national reporting system that integrates producer registration, collection targets and results, transport, treatment, material recovery, and e-waste residues. The system should connect EPR reporting with related platforms, including SIPSN and SPEED, through common data standards, operator identification, and data exchange mechanisms. Reporting should include transfer records or digital manifests, verification procedures, and monitoring dashboards to ensure traceability of e-waste flows from producers to final treatment facilities. **Gap to Address:** E-waste data are currently reported separately through several systems that use different classifications. For example, household e-waste may be recorded in SIPSN as specific waste or waste managed by local governments. After being transferred to a licensed operator, the same material may be reported through SPEED as hazardous waste. At the same time, producers are not yet required to report collection and waste reduction volumes through an EPR mechanism. Without a common data exchange system, these records are difficult to connect and may be omitted, remain unverifiable, or be counted more than once. Existing reporting also rarely provides a complete account of the waste origin, quantity collected, transport and treatment operators, material recovery rate, and quantity of residues disposed of. This limits the government's ability to assess producer compliance, measure national EPR performance, and verify that e-waste reaches appropriate treatment facilities. **Supporting Policy Framework:** (1) Presidential Regulation No. 39/2019 on One Data Indonesia, (2) Presidential Regulation No. 95/2018 on Electronic-Based Government, (3) Government Regulation No. 27/2020 on Specific Waste Management, (4) Government Regulation No. 22/2021 on Environmental Protection and Management, (5) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures and Requirements for Hazardous Waste Management.				1. Ministry of Environment 2. Ministry of Industry	

Strategy 2 Developing Circular Economy Infrastructure

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) by developing e-waste material recovery infrastructure for collection, sorting, treatment, and transfer to further processing facilities for refurbishment, remanufacturing, and recycling. It covers the expansion of e-waste material recovery facilities (Action 2.1), the integration of small and medium-sized industries, micro, small, and medium-sized enterprises, and informal operators into circular business ecosystems (Action 2.5), and research and development of recycling technologies (Action 2.6).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
2.1	**Establish temporary storage facilities for specific and hazardous waste (TPSSS-B3) across Indonesia**	Develop a network of Temporary Storage Facilities for Specific and Hazardous Waste (TPSSS-B3) at the provincial and district or city levels. These facilities will serve as primary temporary collection points for e-waste before it is transferred to licensed treatment facilities. **Gap to Address:** E-waste collection and consolidation facilities connected to licensed operators remain limited and unevenly distributed. Jakarta, for example, has drop boxes, collection services, consolidation warehouses, and regular transport to treatment partners. However, similar service chains are not yet widely available in other regions. As a result, e-waste in underserved areas lacks accessible formal channels for collection and efficient transfer to appropriate treatment facilities. **Supporting Policy Framework:** (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures for the Management of Hazardous and Toxic Waste, (3) Minister of Environment and Forestry Regulation No. 9/2024 on the Management of Waste Containing Hazardous and Toxic Substances and Hazardous and Toxic Waste.				1. Ministry of Public Works 2. Local Governments 3. Hazardous and Toxic Waste Management Service Providers	• Ministry of Environment/Environmental Control Agency • Ministry of Home Affairs • Ministry of National Development Planning/Bappenas • Private Sector
2.2	**Encourage the establishment of hazardous waste management service providers in underserved regions to strengthen the recovery of valuable materials**	Provide incentives and facilitate investment for hazardous waste collection, transport, and treatment service providers to expand their operations into regions that do not yet have access to e-waste management facilities. **Gap to Address:** Access to e-waste management services remains uneven across regions. Hazardous waste management service providers are still concentrated in Java, and their overall number remains limited. Regions located far from treatment centres must therefore bear higher costs for consolidation and transport across provinces or between islands. These conditions can lead to longer storage periods and make formal management channels less competitive than informal ones. **Supporting Policy Framework:** (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Government Regulation No. 22/2021				1. Ministry of Industry 2. Producer Associations 3. Local Governments 4. Hazardous and Toxic Waste Management Service Providers	• Ministry of Environment/Environmental Control Agency • Ministry of Home Affairs • Ministry of National Development Planning/Bappenas • Private Sector

