Blue Accounting, Blue Finance, and Regional Blue Economy Performance: A Provincial Analysis Within Indonesia

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Abstract. This study aims to evaluate how blue finance and regional policy mechanisms contribute to provincial-level blue economy performance in Indonesia. A mixed-methods design was used, combining qualitative policy analysis with quantitative measurements of the Indonesian Blue Economy Index (IBEI) to assess regional sustainability performance. The findings indicate variations across provinces in achieving the established national IBEI targets. Higher IBEI scores for sustainability reporting indicate higher levels of resource management integration and transparent policy implementation. This study makes a theoretical contribution by positioning blue accounting as an extension of environmental accounting that strengthens governance within a blue economy framework. In practice, blue accounting and blue financial management make provincial blue economy accounts more accountable and facilitate increased targets in subsequent years. Furthermore, in maritime-related matters, it provides evidence-based guidance for local governments to improve strategic planning, fiscal alignment, and marine resource management. This study is limited by the availability and consistency of environmental disclosures across 38 provinces, which suggests opportunities for future longitudinal and cross-national analysis.

Keywords: *Blue Finance; Blue Economy; IBEI; Sustainability Governance; Regional Policy*
JEL Classification: Q56; Q57; Q1, H72,R58

1 Introduction

Green economy is just green without blue sustainable blue economy: The greening of the blue opposition Movement in a direction towards an economic path and toward sustainable development has been increasingly developed over the past decade focusing not only on terrestrial environment but also marine. The Indonesian Government, in particular the Ministry of Marine Affairs and Fisheries is actively promoting Blue Economy in the development of marine and fisheries. (3) The Blue Economy, which explicitly includes the principles of marine utilization including fisheries resources, energy and minerals in the sea and on land with coastlines and small islands as well as national non-conventional matters (Law No. 32/2014 related to Marine), then becomes a means for economic activity through processes that constitute part of the maritime industry, such as maritime tourism; shipping(the movement or transportation of goods) across the seas (maritime transport); construction activities at sea. With respect to the realization of Blue Economy in Indonesia, there are three main strategies: increasing the quality and quantity of conservation areas to support marine ecology and fishery resources; accelerating resource utiliz.

In recent years, global attention to the blue economy has increased due to increasing pressure on marine ecosystems, the growing importance of the maritime sector, and the need for economic models resilient to climate change [1]. As an archipelagic nation, Indonesia has strong potential to advance a blue economy framework; however, differences in policy implementation and governance across regions remain an ongoing challenge. Therefore, strengthening sustainability-oriented governance through mechanisms such as blue finance and accounting is increasingly relevant in bridging this gap [2].

Blue finance and accounting, as an extension of green accounting, aim to systematically recognize, measure, and report the economic value of marine and coastal resources in public decision-making systems. This approach ensures that environmental and social externalities are integrated into regional development planning and evaluation [3].

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Recent studies emphasize that integrating marine environmental accounting into policy design significantly improves transparency, accountability, and long-term sustainability, particularly in coastal areas that rely heavily on marine-based economic activities. Despite this growing relevance, empirical research applying blue finance and accounting to assess the effectiveness of regional policies remains limited, particularly given the differences across Indonesia's provinces.

New conservation areas will also be established in suggested fisheries management areas (FMA), especially those that intend to have fishing quota-based systems. Not only the creation of new protected areas, but also the enforcement of zoning in existing already established marine conservation areas will be scrutinized. The percentage of the no-take and no-entry zones will be enhanced in areas of high ecological value and environmental services. Assessment of the current conservation area will be carried out in the short term, up to the end of RPJMN 2024, while adding new conservation areas and changing existing areas' zoning are targeted then to be set in the medium-term period for RPJMN 2025-2029. Under the Quota-Based Fisheries Program, FMAs would be rationalized for industrial fisheries especially in relation to port infrastructure, fishery product processing plants, fishing vessels and other related economic activities. The fishing areas served by these fisheries are FMAs 572, 573, 711, 715, 716 and 718 (Figure 1, MMAF, 2022).



