Proposal for Social Implementation of the Circular Value-Added Productivity

(Circular Economy Association White Paper)

March 2026

Study Group on Common Infrastructure Standards for Circular Business

Circular Economy Association

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Audience members

- Policy and Coordination Division, Environmental Regeneration and Resource Circulation Bureau, Ministry of the Environment
- Resource Efficiency and Circular Economy Division; GX Policy Group; Innovation and Environment Policy Bureau; Ministry of Economy, Trade and Industry

About the Study Group on Common Infrastructure Standards for Circular Business

The Study Group on Common Infrastructure Standards for Circular Business (the "Study Group") was established as a (confidentiality and consultation) committee to conduct surveys, research, and deliberations regarding the formation of circular business models, consortia, business alliances, etc. for specific members of the Circular Economy Association (the "Association"). The Study Group began its activities from February 7, 2025, at the proposal of AIST Solutions Co.,[*1] which is a member of the Association.

Aiming to spread superior circular business, the Study Group has adopted as a case study the common infrastructure standards for circular business proposed by the Hitachi-AIST Circular Economy Cooperative Research Laboratory (H-AIST CE Lab.)[*2], comprising data model standards for information on goods including quality information, as well as growth level assessment standards for circular business. The Study Group is discussing approaches to rule formation that contribute to enhancing competitiveness, and is also examining the necessary matters to advance proposals for new items for international standards in collaboration with relevant parties.

*1 AIST Solutions Co. (https://www.aist-solutions.co.jp/) is a subsidiary of the National Institute of Advanced Industrial Science and Technology (AIST).

*2 H-AIST CE Lab. (https://unit.aist.go.jp/hitachi-cecrl/en/index.html) is a joint research project of Hitachi, Ltd. and AIST.

About the Circular Economy Association

The Circular Economy Association was established on February 26, 2021, centered on members involved with the International Organization for Standardization Technical Committee 323 (ISO/TC323) and other parties. It was launched to promote the development and implementation of circular business with the aim of realizing a circular economy-based society that can develop sustainably while utilizing limited natural resources efficiently. It presently has more than 40 members (including corporations, organizations, and individuals) and more than 10 advisors and research fellows.

The Association is engaged in activities such as survey research and the provision of information regarding the circular economy, the holding of lectures and training sessions, the provision of opportunities for exchange and collaboration with relevant institutions, and the disclosure and communication of Association activities. As part of these activities, the Association is examining global strategies in ISO/TC323 in collaboration with the Japan Environmental Management Association for Industry. Specifically, this includes the joint establishment and operation of the Study Group for International Strategy Concerning the Circular Economy Field and the ISO Standards Translation Committee, as well as examinations of the necessary rule formation strategy to promote and establish circular business internationally. The Association also organizes seminars each year to make the status of activities under ISO/TC323 widely known.

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Study Group on Common Infrastructure Standards for Circular Business

1. Introduction

The transition to a circular economy (CE) is an urgent issue for governments and industries that seek to achieve sustainable economic growth through the circular use of resources. To promote a smooth transition, indicators that effectively reflect the performance of companies and organizations, clearly indicate progress, and identify areas for improvement are essential. Although there are many circularity indicators that evaluate various aspects of the environment, society, and the economy individually, integrated indicators that include both environmental value and economic value are limited. While existing integrated indicators tend to measure economic value efficiency relative to environmental impact, prioritizing reductions in environmental burden such as CO2 emissions and resource input, they do not sufficiently reflect the economic rationality required by industry (see Appendix).

In expanding circular business, it is essential to secure not only reduction in environmental load but also sufficient economic viability so that companies can continue business operations over the long term. Business cannot be sustained unless companies secure a certain level of profits. If economic viability is undermined by excessive prioritization of environmental value, circular business itself becomes difficult to continue, potentially bringing the transition to a CE to a standstill. For that reason, in CE assessment, indicators that appropriately capture the costs of business operations along with environmental value are necessary. Introducing evaluation criteria that incorporate economic rationality is fundamental for enabling companies to advance circular business in a feasible and sustainable manner and plays an important role in accelerating the transition to a CE in society as a whole. Also, in circular business, value creation is not usually completed by individual organizations, but instead value networks (VNs) are formed whereby multiple organizations cooperate through the provision of products,

components, and services.[1] Accordingly, when assessing the sustainability of circular business, it is essential to capture the economic efficiency of not only individual organizations but also of entire networks.

