

Measuring the Impact of the Blue Economy

OCTOBER 2026

A Triple-Bottom-Line Framework for Innovators



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Earth Economics acknowledges that we operate on the lands of the Coast Salish peoples, specifically the ancestral homelands of the Puyallup Tribe of Indians, and the 1854 Medicine Creek Treaty.

Introduction

THE BLUE ECONOMY

Forty percent of the U.S. population lives in coastal counties, though these form just 10 percent of the nation's landmass. These counties produce \$10 trillion in goods and services, employ 54.6 million people, and pay \$4 trillion in wages. The concept of the "blue economy," which emerged at the 2012 UN Conference on Sustainable Development in Rio de Janeiro, is characterized by innovations and activities that make sustainable use of ocean resources to improve livelihoods, while preserving the health of marine and coastal ecosystems. A truly sustainable blue economy requires addressing interdependencies between environmental, economic, and social factors, often referred to as the "triple-bottom-line" (OECD, 2016). The central challenge is finding healthy equilibria between marine ecosystems, coastal communities, and ocean-based industries.

Emergent ocean-based industries can help to overcome economic, social, and environmental challenges facing communities by proposing alternatives to how society interacts with marine life, through innovations in aquaculture, renewable energy, biotechnology, etc. According to the *Ocean Impact Navigator*, the blue economy can lead to "rigorous and efficient ocean regeneration and protection, sustainable production, and equitable prosperity to serve people and the planet, both now and in the future" (Vincent et al., 2022). The ocean is a central pillar of the modern global economy—nearly all international goods (90 percent) are shipped overseas, the seafood sector employs 237 million people, and millions more work in ports and tourism. Three billion people rely on the ocean for protein and crucial nutrients, while coastal habitats protect hundreds of millions of people (Stuchtey et al., 2020). A truly sustainable blue economy provides jobs and food while addressing inequality and protecting marine and coastal ecosystems to reduce disaster risk.

ABOUT MARITIME BLUE

Maritime Blue is an independent 501(c)(3) strategic alliance that fosters collaboration among industry, government, academia, communities, and investors to create sustainable maritime and ocean industries and propel the Pacific Northwest toward global leadership in ocean-based innovation. It empowers regional actors to thrive in the Blue Economy by accelerating innovation and entrepreneurship, centering equity, addressing climate change, restoring marine ecosystems, and building a diverse workforce.

Maritime Blue has supported the development of clean hydrogen for port and maritime applications, the West Coast offshore wind supply chain, zero-emission high-speed hydrofoil vessels, and robust connectivity networks for port activities. Its incubator and accelerator programs produce technologies and approaches actively targeting the protection of marine life. Additionally, its youth and training programs integrate equity and inclusiveness to create and retain a diverse workforce as a critical pillar to the sector's long-term sustainability.



ALIGNMENT WITH THE UN SUSTAINABLE DEVELOPMENT GOALS

The United Nation's *Sustainable Development Goals (SDGs)* establish targets for human, societal, and planetary well-being. According to Littig and Griessler (2005), society, economies, and the environment are interconnected systems that achieve balance over time to encourage human achievement (Figure 1).

Although the blue economy is bound to impact every SDG, the following selections are relevant along with their practical significance in terms of sustainability and equity impacts color-coded by an environmental, economic, or social dimension in Table 1).