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
		on Environmental Protection and Management, (3) Government Regulation No. 28/2025 on Risk-Based Business Licensing, (4) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures for the Management of Hazardous and Toxic Waste.					
2.3	**Develop integrated e-waste collection and treatment systems**	Establish scheduled collection services, drop-off points, consolidation centres, informal sector participation, and transport mechanisms integrated with formal treatment facilities to increase e-waste collection rates. **Gap to Address:** Formal e-waste collection remains low, while significant quantities continue to enter informal channels. Waste banks are generally not yet equipped to accept e-waste. Meanwhile, drop boxes, collection services, and transport to licensed treatment operators, as available in Jakarta, have not been provided consistently in other regions. Consequently, communities often rely on informal collectors, material flows remain unrecorded, and low-value or hazardous components may not be managed safely. **Supporting Policy Framework:** (1) Government Regulation No. 27/2020 on Specific Waste Management, (2) Government Regulation No. 22/2021 on Environmental Protection and Management, (3) Minister of Environment and Forestry Regulation No. 6/2021 on Procedures for the Management of Hazardous and Toxic Waste, (4) Minister of Environment and Forestry Regulation No. 9/2024 on the Management of Waste Containing Hazardous and Toxic Substances and Hazardous and Toxic Waste, (5) Relevant local waste management regulations.				1. Local Governments 2. Hazardous and Toxic Waste Management Service Providers 3. Producer Associations	• Ministry of Environment/Environmental Control Agency • Ministry of Home Affairs • Ministry of Communication and Digital Affairs • Private Sector
2.4	**Advance research and recycling technology development**	Support research, innovation, and pilot projects for e-waste treatment and electronic material recovery technologies to improve efficiency, increase added value, and strengthen the competitiveness of the national recycling industry. **Gap to Address:** Domestic treatment technologies for complex electronic components remain limited. Manual dismantling generally recovers only iron, copper, and aluminium. Valuable metals in circuit boards are not yet recovered optimally, while hazardous components may not be handled safely. **Supporting Policy Framework:** (1) National Circular Economy Action Plan, (2) National Strategic Research Roadmap and Agenda 2026.				National Research and Innovation Agency (BRIN)	• Ministry of Environment/Environmental Control Agency • Ministry of Industry • Ministry of National Development Planning/Bappenas • Higher Education Institutions • Private Sector

Strategy 3 Implementing Ecodesign and Product Innovation

This strategy supports the implementation of the National Circular Economy Action Plan (RAN-ES, 2025–2045, link) through ecodesign and product innovation. It promotes the application of ecodesign principles to electronic products and electrical equipment (Action 3.2).

No.	Action Plan	Description	Implementation Period			Lead Institutions	Supporting Institutions
			Short Term (1 Year)	Medium Term (2-3 Year)	Long Term (5 Year)		
3.1	**Use public procurement to support circular electronic products**	Use government purchasing power to create market demand for electronic products that meet criteria for repairability, reuse, and recycling. Apply ecodesign criteria to the procurement of refurbished electronics and incorporate them into sustainable procurement standards. **Gap to Address:** Public procurement does not yet apply specific and consistent circularity criteria to electronic products. For example, laptop procurement may specify technical requirements, domestic content (TKDN), and warranty periods, but it does not consistently assess battery replacement, spare part availability, repair services, service life, recycled content, or take-back at the end of the product's useful life. **Supporting Policy Framework:** (1) Presidential Regulation No. 16/2018 on Public Procurement of Goods and Services, as amended by Presidential Regulations No. 12/2021 and No. 46/2025, (2) LKPP Regulation No. 12/2021 on Guidelines for Implementing Public Procurement of Goods and Services through Suppliers. These instruments provide a general basis for sustainable procurement. However, specific technical criteria are still required for circular electronic products.				1. Ministry of Environment 2. National Public Procurement Agency (LKPP)	
3.2	**Promote eco design principles in electronic products**	Encourage producers to integrate eco design principles into the product design stage, including modularity, spare part availability, repairability, reuse, and recyclability. This should be supported by appropriate standards, ecolabels, and policy instruments. **Gap to Address:** No policy instrument specifically regulates the design of electronic products to support circularity. As a result, repairability, reuse, and recyclability remain limited. For example, batteries or components that are difficult to remove, the use of permanent adhesives, unavailable spare parts, and limited repair information may result in the replacement of an entire product when only one component is damaged. Such designs shorten product service life and make reuse and material recovery more difficult. **Supporting Policy Framework:** No specific policy instrument is currently available. A new instrument is required to establish ecodesign requirements, repairability indicators, spare part availability requirements, and recycling standards for electronic products.				Ministry of Industry	