Figure 1. Implementation of quota-based fishing in the FMAs

Actual application over the 37 provinces of Indonesia (which is exclusive of coastal highlands in Papua) could be a long way from uniform. As a result, policy orientations, resource management practices and regional institutional readiness are also varied. This void necessitates a quantifiable and uniform measuring instrument to monitor the advance of each province in Indonesia. The Indonesian Blue Economy Index (IBEI), which was established to measure the economic, social, and ecological dimensions of blue economy performance, offers a valuable macro-level tool for examining these relative differences. Yet there are few studies investigating IBEI as an instrument on the basis of which to measure alignment in regional strategic planning with a given country's national blue economy agenda. This lack is the novelty of this research. This paper is an empirical study that explains discrepancies among provinces the blue economy performance in Indonesia, mainly concerning how accounting and blue finance practices either facilitate or hamper policy making to be implemented by each province. Through combining a qualitative analysis of strategic policy documents with life cycle sustainability indicator (IBEI) measurements, this study provides an integrated assessment of the extent to which local government policies have potential in supporting the development ambitions for Indonesia's blue economy. This is consistent with a stronger evidence-based framework for strengthening regional governance and sustainable and equitable marine resource management [4].

The study is anticipated to have both theoretical and practical contributions; enhancing the conceptual landscape of blue accounting and finance in the sustainable governance setting, and more precisely policy implications for regional governments. An understanding of how much blue accounting and finance affect the performance of IBEI will help to bridge strategic gaps in inter-regional coordination and provide a platform for Indonesia's transition to a

sustainable, balanced blue economic model. With reference to the research question, one of this study's main objectives is: how appropriate is the strategic design of regional government policies in helping Indonesia reach its blue economy goals? How is the success of RPI in accordance with the average performance of IBEI in Indonesia? What are the strategic elements that determine how regional policies foster blue growth in mature and emerging spaces? How are regional strategies in relation to national targets contained in the 2025–2045 National Medium-Term Development Plan and the 2025–2029 National Medium-Term Development Plan?

2 Literature Review

2.1. Blue Economy

Indonesia as an archipelagic country the world's largest one increasingly making the blue economy one of its key elements in accelerating national development. The blue economy focuses on the sustainable use of marine and coastal resources to promote economic growth, ecological integrity, and social well-being in the coastal communities. Recent international research shows that blue economy success is reliant on not only effective environmental governance, but also strong governance and accountability mechanisms combined with inclusive community engagement [5].

In order to systematically review the regional performance, Indonesia presented the IBEI (Indonesia Blue Economy Index) that consists of economic, environmental and social pillars. On the other hand, very little academic applies based on IBEI are found and there is a huge room for knowledge about how to assess blue economy among provinces. Nevertheless, previous studies tend to analyze each sector separately in the absence of an integrated evaluation on marine resource management and governance quality, as well as socio-economic condition, at a provincial level [6]. Consistent with these trends is the international dialogue on sustainable development where green accounting has subsequently given rise to what I now refer to as blue accounting.

Green accounting concerns environmental costs, carbon dioxide emissions and ecological damage. Blue accounting, on the other hand, would apply these same principles to marine ecosystems, emphasizing the valuation, acknowledgement and reporting of coastal and marine-based resources. This type of approach reinforces the transparency in marine governance and facilitates policy decision making over long-term by incorporating ecological capital into financial, development frameworks [7]. Another factor affecting the blue economy performance is the plurality of local cultural systems and including corpus law forms, local knowledge on marine resource and community-based management.

Generations of coastal communities have managed marine resources through governance institutions, but these resources continue to be absent from policy and economic systems. Preliminary investigations indicate that combining local culture and marine governance promotes collective management of the system, and leads to positive ecological results [8].

Priority Accounts Blue Acounting and Finance to be Developed

Table 1 at least requires the development of four accounts or modules for the realization of the Blue Economy in Indonesia. These accounts or modules are general ecosystem accounts (which cover the amount, state and monetary value of assets), flows to the economy, flows to the environment and governance accounts.