Figure 1. The Triple-Bottom-Line of Sustainability

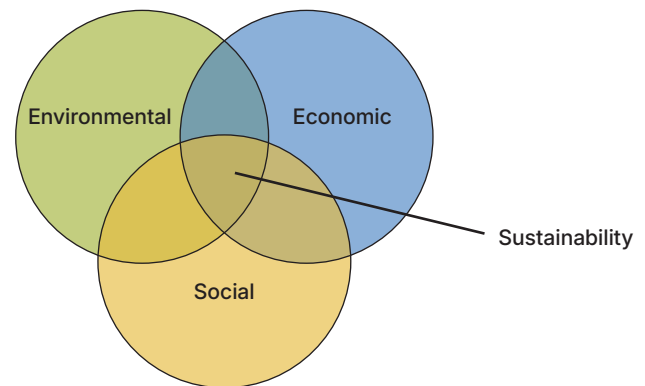


Table 1. SDG Impacts by Dimension

Sustainable Development Goals	Economic	Environmental	Social	References
 #2 Zero Hunger	Sustainable agricultural productivity		Improved nutrition; Health outcomes	2, 4, 5
 #3 Good Health and Well-Being			Better health; Longevity	5, 7, 9
 #5 Gender Equality	Increased economic participation; Productivity from women		Greater social justice; Equity	2, 5, 7, 9
 #6 Clean Water and Sanitation		Protection and sustainable management of water resources	Social well-being	1, 3, 5, 7
 #7 Affordable and Clean Energy	Reduced energy costs; Economic opportunities in renewable energy	Lower greenhouse gas emissions; Reduced environmental impact		1, 3, 5, 6, 8
 #8 Decent Work and Economic Growth	Sustainable economic development; Job creation		Improved livelihoods	1, 2, 4, 9
 #9 Industry, Innovation and Infrastructure	Enhanced productivity; Economic growth	Innovation in sustainable technologies		1, 3, 4
 #10 Reduced Inequalities	More equitable distribution of wealth		Greater social cohesion	2, 7, 9
 #11 Sustainable Cities and Communities	Efficient resource use; Economic resilience	Reduced environmental footprint; Improved urban ecosystems	Enhanced quality of urban life	1, 3, 9
 #12 Responsible Consumption and Production	Cost savings; Economic opportunities through efficiency	Minimized waste; Sustainable resource use		1, 3, 6
 #13 Climate Action	Mitigation of economic risks	Reduction of greenhouse gas emissions; Adaptation to climate change		1, 4, 5, 9
 #14 Life Below Water		Healthy marine ecosystems; Biodiversity		3, 6, 8

References: 1. WCED, 1987; 2. Littig and Griessler, 2005; 3. Kumar, 2012; 4. Slaper and Hall, 2011; 5. UN, 2015; 6. UN ESCAP, 2015; 7. UN DESA, 2017; 8. UN, 2019; 9. UN DESA, 2020

MARITIME BLUE FOCUS AREAS

The Washington State Strategy for the Blue Economy published in 2019 outlines a plan for a growing maritime economy spanning a wide range of sectors and supporting living-wage jobs, a healthy environment, and resilient communities. This led to development of strategic focus areas (Table 2).

Their broad scope highlights the diversity of blue cluster industries and stakeholders, spanning entrepreneurs, government (local, state, federal, Tribal), academia, nonprofit and community organizations, and investors. Around the world, blue economy innovations are emerging to provide economic opportunity and address social inequity and ameliorate climate and ecological crises (Quist and Roukouni, 2020; Schopmeyer et al., 2017; Saether and Moe, 2021; Swansea Council, 2023; New Zealand Ministry for Prime Industries, 2024) (Table 2).

Table 2. Five Strategic Focus Areas and Global Case Studies

1	Sustainable Fishing and Seafood The practices, policies, markets, and technologies that together ensure the long-term, just, and regenerative provisioning of food from the ocean.	Quota Management System, New Zealand - Local governments have established a system controlling fish harvests to prevent overfishing, promoting ecological balance while supporting livelihoods - Impacts food security and marine ecosystems
2	Healthy Ocean Ecosystems Ecosystems that are biologically diverse, ecologically functional, able to sustainably support subsistence and economic activity, and resilient to human pressures.	Coral Restoration Foundation, Florida, USA - The Foundation is designing and implementing scalable coral reef restoration techniques including coral farming and transplantation to combat coral degradation - Impacts biodiversity conservation, marine ecosystems, and educational outcomes
3	Digital Transformation The adoption of digital tools and data-driven processes to modernize business models, improve operational efficiency, insights, and create new value streams.	Port of Rotterdam's Digital Twin, Netherlands - Using advanced data analytics, the port has created a digital twin that models port activity to optimize logistics, reduce emissions, and increase efficiency - Impacts economic growth, food security, marine ecosystems, and collaborative partnerships
4	Maritime Decarbonization The transition of the maritime industry towards net zero emissions by 2050 through the broad adoption and deployment of low and zero emission vessels, supportive technologies, and infrastructure development.	Electric Ferry Project, Norway - The Ampere ferry operates in the Sognefjord and is the world's first battery electric ferry, generating significantly fewer emissions than conventional ferries - Impacts climate mitigation, marine ecosystems, economic growth, and community mobility
5	Renewable Ocean Energy Energy harnessed from oceanic sources in ways that are naturally replenished, such as wind, wave, thermal, and salinity gradients.	Renewable Ocean Energy: Blue Eden, Swansea, UK - The Swansea Council has laid the groundwork for a large-scale tidal energy project aimed at producing clean energy through underwater turbines and mitigating coastal erosion - Impacts renewable energy generation, climate resilience, and socio-economic inequities

REPORT AIMS

Blue economy stakeholders design and implement innovations that directly impact SDG outcomes; measuring such impacts can attract investment and support new technologies, to the benefit of communities and the environment. However, as the *Ocean Impact Navigator* highlights, defining and selecting appropriate metrics across blue clusters can be challenging.

The *Ocean Impact Navigator* convened 14 organizations to compare approaches in measuring sustainability and equity impacts in the blue economy. Each reported the lack of a unified impact framework (Vincent et al., 2022), and that although it was relatively straightforward to identify and leverage operational indicators (e.g., participation in training programs), tracing impact-oriented indicators was challenging (e.g., effects on destructive fishing).

Photon Marine deploys electric workboats at the Port of Friday Harbor.

The goal of this report is to develop a conceptual Blue Economy Impact Framework (BEI) that blue economy clusters and decision-makers can use in their efforts to assess the sustainability impacts of innovations and practices.

Guided by Maritime Blue's five focus areas, the BEI centers on the Pacific Northwest context and is intended as a tool to help stakeholders better understand blue economy impacts, synergies, and trade-offs.