To address this, the Hitachi–AIST Circular Economy Cooperative Research Laboratory (H-AIST CE Lab.) proposed the Circular Value-Added Productivity (CVP), which evaluates the economic efficiency of circular action using standard financial data [1-3].

Within this context, the Circular Economy Association established the Study Group on Common Infrastructure Standards for Circular Business as a confidentiality committee on February 7, 2025 [4]. In examining approaches to international rule-making for CE–oriented business, the Study Group has taken as a case study the Common Infrastructure Standards for Circular Economy–Oriented Business proposed by H-AIST CE Lab. These standards comprise data model standards for information on goods, including quality-related information, as well as the Growth Level Assessment Standards for Circular Economy–Oriented Business, referred to as the CVP. Amid the acceleration of international discussions on the CE, the Study Group is also examining approaches to the formation of fair and effective rules, in collaboration with relevant stakeholders, with the aim of contributing to global CE development through standards that can be accepted internationally.

Focusing in particular on discussions within the Study Group on the Growth Level Assessment Standards, this white paper organizes the key issues, discussion points, and policy directions related to methods for evaluating CE–oriented businesses and for formulating relevant rules. It further provides guidance toward the future practical application of the CVP.

2. Circular Value-Added Productivity

This chapter explains CVP as proposed by the H-AIST CE Lab. CVP is an indicator that applies the general definition of productivity to CE–oriented business activities. Its defining equation is shown below [1-3].

$$CVP = \frac{Y_{\mathrm{CE}}}{E_{\mathrm{CE}}} \qquad (1)$$

Y_{CE} represents the value added from Circular actions, and E_{CE} represents the expenditure

[1] The definition of VN conforms with ISO 59004, which provides vocabulary, principles, and guidance for CE implementation. The criteria for VN are expected to be made concrete in ISO 59011 and other future standards.

on Circular actions. Using standard financial data, Eq. (1) can be expressed as follows.

$$CVP = \frac{S_{CE} - I_{CE}}{C_{CE} + G_{CE}} \qquad (2)$$

S_{CE} denotes the sales from Circular actions; I_{CE} denotes the intermediate goods costs for Circular actions; C_{CE} denotes the cost of goods sold (COGS) for Circular actions; and G_{CE} denotes the selling, general, and administrative expenses (SG&A) for Circular actions. Although there are multiple definitions and calculation methods for value added, this research report adopts the commonly used subtraction method and organizes the formula using standard financial statement items.

The model defining equation used for CVP is based on the widely accepted production efficiency concept of evaluating productivity as the ratio of value added to input resources (expenditures). For that reason, it is easy for companies to understand and also highly compatible with common financial analysis processes. Because GDP is defined as the aggregation of value added, CVP can conceptually relate firm-level activities to economic growth at the national or regional level. This characteristic allows CVP, despite its simplicity, to accurately capture the economic value creation of Circular actions. CVP clarifies the relationship between value added and expenditure based on financial data, which allows for an examination of whether the additional costs associated with CE transition are reasonable and whether circular business can advance without undermining economic viability. CVP can be utilized in various situations such as current-state analysis within an organization, verification of improvement measures, and year-to-year comparisons.

Prior research has clarified several important aspects of CVP [3]. For example, in the remanufacturing use case, while CVP showed a positive correlation with operating profit, Circular Material Productivity (CMP) [5]—developed by the World Business Council for Sustainable Development (WBCSD)—remained largely unchanged. This contrast reflects the different evaluation perspectives of the two indicators. These results indicate that CVP can serve as a complementary indicator to existing CE indicators. When used alongside those indicators, it enables a more balanced assessment of circular strategies. Furthermore, combining CVP with other CE indicators is also essential not only for comprehensive assessment but also for preventing greenwashing and ensuring the credibility of CE strategies. In addition, it is important to recognize that when conducting evaluations using CVP, differences among industries in financial structure and cost structure may affect the results. For that reason, it has become clear that normalization is

necessary to fairly and meaningfully carry out cross-sectoral CVP comparisons. Other use cases including the abovementioned remanufacturing use case have been examined in prior research [2-3].