Preparing the Priority Accounts

The task force will subsequently have the prepared priority accounts initiated. Each account will have unique difficulties and concerns around data availability, common methods of standardization, technical readiness for preparation, and the complexity of problems. The idea is to optimize the best data we have at this time and plan for when more updated information will become available. Overall Ecosystem Accounting (national scale/Fishery Management Area) Nationalscale overall ecosystem accounting is the first to be developed. This account is extremely important in the management of marine resources, particularly concerning the processes by which resources are exploited and the effects of such exploitation on ecosystems over a given time period. The followings are the activities contained in the action plan for preparation of overall ecosystem accounts compilation of secondary data at national level, where in primary data collection for prioritized locations, analysis and presentation of data, and dissemination

Table 1. Priority for Accounts Module Papparation

No.	Accounts/Module	Priority		Technical Considerations
		Short – Medium Term	Medium – Long Term	
1.	Extent of area, condition, and monetary values of marine resources	√		- Secondary data is obtained from institutions and global datasets (satellite images). - Accounts on fish resources will be prepared as an individual ecosystem asset.
2.	The flow of goods and services into the economy	√		Focus on the standard industrial classification of (KBLI) as supported by the MMAF
3.	Flow of residuals (waste/pollution) into marine environment from economic activities	√		Secondary data will be relatively used, except for certain locations (ex. intensive use)
4.	Ocean economy		√	The economic sector is very large and beyond the MMAF authority
5.	Ocean governance	√		Involve policies and budgeting for marine spatial planning, conservation areas, species protection, FMA management planning, fisheries management plans, other sector regulations, and local/customary practices and rules.
6.	Combined presentation (summary tables)		√	Can only be compiled after all accounts or modules are completed
7.	Ocean wealth		√	

The accounts/modules are based on the guidelines provided by the Global Ocean Account Partnership (GOAP).

Resouces: MMAF (2022)

Fisheries Accounting (selected species)

The fisheries accounts form an integral part of the ecosystem accounts and are calculated as a systematic allocation to specific ecosystem assets. Fisheries accounting can contribute to transmitting changes in the broader ecosystem down to fisheries resource stocks. There is also the need to investigate the effect of economic use on fish stocks and population health, as fish resources are one of the major ecosystem services. The action plan for fisheries accounting preparation is Collection of secondary data on national production, Collecting primary data on priority species, Analysis and production of Statistics, and Publicity.

3 Methodology

3.1. Population, Sampling Technique, and Data Collection

This research has been undertaken to see through the potential of a blue economy following long and medium term development policy of Indonesia at province level. This potential was demonstrated by the formulation of sub-national development goals which already complement the national blue-growth agenda both directly and indirectly. Hence, the study population comprised all the provincial governments throughout Indonesia. By 2025, Indonesia would have 38 provinces and all these province will become part of the target population. Secondary data, mostly planning documents such as RPJPD and RPJMD in regions were utilized in this study. The methodology of data collection involves review of existing sources in the form of literature and official documents by local governments and relevant ministries.

1. This is a qualitative study and sampling was done purposively on this following criteria:
2. The province has launched its revised RPJPD on the basis that targets for new development evolve.
3. The RPJPD and the RPJMD are designed toward 2025–2045 (RPJPD) and 2025–2029 (RPJMD).
4. Both RPJPD and RPJMD are disbursed in public, either online or offline.

Specifically, the RPJPD documents mention the Blue Economy Index (IBEI) as a long-term development achievement indicator.

This criteria selection makes it possible to guarantee that the selected provinces do effectively have the strategic condition to integrate blue economy in their regional development planning framework.

Table 2. IBEI and Blue Economics Pillar Achievement Gap

	GAP		
	ECONOMICS	ENVIRONMENT	SOCIAL
LOW	< 14.30	< 7.30	> -35.5
MIDDLE	14.30 sd 31.27	7.30 sd 19.76	35.5 sd -6.5
HIGH	31.27 sd 48.25	19.76 sd 32.23	-6.5 sd 22.5

Source: Processed data (2025)

4 Research Result

4.1. Explore and analyze the accuracy of regional government policy strategic Design in supporting the achievement of a national blue economy

The efficiency of the local government policies in promoting the blue economy can be seen from the gap between BEI achievement level and blue economy pillar achievement level obtained for each province. The distinction between achievement levels can be grouped into clusters of low, moderate, and high as presented in Table 3. This study further grouped provinces according to these classification criteria. The distribution of the number of provinces in each standard are presented in Table 3 below. From Table 3, we may also observe that blue economy pillar was given substantial attention in blue economy achievement priorities. It is also reflected in the numbers, where differences are over and above regional IBEI rates. Provincial thrust must be on attaining the blue economy pillar that is beyond the minimum mandatory IBEI level." So the government's own strategic plan is all you need to achieve the blue economy.

