



# BRIDGE-BS Black Sea Towards 2050 Series: "The Future of Blue Economy"

*Transformative Pathways at Pilot Site Level*

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ReSEES

Research laboratory on  
Socio-Economic and  
Environmental Sustainability



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# TRANSFORMATIVE PATHWAYS

## DEFINITION

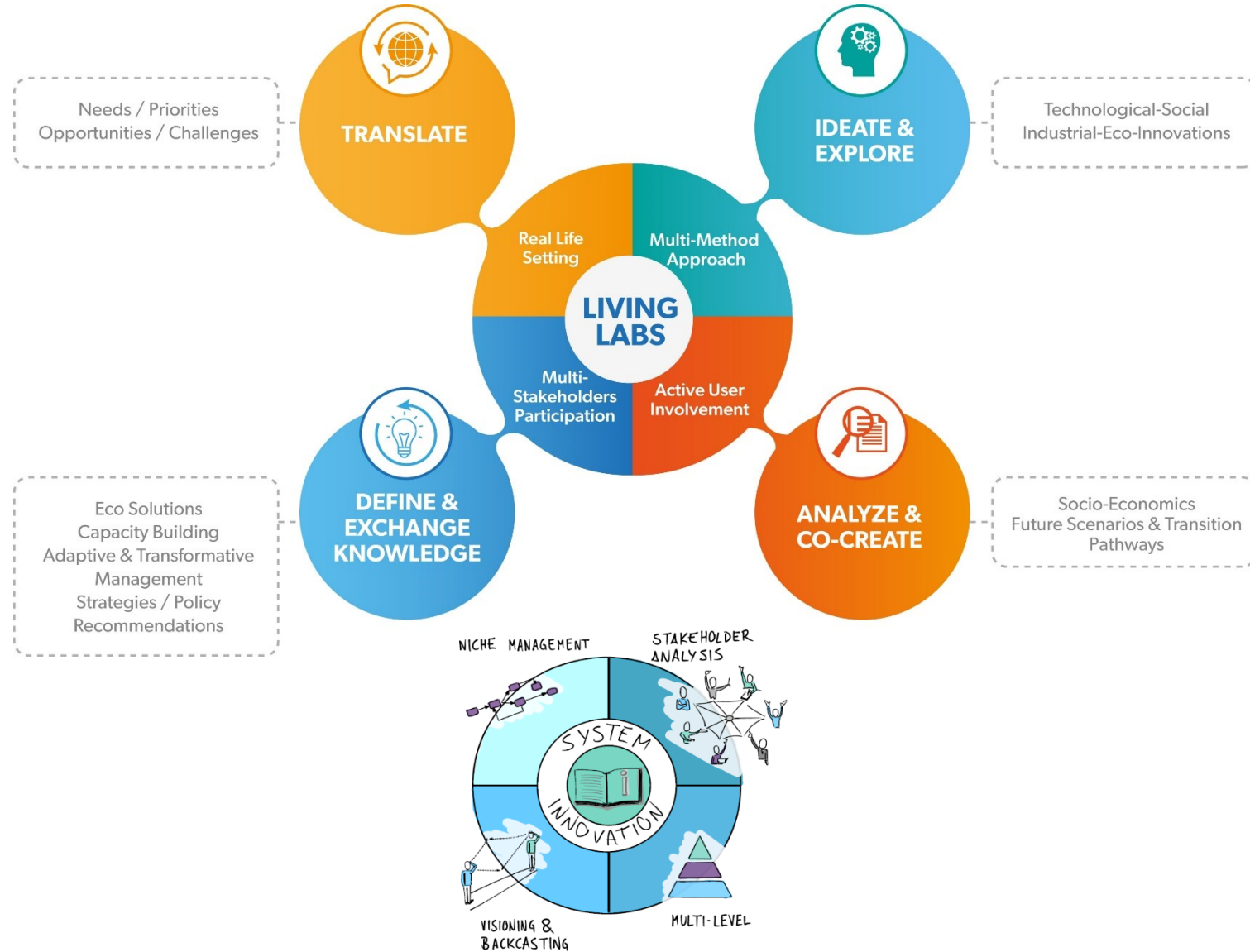
- Refers to a **trajectory or route of change** that leads to a fundamental and significant shift in a **system, process, or situation**, to depart from current unsustainable practices to transition to a **desirable sustainable state**, **challenging the status quo** and leading to more **resilient, equitable, and sustainable outcomes**.