BENCHMARK

The Netherlands' Electronic Waste Take-Back Programme as a Reference for Implementation

As a reference for Strategy 1, on EPR and Producer Responsibility Organisations (PROs), and Strategy 2, on integrating the informal sector into the formal system, the Netherlands' take-back programme for Waste Electrical and Electronic Equipment (WEEE) shows that a successful take-back system depends not only on regulation. It also requires integrated collection channels, economic incentives, waste flow monitoring, and structured engagement with both formal and informal sectors.

The programme aims to prevent electronic waste from leaking out of the system during collection and aggregation. It focuses in particular on metal recovery companies, which have historically served as a main entry point for informal and non-compliant e-waste flows.

Electronic waste from households and businesses moves through two main channels: retailers and official collection points, and the informal sector and metal recycling businesses. Both channels ultimately lead to licensed treatment facilities. Stichting OPEN, the Netherlands' sole Producer Responsibility Organisation (PRO), oversees and coordinates the process.

Key policies in the take-back programme include market-based incentives at aggregation points, take-back obligations for retailers, centralised reporting and waste flow monitoring, conditional payments based on compliance, and changes to the market for informal dismantling practices.

The programme has produced several measurable outcomes, including a 26% increase in electronic waste collection, a reduction in e-waste flows outside the formal system, and the Netherlands' position as one of Europe's leading countries in WEEE flow monitoring. This has been achieved by balancing the amount of WEEE generated against e-waste flows that are officially documented and recorded.

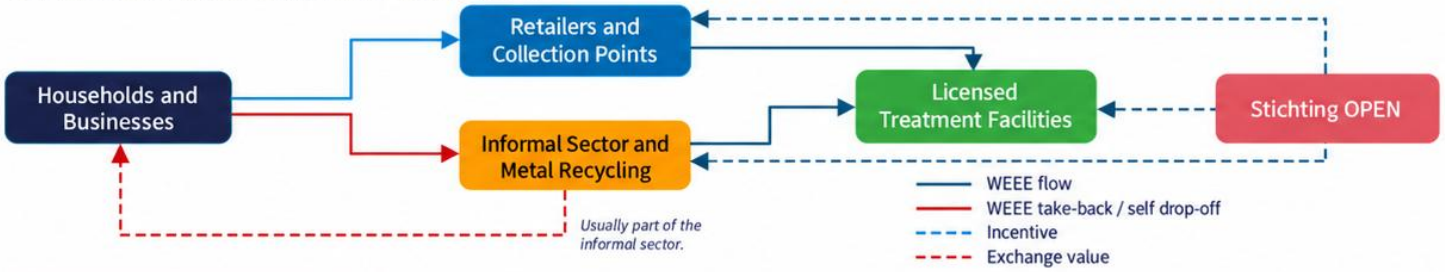
As a PRO, Stichting OPEN is an operationally independent partner of the government. It has a supervisory board and operates transparently. The organisation is not-for-profit. Any surplus is reinvested in the system or used to reduce producer contributions, while collection and recycling operations are carried out by contracted third parties.

This model offers a useful reference for designing an EPR institution for electronic products in Indonesia, as described in Strategy 1. In particular, it demonstrates the value of an independent, transparent, not-for-profit management body or Producer Responsibility Organisation.

The model also informs the integration of informal sector workers into the system, as described in Strategy 2. Possible measures include market-based incentives at collection points, take-back obligations for retailers, and changes to the market for informal dismantling. These measures should reflect the institutional context and structure of Indonesia's informal sector.