Table 3. Number of provinces in each category

	Number of Provinces		
	Economics	Environment	Social
Low	6	5	19
Middle	19	20	12
High	9	9	3

Source: Processed data (2025)

4.2. Measuring the achievement of the blue economy index (IBEI) at the provincial level as a reflection of the implementation of sustainable marine and fisheries policies

The measurement of the Indonesian Blue Economy Index (IBEI) at Provincial level is a strategic criterion to determine how far local governments implement marine and fisheries sustainable policy. Adopting three dimensions including economic, environmental and social development axes, IBEI serves as a comprehensive index to reflect how provinces' development is in accordance with the national blue economy desires. The 2023 IBEI finds large differences between Indonesia's 34 provinces representing different combinations for institutional capacity, resource governance, cultural cohesion and prioritization in local policies. Provinces like South Sulawesi (80.86), East Java (71.63) and East Nusa Tenggara (68.50) have consistently showed higher performance compared to other regions, indicative of greater convergence with an integrated sustainability governance framework under the Malaysian context that is in place in this paper.

These drive provinces show a stronger correlation between top and detailed strategic planning instruments (RPJMD/RPJPD) and operational policies on MAFF, fisheries, coastal tourism (conservation), and sea logistics. Resorting to the IBEI as basic indicator is closely related with blue accounting of marine resources values, depletion and restoration costs and also asset sustainability. Blue accounting is conceptually similar to green accounting, but its focus lies on coastal and marine ecosystems. Most provinces with high score in IBEI have greater accounting integration, such as a clear registering of objective-based budget execution, also watching for the registration of marine conservation expenses, regular reports on coastal asset states (and filters to assess environmental degradation and recovery). For instance, regions such as Central Java, Maluku, and East Nusa Tenggara exhibit reporting habits wherein pollution is reported along with investments in the social sector and help policy makers assess trade-offs that are sustainable. In the meanwhile, less wealthy provinces generally do not have a system accounting for ecosystem-based values; This results in no or fragmented policy implementation and insufficient quality of economic aggregate data as well as short-term oriented land use planning.

Provincial differences are also the product of cultural management regimes and patterns of community marine management. 3.2 Local governance mechanisms Indigenous institutions, be they Sasi (Maluku and Papua), Panglima Laot (Aceh) or Awig-awig (Bali/Lombok) continue to have a strong influence over the regulation of access, conservation practices and social norms governing local management of coastal resources. Regions that are successful in integrating cultural systems with formal policy arrangements commonly exhibit higher environmental and socio stability indicators. Local cultural capital not only promotes marine adherence, but extends blue accounting by providing social indicators and nonmonetary metrics to accommodate cultural stewardship, community involvement and traditional ecological knowledge. These trends illustrate the need to integrate contemporary sustainability discourses with established local institutions in order to attain more durable blue economic development.

4.3. Identify factors that determine the effectiveness of regional policies in supporting priority and emerging blue economy sectors

he success of regional government policies in promoting Indonesia's blue economy agenda is influenced by a selection of institutional, financial, social, environmental and cultural drivers. As was mentioned in the abstract and introduction of this study, IBEI which is a macro-scale indicator can be utilised as an early warning system for policy disparities among provinces. Although there have been provinces in which accounts for marine environment are produced, such as Central Java East Nusa Tenggara and Maluku, now days we can start to admit the progress of a guide to use the system toward sustainable economic production is not well implemented due fundamentally to its unsufficient integration with public policy planning. This section recognizes and explains the drivers and constraints in policy effectiveness, putting emphasis on the potential instrumental role of blue accounting to link regional governance outputs to national blue economy aspirations.

Institutional capacity should provide the basis for sound blue economy policy. Provinces with strong governance and clear regulatory mechanisms, as well as coordination between local and national bodies typically have higher synthetic IBEI scores. It allows for policies to be made and implemented in a consistent manner across sectors. Limited or weak institutional capacity undermines coordinated planning, enforcement of rules, and promoting marine environmental accounting in policy review.

This perspective not only recognizes the significance of governance in transitions towards sustainability. [9] for instance, argue that governance factors have a great impact on the effectiveness of green and blue economy initiatives at Indonesian SOEs, including accountability and transparency. This is mirrored in the case of Indonesia, where places with good governance accommodate much more with the national blue economy targets.