3. Application to Value Networks

As stated in the introduction, in the circular business, value networks (VNs) are often formed, whereby multiple organizations cooperate and create value. Because CVP is calculated based on the common financial concepts of value added and expenditures, it can be used to assess not only individual organizations but also VNs. When CVP is applied to a VN, it is necessary to add a new interpretation to Equation 2, and in this case the equation is as follows:

$$CVP_{\mathrm{VN}} = \frac{\sum(S_{\mathrm{CE}i} - I_{\mathrm{CE}i})}{\sum(C_{\mathrm{CE}i} + G_{\mathrm{CE}i}) - \sum C_{Di}} \qquad (3)$$

In this equation, the subscript i denotes an index identifying each participating organization in the VN, and the summation is taken over all participating organizations. When CVP is applied to a VN, each organization that comprises the VN calculates the Y_{CE} and E_{CE} for their activities involving the VN, and these are aggregated. At that time, to prevent double counting of expenditures within the VN, the purchase costs of resources exchanged within the VN—denoted as C_{D} and including materials, products, services, information, and other items—need to be excluded from the cost of sales in the denominator [2].

4. Discussions at the Study Group

This chapter describes the content of the discussions held at the Study Group regarding the practical application of CVP. The main discussion items are shown in Table 1, which summarizes these by category; by issues, comments, questions, etc.; and by policies in response, discussions about issues, etc. As issues associated with the application of CVP, the main discussions concerned clarification of the definition of CE business (i.e., the Circular actions in Equation 1), the potential for disclosing CVP data, and the potential for acquiring data required to estimate CVP.

The definition of CE business has not yet been unified in the discussions on international

standardization. While the European Union (EU) has taken the lead through the EU taxonomy for sustainable activities, including criteria related to the CE, the impression is that this is still at the discussion stage, as there are some industries with detailed definitions and others without any definition [6]. In Japan as well, the definition of CE commerce is being developed within the Ministry of Economy, Trade and Industry's Circular Partners (CPs), but the definition of CE business as a whole has not yet been fully clarified [7]. At WBCSD, discussions are expected to proceed with the Global Circularity Protocol (GCP) [8]. It is difficult for individual companies to define CE business, but we expect that the definition will be clarified as the CE matures. Even if CVP values are disclosed while it remains uncertain which operations qualify as CE business, we consider it possible to prevent greenwashing if companies clarify what they have calculated as CE business.

Regarding the potential for disclosing CVP data, there may be cases in which CVP data constitutes sensitive information, given that it measures the efficiency of business operations. For this reason, it was pointed out that, at least in the initial stage, using CVP for internal purposes without disclosure can be an effective tool for promoting an efficient transition to a CE. If they do choose to disclose CVP data, it may be an option to use third-party certification to have just the final CVP value certified. It has also been pointed out that, because third-party certification entails costs, incentives that would make certification worthwhile for companies will be necessary. Based on opinions such as this, we think that if data is to be disclosed, conversion to data that can be disclosed, such as year-on-year comparisons, should also be considered. In that case, instead of presenting absolute values, methods such as showing the soundness of companies through combining this CVP data with other financial data should be considered in future. Also, it was pointed out that, as third-party certification is a field where Europe has taken the lead, if third-party certification is incorporated into CVP implementation, then international trends will need to be taken into account when considering the approach.

With regard to the availability of data for estimating CVP, it was pointed out that some method of distinguishing CE-related activities from existing business activities, for example by applying a certain ratio (i.e., a CE ratio), would be required. With respect to this point, however, it was pointed out that companies are undoubtedly calculating costs internally when they conduct CE business, so this should be left up to the companies. Nonetheless, we believe that, even in this case, the preparation of a simple certification system and guidelines could promote the spread of CVP.

In addition, discussions were held regarding issues relating not only to CVP, but to other indicators as well. This included motivation to use CVP and associated demand, an issue

also pointed out in the comments on third-party certification above. Benefits for companies are essential to spread the use of indicators.

Aside from issues, many expressed expectations that a market can be created using CVP and pointed out the importance of developing a framework linking CVP improvement to evaluations by financial institutions and investment decisions. Also, the possibility of proposing standards to the ISO, WBCSD, and other bodies was discussed as a means of contributing to international discussions on a CE. In addition, it was pointed out that, when examining these matters, it is necessary to formulate rules whereby diverse bodies including domestic companies can make a smooth transition to a CE.