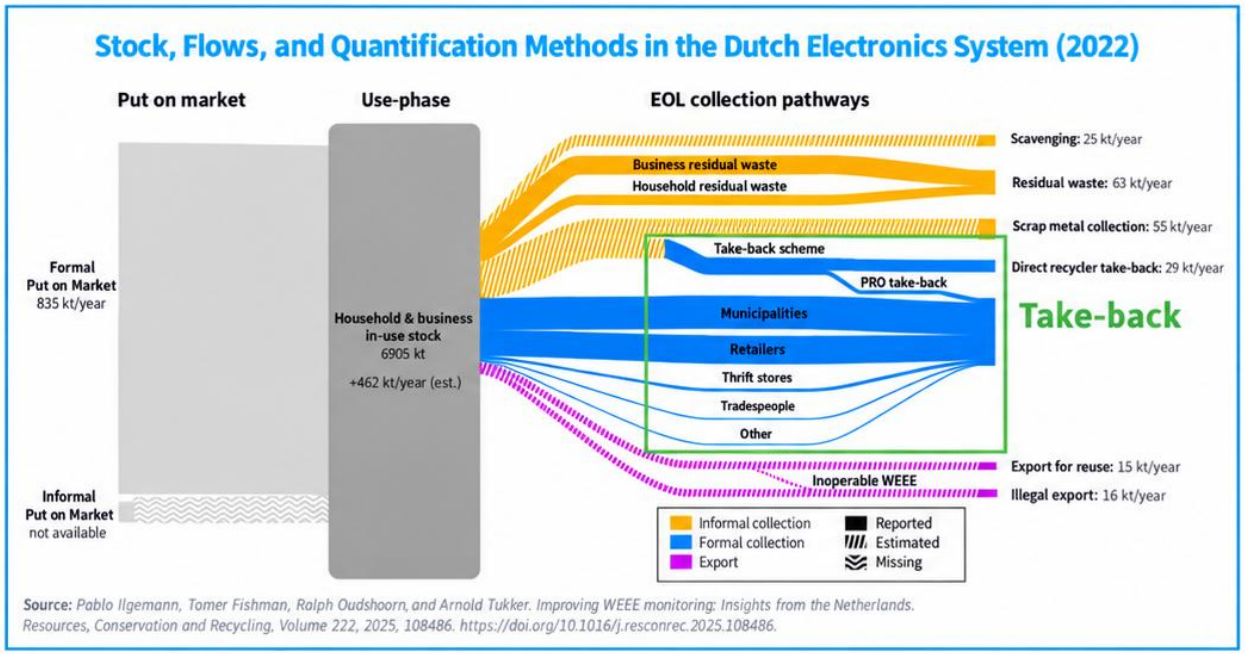
Take-Back Programme for Waste Electrical and Electronic Equipment in the Netherlands

Key principle: *prevent WEEE leakage during collection and aggregation, with particular attention to metal recovery companies that have historically served as a main entry point for informal and non-compliant e-waste flows.*



Programme Impacts

- Increased collection rates by up to 26%
- Reduced e-waste flows outside the formal system
- Established the Netherlands as a European leader in WEEE flow monitoring by balancing the weight of WEEE generated with formally documented and recorded e-waste flows.



Key Policies in the Take-Back Programme

- Market-based incentives at aggregation points
- Retailer take-back obligations
- Centralised reporting and waste flow monitoring
- Conditional remuneration based on compliance
- Restructuring the market for informal dismantling practices.

About Stichting OPEN

- The Netherlands' only Producer Responsibility Organisation (PRO)
- A government partner with operational autonomy
- Governed by a supervisory board and committed to full transparency
- Not-for-profit. Surpluses are reinvested in the system or used to reduce producer contributions
- Does not conduct physical operations directly
- Contracts partners to carry out collection, treatment, and recycling.

Figure 15 Take-Back Programme for Waste Electrical and Electronic Equipment in the Netherlands.

Source: Ilgemann Fishman, Oudshoorn, and Tukker (2025), Resources, Conservation and Recycling, Vol. 222, 108486.



4. Conclusion

4. Conclusion

Indonesia has reached an important point in its transition to a circular economy. Much of the policy framework is already in place. It is incorporated into the RPJPN, implemented through the RPJMN, and increasingly reflected in sectoral regulations. What is still needed is not another layer of policy, but a mechanism that turns these commitments into enforceable action with tangible economic impact.

The construction and electronics sectors illustrate this gap clearly. In construction, the main challenge is fragmentation. Existing regulations, procurement systems, and BIM frameworks are not yet linked to circularity outcomes. Connecting these instruments, beginning with public procurement as an early market signal, using demolition regulations to support material recovery, and building an integrated monitoring framework, could drive systemic change without waiting for new regulations.