Another important determinant is fiscal capacity. Wealthier provinces will have a budget to create infrastructure, research and monitoring structures necessary for the sustainable management of resources. On the other hand, fiscal constraints hamper regional governments' capacity to enforce bold plans, especially in more isolated or lowdeveloped coastal areas. Blue accounting allows provinces to more strategically allocate resources by factoring environmental and social externalities into fiscal decisions.

Investment in the marine economy has been proven to pay off also as a contribution to national GDP especially because of financial return within renewables, fisheries and biotechnology [10]. This is why it is so important to ensure that this more advanced and mature industry receives enough funding. Evidence-based policy requires quality data. Blue accounting is in its essence the evaluation and reporting of marine resources, which forms the basis for adaptive governance. Ideas on how to fish Diffusion Fishers Resources Socio-economy exists (including active, sustainably exploited resources) Fact Coastal ecosystems The index includes fishermen, coastal eco-systems and social-economic components. The IBEI provides a standardized way to represent information from many data sources, and its value depends on local governments' commitment to capturing and reporting good information for public use. To make good local policy, community engagement is key. Local institutions that encourage sustainable management include the Sasi System in Maluku and Panglima Laot in Aceh..

[11] highlights that marine tourism, as one aspect of the blue economy, relies significantly on ecosystem health and conservation efforts. Any good policy must be part of a wider strategy on conservation and climate preparation, including efforts to reduce greenhouse gas emissions. The cultural dimension is key for policies to work. Customary practice and local knowledge are the standards against which community activities and resource use decisions are determined. Kenduri Laut in Aceh and awig-awig in Bali are cultural practices reflecting the values of being balanced with nature, as well as between humans. Place-based policies that recognise and include the 'culture bring more effective as they are in line with local identity, creating strong roots for owning solutions of sustainability. Grassroots-based policies are also expected to be supportive of national targets, as stated in the 2025–2045 National Medium-Term Development Plan (RPJPN) and the 2025–2019 National Medium-Term Development Plan (RPJMN). Provinces that adopt this framework have enhanced institutional legitimacy, opportunities for funding and more reason to expect policy coherence. If these are not in line then communities will work at cross purposes, chasing their tails and expending energy where it is least productive.

[12], for instance, argue that Indonesia's blue economy policy during the leadership of Joko Widodo reached its climax when it matched the Sustainable Development Goals (SDGs) in order to produce local-national resonance. Its ability to compete in new areas such as marine biotechnology, offshore renewable energy and so-called 'ocean science' depends on having skilled people with the freedom to innovate. Provinces with good education and research facilities have a sustainable growth potential for the two sectors. [10] also recognizes that human capital is an important contributor to the development of sustainable ocean economies, since education and training investment may increase productivity and induce adaptive governance. Finally, inter-regional collaboration is essential. Coastal and marine systems frequently cross several provinces, requiring cooperative management to avoid resource competition while

ensuring long-term sustainability. Toward a better system Collaboration mechanisms allow regions to exchange data, calibrate laws and work together on infrastructure.

However, [13] analyzed Indonesia cooperation with FAO in Lombok and concluded the practice of international and inter-regional cooperation played a major role in enhancing blue economy policies. The suitability of regional policies to facilitate the growth of mature and nascent blue economy sectors is conditioned by institutional capability, financial resources, data integration, community engagement, environmental conditions, cultural values, political coherence and human resource capacity and inter-regional cooperation. As outlined in the abstract and introduction, provin-cial differences in IBEI performance are indicative of variation between provinces with respect to the incorporation of blue accounting into governance. Those provinces that mainstream real economy and blue accounting within policy process, allocate adequate budget resources, ground the coastal/great green walling agenda in communities, and align to national priorities are likely to have balanced economic, social and environmental outcomes. Supporting these enhancers through integrated, evidence-based and culturally relevant methods is crucial for achieving a sustainable, inclusive and resilient blue economy in the varied provinces of Indonesia.