The BEI also informs the design and implementation of ocean innovations, the impact of investments, and data collection, monitoring, and reporting processes. The framework helps blue clusters to compare, discuss, establish Key Performance Indicator (KPI) benchmarks, and implement strategic decisions.

KEY TERMS

BEI Framework = Blue Economy Impact Framework

TBL = Triple-Bottom-Line

KPI = Key Performance Indicator



Establishing a Key Performance Indicator Framework

DEFINING KPI FRAMEWORKS

Key Performance Indicators (KPIs) are measures of how effectively an organization, process, or project is achieving a key objective (Kantor et al., 2019). They can enhance communication, transparency, effectiveness, and accountability, and function as a readily understood tool to assess movement towards sustainable development objectives (FAO, 1999).

Relevant KPIs must match the needs of local stakeholders and projects and conform to local policies and political contexts. Accordingly, there are no universally accepted triple-bottom-line standards (Slaper et al., 2011). This is also true of the blue economy, which lacks an “off-the-shelf” KPI impact framework for evaluating the impact of innovation (Vincent et al., 2022).

According to Cardoso-Andrade et al., (2022) ideal KPIs are:

- relevant to policy objectives
- unambiguous, reliable, and accurate
- useful for monitoring and reflecting changing status
- linked to baseline data
- unique

BLUE ECONOMY KPI FRAMEWORKS

Literature review

Earth Economics reviewed over three hundred sources on blue economy innovations and sustainability, before selecting eleven frameworks with KPIs based on their relevance to the five focus areas and a Pacific Northwest context. Each framework addresses at least two sustainability domains and one focus area. The seven frameworks that offered quantitative KPIs became the initial basis of the Blue Economy Impact (BEI) Framework (Table 3). More than half include all three domains and three focus areas (Table 4).

Table 3. Seven Frameworks Aggregated into the BEI Framework

	Smart Port Index (Molavi et al., 2020)	Maritime Economic Impacts (McKinley Research Group, 2023)	Digital and Marine Fishery Economies (Jiang et al., 2024)	Sustainable Marine Capture Fisheries (FAO, 1999)	Ocean Impact Navigator (Vincent et al., 2022)	Vital Signs Framework (Puget Sound Partnership, 2024)	Coastal MPAs (Cardoso et al., 2022)
1 Sustainable Fishing and Seafood		●	●	●	●	●	●
2 Healthy Ocean Ecosystems	●		●	●	●	●	●
3 Digital Transformation	●	●	●				
4 Maritime Decarbonization	●				●		●
5 Renewable Ocean Energy	●				●		
INDUSTRIAL FOCUS ← SUSTAINABILITY → ECOSYSTEM FOCUS							

Table 4. Blue Economy Frameworks and Associated KPIs, Metrics, Domains, and Focus Areas

Focus Areas: 1) Sustainable Fishing and Seafood, 2) Healthy Ocean Ecosystems, 3) Digital Transformation, 4) Maritime Decarbonization, 5) Renewable Ocean Energy

Source	Framework	KPIs	Metrics	Economic	Environmental	Social	Focus Areas
Anderson et al., 2015	Fishery Performance Indicators: A Management Tool for Triple-bottom-line Outcomes	68	No	●	●	●	1
Cardoso-Andrade et al., 2022	Setting Performance Indicators for Coastal Marine Protected Areas	132	Yes	●	●	●	1, 2, 4
FAO, 1999	Indicators for Sustainable Development of Marine Capture Fisheries	35	No	●	●	●	1, 2
Ashford, 2024	Selected interconnections between human health and activities in and around the ocean	39	No		●	●	1, 2, 5
Jiang et al., 2024	Digital economy and marine fishery economy quality indicator system	26	Yes	●	●		1, 2, 3
Kantor et al., 2019	Key performance indicators in industry and for industrial symbiosis	108	Yes	●	●	●	2
McKinley Research Group, 2023	WA Maritime Economic Impacts	19	Yes		●	●	1, 3
Molavi et al., 2020	A framework for building a smart port and smart port index	88	Yes	●	●		2, 3, 4, 5
OECD, 2025	Sustainable Ocean Economy Database	99	Yes	●	●		1, 2, 3, 4, 5
Puget Sound Partnership, 2024	Vital Signs Framework	72	Yes	●	●	●	1, 2
Vincent et al., 2022	Ocean Impact Navigator	30	No	●	●	●	1, 2, 4, 5

Spectrum of the blue economy

The literature review identified a broad diversity of blue economy focus areas, reflecting the richness and complexity of ocean sustainability. Several frameworks are oriented towards fishing and shipping industries, such as the Food and Agriculture Organization (FAO) Fishery Resources Division's four-part assessment (ecological, economic, social, institutional) of fishery status and performance (FAO 1999). Kantor et al., (2019) identified KPIs of synergies and trade-offs across a range of industrial sectors. Two frameworks leverage indicators for digital transformation: Molavi et al., (2020) focused on efficiency, decarbonization, and pollution abatement at "smart ports," while Jiang et al., (2024) combined digital economy and fisheries indicators.