Table 1: **Main Discussion Items at the Study Group**

Category	Issues, comments, questions, etc.	Policies in response, discussions about issues, etc.
Clarification of the definition of CE business	The definition of CE business is unclear.	・ From the perspective of taxonomy related to the CE, the EU is taking the lead; however, at present, it is still under development [6]. In Japan as well, the definition of CE commerce is making progress among CPs, but areas outside commerce are not defined [7]. At WBCSD, discussions are expected to proceed with the GCP [8]. ・ It is difficult for individual companies to define CE business, but we expect that the definition will be clarified as the CE matures. Even if CVP values are disclosed while it remains uncertain which operations qualify as CE business, we consider it possible to prevent greenwashing if companies clarify what they have calculated as CE business. ・ In the case of VNs, this may depend on whether or not the VN is a CE.
Difficulty of disclosing CVP data	The disclosure of data used in CVP calculation is difficult.	・ It was pointed out that, at least initially, using CVP internally without disclosure is effective as a tool for promoting an efficient transition to a CE. ・ If they do choose to disclose CVP data, it may be an option to use third-party certification to have just the final CVP value certified. ・ Conversion to data that can be disclosed, such as year-on-year comparisons, may also be possible.
	The disclosure of numerator and denominator data within VNs is difficult.	・ Data management by financial and other institutions as third parties is also possible. ・ Disclosing numerator and denominator values within a VN can be expected to have an effect in maintaining equity among the stakeholders that comprise the VN.
Difficulty of acquiring CVP	The acquisition of data separating CE business	・ Methods of separating CE business from existing business with some sort of ratio (i.e., a

data	and existing business is difficult.	CE ratio) will be necessary. ・ In this regard, it was pointed out that companies are undoubtedly calculating costs internally when they conduct CE business, so this should be left up to the companies. We believe that, even in this case, it might be advisable to prepare a simple certification system and guidelines.
Motivation to use CVP and associated demand	Can CVP become an indicator sought by financial institutions? Can this indicator be successfully linked to sustainable finance?	・ We believe that, among diverse sustainable finance indicators, CVP offers potential for linkage to sustainable finance as a CE indicator that accounts for economic viability. ・ Financial institutions are seeking an easily understood CE indicator, and CVP could be a candidate.
	Will new value be created by this indicator, such as formation of a new market?	・ CVP could make it possible to select economically efficient businesses for advancing the transition to a CE. In other words, clarifying economically inefficient CE transition businesses could enable areas that government should strengthen to be identified.
	It would be good if Japan could contribute to indicator design based on its knowledge and experience regarding circularity.	・ Japan's experience in household appliance recycling and other areas could be used in setting a CE taxonomy, etc.
	There do not appear to be clear benefits justifying the work-hours required for calculation.	・ It was pointed out that CVP can initially be used internally as an effective tool for advancing an efficient transition to a CE. ・ Thereafter, the range of use could be expanded if, compared with other indicators, it can be used as an effective tool for presentations to financial institutions, etc.
Target boundaries	Can CVP be used for everything from products to national governments? Companies want to use it for product promotion, and the standards must address VNs.	・ Regarding use on an individual-product basis, the calculations themselves are theoretically possible, but fundamentally CVP is intended to be used at the level of businesses to national governments. As everything need not be assessed using a single indicator, a different indicator may be better for product promotion.
Potential for CVP application	The indicator is difficult to use for infrastructure, buildings, and so forth, for which it takes a long time to recover investment.	・ The EU taxonomy for buildings and infrastructure is progressing. However, we consider that there are presently issues in using annual CVP values for infrastructure and construction businesses with long investment and recovery periods. Our assumption is that CVP will first be used in electrical, electronic, and service fields.
Standardization	It would be best to first push the cause at WBCSD; and as value added varies by industry, standards should be discussed and addressed individually at the ISO.	・ After standards for VNs are addressed, one option will be to prioritize influencing WBCSD.

5. Future Outlook

This chapter presents the potential future outlook following discussions at the Study Group. Initiatives to influence the ISO, WBCSD, and other bodies may be a powerful option as a policy for the formation of future CVP rules.

5.1 ISO: Significance of Rule Formation, and Actions to Be Taken

The formation of rules at the ISO is extremely important in ensuring international consistency and in constructing a framework that can be broadly accepted into regulations and industries in each country. In particular, ISO standards have strong efficacy in the World Trade Organization's Agreement on Technical Barriers to Trade and contribute to avoiding nontariff barriers in international trade. Consequently, it is important to be actively involved in standardization at the ISO to ensure international consistency and construct a framework that is fair and feasible in the regulatory environment of each country.