The structural challenges in the electronics sector are more fundamental. A market dominated by assembly companies and traders, the absence of a comprehensive EPR framework, and informal collection networks operating outside the formal system have created a major governance gap in electronic waste management. Addressing this gap requires a phased approach. First, operationalise existing local regulations. Next, integrate informal sector workers as a key part of the formal collection system. Then build EPR accountability on top of the infrastructure already established.

The two sectors point to the same conclusion: effective circular economy implementation requires clear accountability, enforceable obligations, and data systems that support decision-making, rather than administrative reporting alone. Indonesia has an adequate legal foundation. The next step is to put it into practice through coordinated institutional action, circular procurement systems, targeted financing, and political commitment to accountability for results, not just processes.

The opportunity to act is here. As Indonesia expands infrastructure development, accelerates urbanisation, and transitions to renewable energy, the flow of materials that determines circularity, including construction materials and electronic components, will grow significantly. The governance framework established today will determine whether these materials remain locked into a linear model or are redirected into a regenerative economy. The cost of inaction is not limited to environmental damage. It also includes lost economic value from materials that could be recovered, reused, and circulated within Indonesia's industrial system.

Appendices

Appendix 1. Regulations Related to Construction

Laws	1. Law No. 28/2002 on Buildings 2. Law No. 18/2008 on Waste Management 3. Law No. 32/2009 on Environmental Protection and Management
Government Regulations	1. Government Regulation No. 27/2020 on the Management of Specific Waste 2. Government Regulation No. 14/2021 on Amendments to Government Regulation No. 22/2020 on the Implementing Regulations for Law No. 2/2017 on Construction Services 3. Government Regulation No. 16/2021 on the Implementing Regulations for Law No. 28/2002 on Buildings 4. Government Regulation No. 22/2021 on Environmental Protection and Management
Presidential Regulations	1. Presidential Regulation No. 170/2024 on the Ministry of Public Works 2. Presidential Regulation No. 12/2025 on the RPJMN 2025–2029 3. Presidential Regulation No. 109/2025 on Urban Waste Management through Waste-to-Renewable-Energy Processing Using Environmentally Friendly Technology
Ministerial Regulations	1. Environment Minister Regulation No. 2/2014 on the Use of Ecolabels 2. Public Works and Housing Minister Regulation No. 22/2018 on the Construction of State Buildings 3. Industry Minister Regulation No. 39/2018 on Procedures for Green Industry Standard (SIH) Certification 4. Public Works and Housing Minister Regulation No. 9/2021 on Guidelines for Sustainable Construction 5. Public Works and Housing Minister Regulation No. 18/2021 on Building Demolition 6. Public Works and Housing Minister Regulation No. 21/2021 on Green Building Performance Assessment 7. Public Works and Housing Minister Regulation No. 8/2022 on Procedures for Construction Services Standard Certification 8. Public Works and Housing Minister Regulation No. 10/2023 on Smart Buildings 9. Industry Minister Regulation No. 45/2024 on the Green Industry Standard for the Flat Steel Industry 10. Industry Minister Regulation No. 46/2024 on the Green Industry Standard for the Flat Glass Industry 11. Environment and Forestry Minister Regulation No. 9/2024 on Hazardous and Toxic Waste Management
Regional Regulations	1. Bone Regency Regional Regulation No. 9/2023 on Waste Management 2. Surabaya City Regional Regulation No. 5/2014 on Waste Management 3. Ambon City Regional Regulation No. 6/2025 on Specific Waste Management 4. Bogor City Regional Regulation No. 2/2019 on Buildings and Building Construction Permits 5. East Java Province Regional Regulation No. 9/2022 on Regional Waste Management 6. West Sumatra Province Regional Regulation No. 1/2025 on Waste Management 7. Riau Province Regional Regulation No. 4/2025 on Waste Management 8. South Sumatra Province Regional Regulation No. 2/2022 on the Guidance and Supervision of Construction Services 9. Lampung Province Regional Regulation No. 9/2021 on Waste Management 10. Bangka Belitung Islands Province Regional Regulation No. 2/2025 on Regional Waste Management 11. Bangka Belitung Islands Province Regional Regulation No. 6/2023 on Buildings 12. Central Java Province Regional Regulation No. 4/2023 on Environmental Protection and Management 13. East Java Province Regional Regulation No. 9/2022 on Regional Waste Management 14. West Nusa Tenggara Province Regional Regulation No. 5/2019 on Waste Management