Finally, the McKinley Research Group (2023) developed 19 economic indicators for Washington state's maritime industry, including ridership on ferries and cruise ships.

Several frameworks emphasize environmental health. 21 of 30 KPIs in the *Ocean Impact Navigator* concern habitat protection (see Figure 13 of Vincent et al., 2022); the remainder focus on economic growth and social well-being. The framework developed by Cardoso-Andrade et al., (2022) offers 132 indicators of ecological and socio-economic impacts, focused on implementing and managing marine protected areas (MPAs). Many KPIs address biodiversity impacts (e.g., population density, species richness).

Finally, the Puget Sound Partnership is a state agency established in 2007 to coordinate the efforts of citizens, governments, tribes, scientists, and businesses to restore and protect Puget Sound. They developed a set of quantitative and qualitative indicators to monitor ecosystem restoration and conservation progress (Puget Sound Partnership, 2018). Their *Vital Signs* framework is unique in combining 72 indicators for habitat, species, and human health, and offers a comprehensive and dynamic approach for protecting the Puget Sound ecosystem. *Vital Signs* indicators emphasize species of considerable regional cultural value (e.g., salmon, orcas).

Qualitative measures and indexes

While each of these KPI frameworks can inform blue economy stakeholders, Earth Economics chose to omit purely qualitative indicators (e.g., Ashford, 2024). Nevertheless, qualitative frameworks can be important for engaging local communities and incorporating their insights, especially regarding the complex relationships between sustainability factors.

Both the *Vital Signs* and Coastal MPA frameworks include qualitative indicators that require direct stakeholder input. For example, the status of local hunting, fishing, and foraging is determined by local stakeholders, as are perceptions about the value of MPAs. There are also several indicators bundled as composite indices (e.g., terrestrial bird populations, human-associated species, forest interior species).

BUILDING THE BEI FRAMEWORK

Synthesis and boundaries

Earth Economics assessed the relevance of the selected KPI frameworks to the five focus areas. Few KPIs addressed social equity or renewable ocean energy, so we identified additional sources incorporating metrics of equity (Österblom et al., 2020; City of Oakland, 2018) and renewable energy (Parker et al., 2025) impacts. Furthermore, Earth Economics consulted with Maritime Blue staff to identify and incorporate KPIs relevant to the growth of start-ups.

KPI frameworks must necessarily fall somewhere along a spectrum between universality and specificity. A list of KPIs applicable to any blue economy (regardless of context) would be impractical. On the other hand, a standardized framework must remain transferable and relevant to multiple blue economy clusters. Towards this end, Earth Economics designed the BEI with primary consideration for blue economy clusters in Washington State's maritime industries. While KPIs relating to the national economy (e.g., OECD, 2025) have been omitted here, in borrowing from frameworks based on SDGs and emphasizing diverse maritime sectors, the BEI strives to be transferable to other coastal regions.

Finally, to produce a succinct list of KPIs, Earth Economics applied the following filters:

- Duplicate KPIs were removed
- Minor variations were merged
- Indicators applicable to Washington State's maritime or estuarine contexts were prioritized
- Indicators less relevant to sustainability dimensions or focus areas (e.g., operational safety) were omitted
- Qualitative indicators (e.g., public perceptions) were omitted

Results: KPIs and sustainability impacts

Table 5 highlights select KPIs from this synthesis (see Appendix B for full list). Sub-indicators detail greater specificity for each KPI. Relevant impacts from Table 1 are attributed to each KPI based on the sustainability area they directly or indirectly address.

Table 5. Highlighted KPIs (see Appendix B for full list)

Domain	KPI	Sub-indicator	Metric	Relevant impacts	Reference
Environmental	Volume of biomass preserved or restored		Cubic meters	Healthy marine ecosystems; Biodiversity	Vincent et al., 2022
Environmental	Nitrogen and phosphorus pollution mitigated	Marine/estuary waters	mg/L	Protection and sustainable management of water resources; Healthy marine ecosystems	Vincent et al., 2022
Economic	Number of ferries	With improved mobility/reduced emissions	Count	Economic growth	McKinley Research Group, 2023
Economic	Marine fishery output value		Thousand US\$	Economic growth; Job creation; Improved nutrition	Jiang et al., 2024
Social	Average earnings per worker		US\$/FTE/yr	Improved livelihoods	McKinley Research Group, 2023
Social	Policies supporting needs and rights of small-scale fishers		Number	Improved livelihoods	Österblom et al., 2020
Social	Percentage of workers who make less than the living wage	Accounting for race/ethnicity	Ratio	More equitable distribution of wealth; Greater social cohesion	City of Oakland, 2018

KPI frameworks help stakeholders to optimize sustainability goals across environmental, economic, and social domains. While the BEI provides a concise summary of key measures, it also highlights the level of effort required. For example, while the “volume of biomass preserved or restored” may increase biodiversity, stakeholders may need to assess “tons of ocean-based seaweed and bivalves produced”, “abundance and biomass of groundfish” and “area of seagrasses protected or restored” separately to determine how individual species and/or habitats are faring.