ISO 59011[9], which complements ISO 59010 [10] by providing requirements and guidance for organizing value networks towards a transition to a CE, is currently under development. As a concrete step, it is envisaged that CVP-related descriptions will first be added to an annex to ISO 59011 and positioned as one element of economic assessment in CE–oriented business. Thereafter, detailed discussions, including the definition and calculation methods of CVP, are expected to proceed within ISO/TC 323 Working Group 3 (WG3), with the possible future adoption of CVP as an ISO indicator also being considered.

5.2 WBCSD: Significance of Rule Formation, and Actions to Be Taken

WBCSD is strengthening its role as a de facto industry standard–setting body through international frameworks formulated by corporate initiative. In particular, the GCP is a comprehensive protocol for measuring, managing, and disclosing companies' CE performance, while the Circular Transition Indicators (CTI), which are its core indicators, determine the measurement of circularity and are thought to have an impact on companies' practices and disclosure. These frameworks may have a great influence on international business practices and reporting standards. For that reason, the formation of rules at WBCSD plays an important role in spreading circularity at the practical level, together with formal standardization by the ISO.

As a concrete action, it was proposed to position CVP within the GCP and combine it with existing indicators (e.g., CMP and CTI Revenue) in order to enable assessment that includes economic aspects. This is expected to allow a comprehensive evaluation

integrating environmental and economic indicators and to contribute to the development of a framework that supports companies' decision-making to accelerate their transition to a CE.

In addition, under BRIDGE Initiative 3 ("International Standardization Project for Value Chain Circularity Indicators and Corporate Disclosure Schemes") implemented by Japan's Ministry of the Environment, efforts are underway to contribute to the GCP under development by WBCSD by utilizing the outcomes of company-level circularity disclosure schemes. The initiative also aims to develop circularity indicators at the value chain level and to provide inputs to international standards and industry standards [11]. The discussions conducted at the Study Group may also contribute to these efforts.

6. Acknowledgements

In the preparation of this white paper, the H-AIST CE Lab. provided valuable materials and suggestions as the basis for discussions. We deeply appreciate their assistance.

7. References

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[10] International Organization for Standardization (ISO) : ISO 59010: Circular economy — Guidance on the transition of business models and value networks (2024)
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[11] BRIDGE Initiative 3: International Standardization Project for Value Chain Circularity Indicators and Corporate Disclosure Schemes
https://www.erca.go.jp/sip/bridge/pdf/shisaku3_01.pdf (in Japanese)

Appendix

Table A1 below shows the mapping of the 45 indicators presented in the H-AIST CE Lab.'s *2024 Activity Report* [A1-A2] onto six assessment scopes ranging from the "entire world" to "specific products and services" and 11 assessment items ranging from "focus on cost and value added" to "focus on employment, etc." While there are relatively many indicators concerning circularity and environmental impact, there are few indicators concerning sales, investments, and other monetary items and concerning society, awareness, etc. In particular, among indicators concerning sales, investments, and other monetary items, no indicators with a "focus on cost and value added" (the area in the red box) are seen in this survey, with only CVP, which is the proposed indicator, mentioned. The typical sources of the indicators shown in Table A1 are presented in Table A2.

The indicators in Table A1 were extracted through the following process: First, information regarding the CE was collected from sources including the ISO and other international organizations, corporate activities (such as those reported in environmental, social, and governance reports), national and local government policy materials and action plans, and academic papers. This led to the identification of approximately 1,400 indicators from a total of 34 types of resource materials. Indicators with similar meanings were then combined into a single indicator, resulting in around 770 indicators. To combine them further, they were recategorized based on the indicators used by CPs: In other words, indicators related to those used by CPs were combined with the CPs' indicators and unrelated indicators were added to cover areas that were lacking. As a result, 14 indicators were added to the CPs' indicators, yielding a final total of 45 indicators extracted.

Because of this organization process, many of the indicators have multiple sources, and Table A2 is therefore not an exhaustive list. Also, when combining indicators into the final 45, judgments were made regarding whether the indicators were related to CE initiatives. Accordingly, it should be noted that the individual indicators combined into a given indicator may not have equivalent meaning. The sources in Table A2 show the typical sources, in addition to which, those derived from the WBCSD CTI and the ISO are marked with checks. Even when including ISO 59020 [A3], ISO 59040 [A4], and CTI, there are no indicators with a "focus on cost and value added," and there is also a shortage of indicators from this perspective internationally.