4.4. Provide data-based policy recommendations and macro analysis to strengthen the role of regional governments in Indonesia's blue economy development agenda

Implementable regional actions for the Indonesian blue economy necessitate policy reforms that are supported by an enabling data system, sustainable finance, institutional capacity, and culturally sensitive governance. The macro-patterns generated by the provincial IBEI scores indicate three priorities as regards policies: (1) reduction of stubborn data and accounting gaps through adoption of blue/green accounting, (2) harmonization of fiscal incentives and budget allocations to observable goals in IBEI target initiatives, and (3) scaling of culturally appropriate arrangements for managing resources at community level that enhance compliance and social externalities. The recommendations that follow are evidence-based and operationally oriented.

Institutionalizing Blue & Green Accounting at the provincial level presents a new challenge for provincial finance and planning offices, requiring them to capture marine natural capital, ecosystem services, and environmental liabilities. Integrate these modules into existing green accounting practices to create an integrated marine-environmental accounting system [7]. Require provinces to publish annual Provincial Marine Reports and link them to the performance indicators of the Regional Medium-Term Development Plan (RPJPD/RPJMD). Public disclosure will increase transparency and enable comparative benchmarking using the IBEI sub-indices. Provide national templates (minimum data fields) and technical assistance for assessment methods (stock assessment, habitat assessment, cost-avoidance approach) so that provinces can produce comparable reports.

Macroanalysis with spatial targeting. Use IBEI mapping to classify provinces into typologies (High-High, High-Low, Low-Low in terms of environment vs. economy). Adjust the policy mix: conservation and support for value-added industries for provinces with High Environment or Low Economy; restoration and regulation for provinces with High Economy/Low Environment.

Scenario projections. Apply scenario analysis (status quo, accounting adoption, investment acceleration) using IBEI trend projections (as previously generated) to estimate national aggregate outcomes for 2025–2030 and fiscal requirements for different ambitions: climate resilience and shocks. Integrate adaptation climate stress tests into IBEI projections, estimate potential IBEI losses from sea level rise and extreme events, and prioritize investments in vulnerable provinces.

Implementation Roadmap (Short, Medium, Long Term). Short (1–2 years): Pilot blue accounting in 5 provinces (various typologies); launch of a national blue data platform; Establishment of pilot conditional grants linked to the IBEI. Medium (3–5 years): Scale up marine accounting to all provinces; institutionalize task forces; launch provincial Centers of Excellence. Long (5–10 years): Mainstreaming the IBEI into national budgeting and the RPJPN/RPJMN review process; development of a blue bond market and regular PES schemes.

5 Conclusion

According to the 2023 Indonesia Blue Economy Index (IBEI) in 38 provinces, there are significant inequality on blue economy progress against economic disparity. Provinces that have more marine-oriented industry like South Sulawesi, East Java, and East Nusa Tenggara showed higher value addition in fisheries, tourism, shipping, and coastal space. Nonetheless, majority of the province remains to be classified as having poor or fair performance in the economic pillar indicating low level diversification, less value-adding processing and underinvestment for marine-based economic activities. This observational collection of facts sheds light on regional blue economy potential which is largely underutilised in both contexts, and will need stronger use of blue accounting, targeted fiscal incentives as well investment in sustainable marine value chains to increase productivity and long-term economic resilience.

Socially, the IBEI results show that social contexts are still the strongest point in most of Indonesian provinces, especially in areas which being hold strong coastal cultural heritages and having long history on the community-based marine practices. Local cultures, customs and various traditional marine resource management systems contribute toward creating social resilience. However, some provinces are still confronted with issues of poverty along the coast, lack-of access to health and education services, regional imbalances in ocean economic opportunities. Building community human capacities will be the most important element to ensure blue economy growth delivers a broadened social impact and promotes inter-generational empowerment.

Good governance evaluations reveal that the policy Design, planning quality and sustainability monitoring are paramount for provincial blue economy performance. Few provinces have good consistency between RPJPD/RPJMD Affordable Targets and IBEI measurable indicators. Other countries, however, reveal weaknesses in data availability, monitoring systems and the incorporation of marine environmental accounting into policy processes. Consequently, governance strengthening should focus on institutionalising blue and green accounting systems, building transparency in the management of resources, establishing data infrastructure at provincial scales, and harmonizing this information between national and regional tiers. Together with a robust system of governance based on clear performance criteria, monitoring, and community involvement, Indonesia's 38 provinces will be prepared to facilitate the transition towards a balanced, visible and accountable blue economy model.

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