Finally, the relative lack of social equity and renewable energy KPIs highlights a gap between the literature and innovations in the blue economy.

Applying the BEI to real-world applications will require that users determine the scope of monitoring efforts, timelines, historical baselines, and data collection. Each is discussed below. The following section applies the BEI’s conceptual framework to individual and collective blue economy initiatives.

Applying the BEI Framework

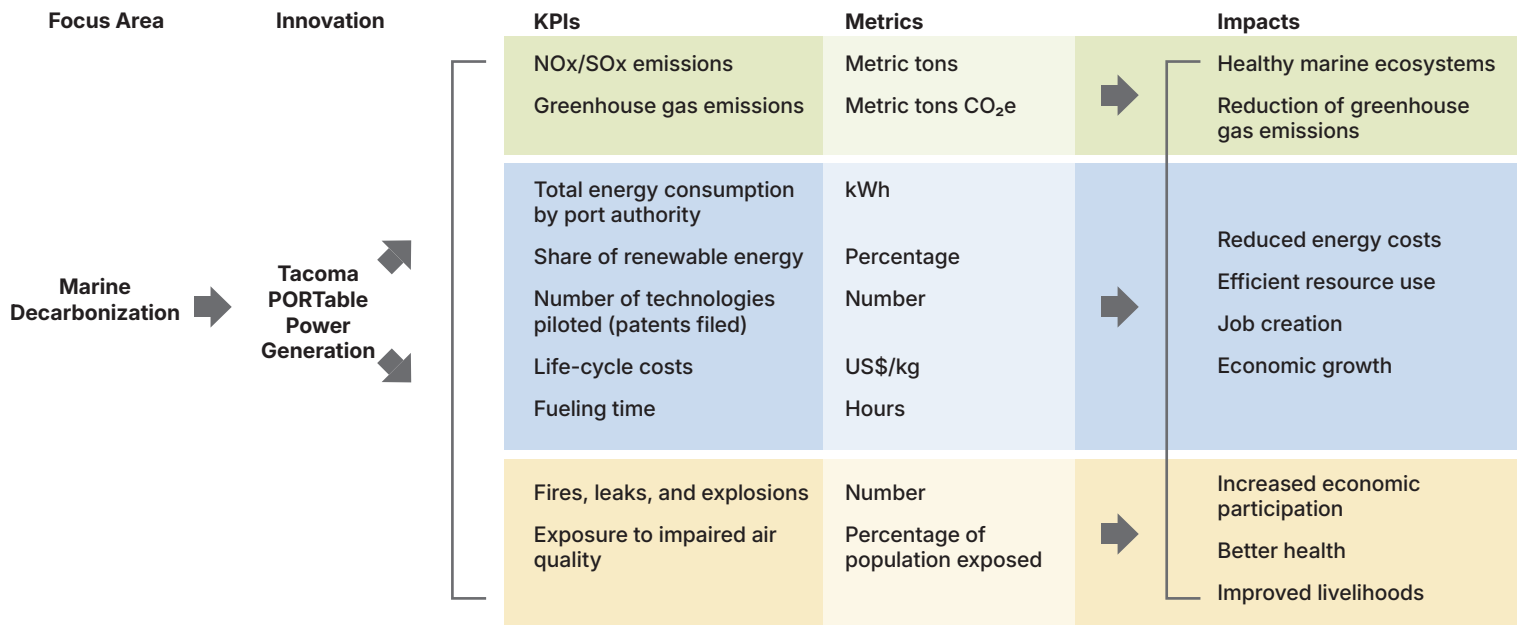
Case Study: Green Hydrogen

Maritime Blue members are advancing a broad portfolio of blue economy projects. This includes the Tacoma *PORTable Power Generation*, a Maritime Decarbonization project that seeks to shift a portion of the Port of Tacoma's fuel needs (largely electrical generation) from diesel generators to hydrogen formate, a liquid hydrogen carrier that is considered to be safer, cheaper, cleaner, and a more flexible source of stored energy. Portable hydrogen formate storage units would power various port infrastructures and operations.

Multiple KPIs can be applied to this project, highlighting its benefits relative to diesel or other energy sources. The following KPIs are likely relevant to an initial deployment of the technology:

- **Total energy consumption by port authority:** the energy potential of stored hydrogen formate and its impact on overall port energy portfolios
- **Lifecycle costs:** the total value chain costs (including production, distribution, and tax credits) as compared with other energy sources, including other means of hydrogen generation, distribution, and storage
- **Number of technologies piloted:** the number of patents generated by this pilot project
- **Energy from renewable sources:** the share of green electricity (primarily hydropower) used for hydrogen production
- **Fires and explosions:** reduced risk or safety incidents, compared with alternative energy sources such as gray-green compressed hydrogen, or gas-powered generators
- **Exposure to impaired air quality:** whether port workers and operators are exposed to lower pollutant loads
- **NOx/SOx emissions:** the degree to which transitioning to green hydrogen reduces emissions of these pollutants, relative to prior port operations
- **GHG emissions:** the degree to which transitioning to green hydrogen reduces emissions of climate-forcing substances (e.g., carbon dioxide, methane), relative to prior port operations