Table A1: Recategorization of the H-AIST CE Lab.'s 45 Indicators[A1-A2]

		Assessment Items										
		Concerning sales, investments, and other monetary items			Concerning circularity and environmental impact (including design)					Concerning society, awareness, etc.		
		Focus on cost and value added	Focus on total weight and sales	Focus on total monetary amount	Focus on environmental impact (CO_2, etc.)	Focus on ratio of total quantity (use)	Focus on total quantity (use)	Focus on total quantity (waste)	Focus on product design	Focus on CE initiatives	Focus on CE awareness	Focus on employment, etc.
Assessment Scopes (Geographical and Physical Range)	**Entire world**	(#38)	#1		(#24)			(#5)		#19	(#27, #28, #29)	(#30)
	Regions and countries	(#38)	#1 (#10)	**#16 (#18)**	#24, #25	#3, #4, #7, #9	#20, #21, #22, #23	**#5, #15**		#19	#27, #28, #29, #42	#30, #31
	Corporate consortia (VNs)	#38	(#10)	**#16 (#18)**	#2, #25, #26	#3, #4, #9	#21, #22, #23	**(#5), #15**	(#32)	#6, (#12, #19)	#41 (#42)	
	Individual companies	#38	#10	**#16 #18**	#2, #25, #26, #39, #40	#3, #4, #8, #9, #15, #33, #34, #35, #37	#11, #21, #22, #23	**(#5), #15**	#32, #36	#12, #17, #19, #44, #45	#41, #43	
	Specific products and services (≈ entire world)	#38	(#10)	**(#16, #18)**		#3, #9, #33, #34, #35, #37	#13 (#21, #22)	**#14**	#36	#12		
	Specific products and services (limited measurement scope, not including Scope 3, etc.)				#2	(#4, #15)		**#15**				

Table A2: Sources of Indicators [A1-A2]

#	Indicator	Sources			#	Indicator	Sources		
		Typical source(s)	CTI	ISO			Typical source(s)	CTI	ISO
#1	CE market size	CPs, etc.	✓		#24	Interactions with the environment	CPs		
#2	GHG emissions reductions in the value chain	CPs, etc.	✓	✓	#25	Impact on biodiversity	CPs, etc.		
#3	Input-side reclaimed materials use rate	CPs	✓		#26	Ecological footprint	CPs, etc.	✓	✓
#4	Output-side reclamation rate	CPs, etc.	✓	✓	#27	Comprehensiveness of transition	CPs		
#5	Final disposal volume	CPs, etc.			#28	Citizens' awareness and behavior	CPs		
#6	Circularity in the value chain	CPs, etc.			#29	Proportion of ethically conscious consumers	CPs, etc.		
#7	Resource procurement volume	CPs			#30	Employment trends	CPs		
#8	Internal procurement rate of reclaimed materials	CPs			#31	Number of CE-related jobs created	CPs		
#9	Product production volume	CPs, etc.		✓	#32	Ecodesign adoption rate	CTI, etc.	✓	✓
#10	Resource productivity	CPs, etc.	✓	✓	#33	Critical materials rate	CTI	✓	
#11	Input volume of reclaimed material	CPs, etc.	✓	✓	#34	Non-virgin raw material content	CTI	✓	
#12	Product consumption activity	CPs, etc.		✓	#35	Reusable raw material content	CTI	✓	
#13	Natural resource consumption per product	CPs			#36	Resource recycling feasibility rate	CTI	✓	
#14	Waste generated per product	CPs	✓		#37	Actual resource circulation rate	CTI	✓	
#15	Waste disposal volume	CPs, etc.		✓	#38	Circular value-added productivity	H-AIST		
#16	Economic opportunities	CPs, etc.	✓	✓	#39	Renewable energy consumption	CTI	✓	
#17	Market formation and expansion	CPs, etc.			#40	Water circulation rate	CTI, etc.	✓	✓
#18	Investment in CE	CPs			#41	Number of CE corporations and personnel trained	OECD, etc.		
#19	Number of CE-related patent applications	CPs, etc.			#42	Degree of response to local characteristics	OECD, etc.		
#20	Economic impact of trade	CPs			#43	Strategy formulation and initiatives	Ellen MacArthur Foundation, etc.		
#21	Import volume of circulating resources	CPs, etc.			#44	Number of traceability disclosures	Circular Economy Indicators Coalition		
#22	Export volume of circulating resources	CPs, etc.			#45	Level of development of circular economy-related IT and systems	Ellen MacArthur Foundation		
#23	Export volume of products utilizing circulating resources	CPs, etc.							

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