	15. East Nusa Tenggara Governor Regulation No. 51/2018 on Environmentally Responsible Offices in East Nusa Tenggara Province 16. Aceh Governor Regulation No. 52/2023 on Guidelines for the Procurement of Goods and/or Services by Public Service Agencies at State Vocational High Schools 17. Riau Governor Regulation No. 9/2021 on the Riau Green Policy Brief 18. Jambi Governor Regulation No. 4/2023 on Specific Policies for the Implementation of Construction Services Procurement 19. Jambi Governor Regulation No. 7/2024 on the Implementation of Jambi Province Regional Regulation No. 4/2023 on the Green Economy Growth Plan 20. Jakarta Capital Region Governor Regulation No. 51/2024 on the Regional Action Plan for the Sustainable Development Goals 21. Jakarta Capital Region Governor Regulation No. 20/2024 on Building Design Requirements 22. Central Java Governor Regulation No. 26/2025 on Support for the Implementation of Green Industry

Appendix 2. Regulations Related to Electronics

Laws	1. Law No. 18/2008 on Waste Management 2. Law No. 32/2009 on Environmental Protection and Management 3. Law No. 3/2014 on Industry 4. Law No. 6/2023 on the Enactment of Government Regulation in Lieu of Law (Perppu) No. 2/2022 on Job Creation 5. Law No. 8/1999 on Consumer Protection
Government Regulations	1. Government Regulation No. 81/2012 on the Management of Household Waste and Waste Similar to Household Waste 2. Government Regulation No. 27/2020 on the Management of Specific Waste 3. Government Regulation No. 22/2021 on Environmental Protection and Management 4. Government Regulation No. 74/2001 on the Management of Hazardous and Toxic Materials
Presidential Regulations	1. Presidential Regulation No. 12/2025 on the RPJMN 2025–2029
Ministerial Regulations	1. Environment and Forestry Minister Regulation No. 6/2021 on Procedures and Requirements for Hazardous and Toxic Waste Management 2. Environment and Forestry Minister Regulation No. 9/2024 on Hazardous and Toxic Waste Management 3. Industry Minister Regulation No. 7/2025 on Mandatory Indonesian National Standards (SNI) for Household Electronics 4. Environment and Forestry Minister Regulation No. 74/2019 on Emergency Response Programmes for Hazardous and Toxic Materials and Waste 5. Environment and Forestry Minister Regulation No. 14/2021 on Waste Management through Waste Banks 6. Environment and Forestry Minister Regulation No. 75/2019 on the Producer Waste Reduction Roadmap (EPR) 7. Home Affairs Minister Regulation No. 21/2025 on Policies and Regulations for the Import of Electronic and Telematics Goods 8. Industry Minister Regulation No. 6/2024 on Procedures for Issuing Technical Considerations for the Import of Electronic Products
Regional Regulations	1. Jakarta Capital Region Regional Regulation No. 3/2013 on Waste Management 2. Jakarta Capital Region Governor Regulation No. 102/2021 on Waste Management Obligations for Areas and Companies 3. East Java Governor Regulation No. 9/2022 on Regional Waste Management 4. Bali Governor Regulation No. 47/2019 on Source-Based Waste Management 5. Denpasar City Regional Regulation No. 8/2023 on Waste Management

	6. Jambi City Regional Regulation No. 5/2020 on Waste Management 7. Bekasi Regency Regional Regulation No. 2/2025 on Waste Management 8. Kebumen Regency Regional Regulation No. 13/2023 on Waste Management 9. Bandung City Regional Regulation No. 9/2018 on Waste Management 10. Tangerang Regency Regional Regulation No. 1/2023 on Waste Management 11. Aceh Jaya Regency Qanun No. 13/2021 on Waste Management 12. Bone Bolango Regency Regional Regulation No. 1/2015 on Waste Management 13. Merangin Regency Regional Regulation No. 2/2014 on Waste Management 14. Tebo Regency Regional Regulation No. 8/2021 on Waste Management 15. Bandung Regency Regional Regulation No. 1/2022 on Waste Management 16. Malang Regency Regional Regulation No. 2/2018 on Waste Management 17. Sekadau Regency Regional Regulation No. 10/2019 on Waste Management


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