Figure 2. BEI Framework for Tacoma *PORTable Power Generation* at the Pilot Stage



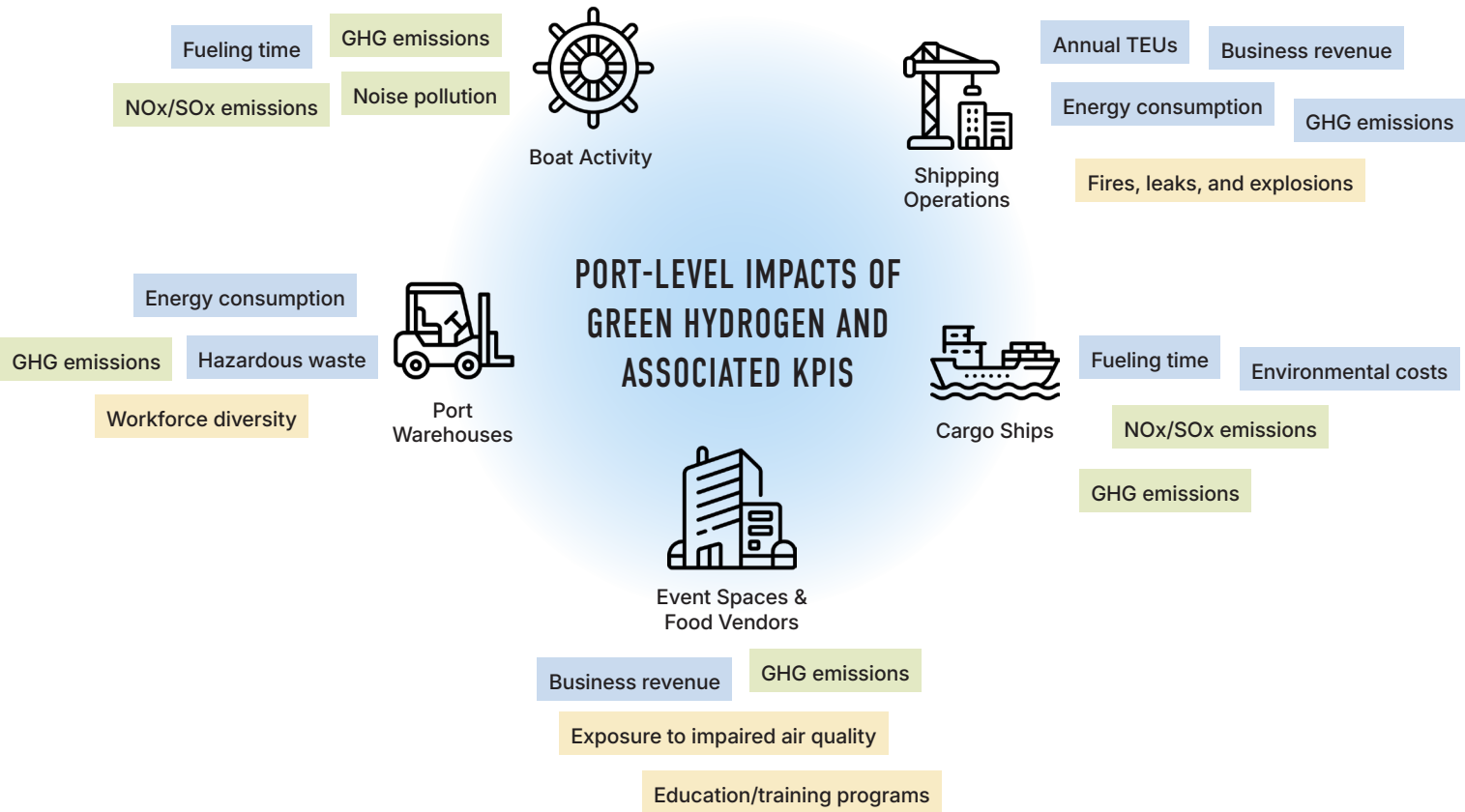
Should *Tacoma PORTable Power Generation* technologies be deployed at larger scales, they will likely influence other aspects of Port operations. Such impacts can be assessed with KPIs more relevant to commercial-scale applications. Figure 3 shows the potential for portable green hydrogen to support shipping and boat operations, manufacturing, community events, and food vendors.

As an example, the greenhouse gas emissions of shipping and manufacturing operations can be analyzed as they shift their operational energy needs to hydrogen. Other KPIs (e.g., education/training programs, business revenue) may emerge, should hydrogen be used to power conference spaces, or lead to lower operating costs.

While hydrogen technology is still evolving, these scenarios demonstrate the value of the BEI framework for analyzing the effects of blue economy innovations. It also improves our understanding of impacts as technologies shift from pilot phases to commercial deployment, as they affect individual technologies, operational sectors, and even entire ports.

Applying the BEI to blue economy innovations illustrates the strategic decisions necessary to delineate and understand sustainability impacts. Analyzing *Tacoma PORTable Power Generation* through a BEI lens can help other clusters understand the impact of investing in green hydrogen technologies. As Maritime Blue collects KPI data to monitor project progress, those data can be shared with other clusters, thus informing the wider blue economy investment journey.

Figure 3. Port-Wide Impacts of PORTable Power and Selected KPIs



Cluster-level innovations

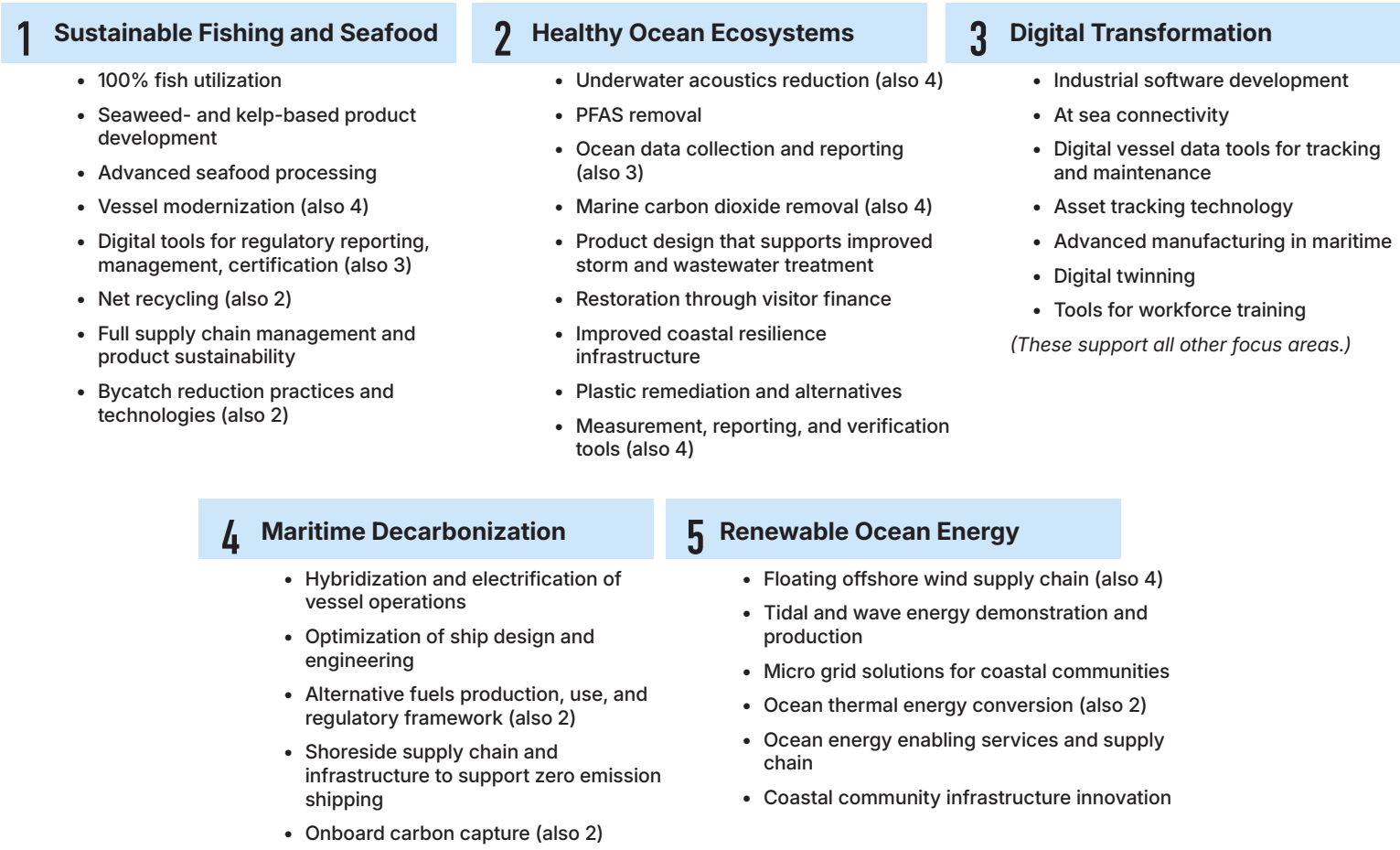
Maritime Blue provides a rich environment for innovators, where triple-bottom-line analysis can be critical for understanding how sustainability goals are being met. Visualizing Maritime Blue innovations across all five focus areas highlights the complexity of understanding sustainability impacts (Figure 5). Each focus area has a distinct set of KPIs, impacting different sustainability areas. Technological innovations in the maturation pipeline include:

- Transitioning to clean hydrogen for port and maritime applications at the Port of Tacoma
- Development and deployment of an offshore wind supply chain in Washington to support turbines along the West Coast
- Commercial deployment of zero-emission high-speed hydrofoil transportation in Puget Sound
- Development of robust 5G networks for port activities enabling real-time environmental monitoring and supporting community safety

As innovations multiply, they may complement each other, work in parallel, or present potential trade-offs against some sustainability goals. KPIs can guide stakeholders in identifying synergies, trade-offs, and gaps among economic, environmental, and social priorities, helping them to optimize outcomes. Local and regional priorities and concerns are critical to this process. For instance, electrification of hydrofoil ferries or green hydrogen may increase aggregate energy demand, which could affect greenhouse gas emissions and air pollution, depending on the final energy portfolio.

Because each of these focus areas involves innovation in a commercial context, it is inevitable that they will share some common KPIs, especially those related to workforce development. Similarly, as Maritime Blue emphasizes prosperous and thriving maritime and coastal communities, KPIs reflecting progress towards these goals are also likely to be relevant to all focus areas.

Figure 4. Blue Economy Innovations Across the Five Focus Areas



THRESHOLDS, DATA, AND MONITORING NEEDS

The goals of each technology or innovation will contextualize KPI performance and make desired impacts more specific. Global, national, regional, state, or local institutions are all capable of establishing such criteria. For instance, the *2023 Seafood Stewardship Index* provides governance, ecological, economic, and social criteria for the global seafood industry (Packer and Beukers, 2022). More region-specific targets could also be established. For example, the Puget Sound Partnership aims that “by 2050, all Chinook Salmon populations increase and at least 50 percent of the populations reach their recovery goals” (2018).

Once innovators have identified KPIs relevant for their project, they will need to assess what is required to measure and track each KPI in terms of technical capacity, timelines, and overall effort. Baseline assessments are needed for identifying and understanding the impact of innovations as drivers of change. *Vital Signs* details monitoring procedures for each KPI, including the stakeholders in charge of collecting data, proposed methods, baseline data, and general guidance and resources (Puget Sound Partnership, 2024). Each step requires significant resources—including establishing the metrics themselves. Puget Sound Partnership has a \$1 million grant competition for experts that can help further develop indicators, including defining baselines or biological thresholds and developing statistical and modeling methods for evaluation of status and trends. Although the BEI is conceptual, stakeholders can use it as an initial step before launching a more applied data collection and project monitoring plan.



Conclusion

IMPLICATIONS OF THE BEI

Innovation clusters will need the right tools to understand the degree to which blue economy innovation creates positive benefits for people, communities, and the environment. This BEI framework demonstrates the complex, interconnected nature of the blue economy, as well as the challenge of capturing the wide range of benefits across recreation, food security, climate stability, trade, transportation, and other sectors.

The BEI provides a guide for stakeholders to understand their project triple-bottom-line impacts and to assess performance relative to priorities, data availability, and specific KPIs. By facilitating an appreciation of the multi-dimensional impacts of each innovation, the BEI framework supports stakeholders to assess each project impact and to inform innovation, design, and implementation processes. The framework thus offers a foundation for strategic decision-making, data collection, stakeholder engagement, and technological development.

Maritime Blue can apply the BEI to current and planned projects, mapping logical paths from initial proposals to their ultimate environmental, economic, and social impacts to fully capture the sustainability performance of each. Individual or collective project performance (by focus area or across the full Maritime Blue portfolio) could steer future investment and demonstrate the cumulative triple-bottom-line impacts of the broader cluster.

APPLICATION BY OTHER BLUE CLUSTERS

The BEI has been designed to apply to the range of currently active blue economy innovations developed by Maritime Blue members, but other blue innovation clusters may follow a similar approach. Platforms seeking to strengthen partnership and collaboration can employ the BEI as a tool to maximize the potential around sustainability impacts awareness and delivery. As innovation clusters collect and generate data while deploying blue economy technologies, they have the opportunity to lead development of best practices in baselines, targets, and data collection.

FUTURE DEVELOPMENTS

This framework could be expanded and operationalized as an online or app-based decision-making tool, enabling stakeholders to identify their desired, planned, or implemented innovations and select desired impacts. Such a tool could then generate KPIs to help document how each innovation could impact sustainability goals.

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Appendix A: Limitations

This report outlines a standardized, transferable, succinct, and balanced list of KPIs that address both SDGs and blue economy innovation priorities, which resulted in inevitable compromises. While a robust literature review informed this process, Earth Economics and Washington Maritime Blue teams made a purposeful selection of key studies. As such, the KPIs included here are non-exhaustive and may not capture the full breadth of innovations, practices, initiatives, or changes that may be measured.

Even so, Earth Economics has taken a broad approach when identifying KPIs and sustainability frameworks. Further research could produce and organize a more conclusive set of KPIs (numbering thousands) via an online tool.

Appendix B highlights an overarching limitation to the KPI review for assigning KPIs to blue economy innovations: there are hardly any renewable ocean energy or social indicators explicitly tied to the blue economy.