## IN THE CONTEXT OF BRIDGE-BS

- **Transformative pathways** have been co-designed with **local stakeholders** which identified a portfolio of **short, mid and long terms actions** including **technological, social, institutional innovations, management measures and best practices** necessary to transform key blue sectors towards sustainability to reach to future envisioned by stakeholders (**2050 stakeholder vision**)



# BRIDGE BS SUSTAINABILITY LIVING LABS CONCEPT





# ENGAGING LOCAL STAKEHOLDER IN THE BLACK SEA



**3** Rounds of Living Labs in **6** Pilot Sites



SCAN FOR MORE INFO ON PILOT SITES

2022 → **+120**

2023 → **+140**

2024 → **+150**

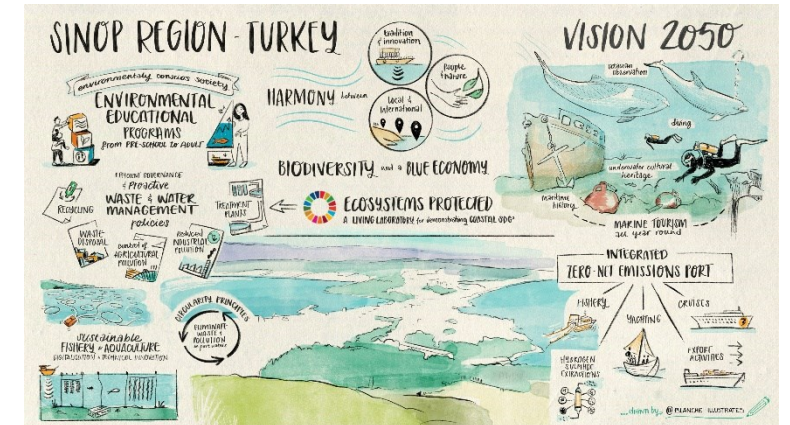
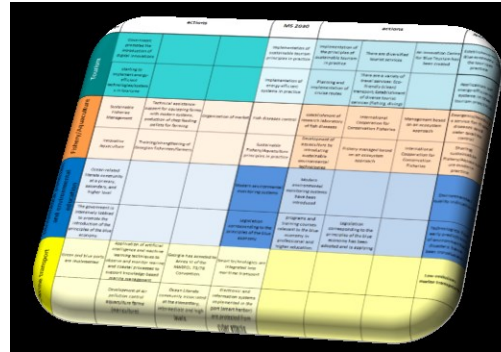
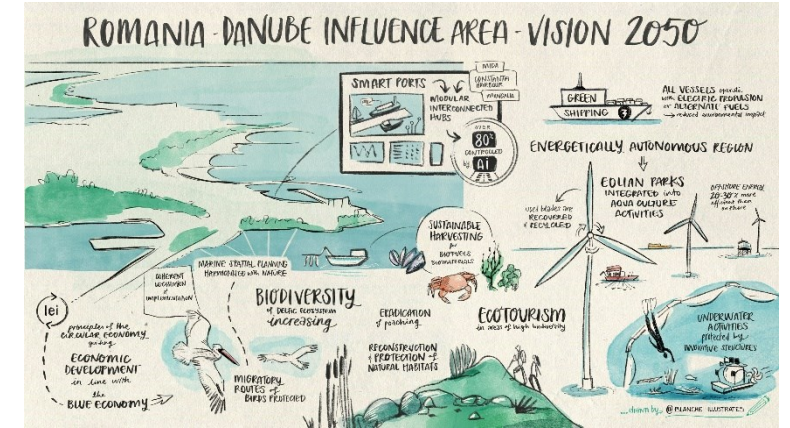
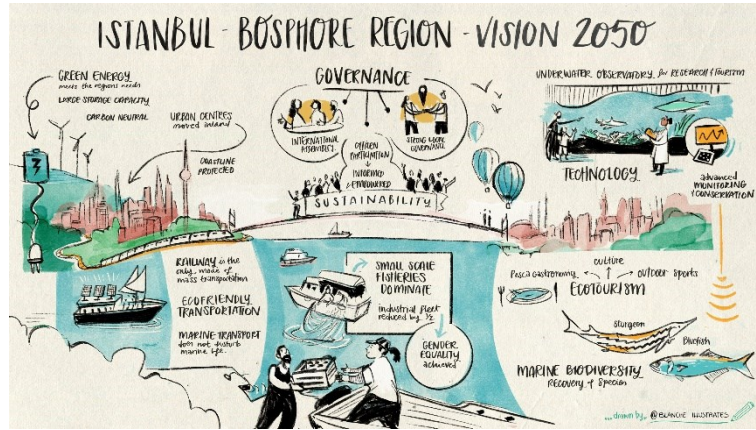
Stakeholders from the blue economy sectors were engaged in local Living Labs held in BRIDGE-BS Pilot Sites.

BRIDGE-BS LL stakeholders' engagement flow





# BRIDGE-BS PILOT SITES VISION





# BRIDGE-BS TRANSFORMATIVE PATHWAYS

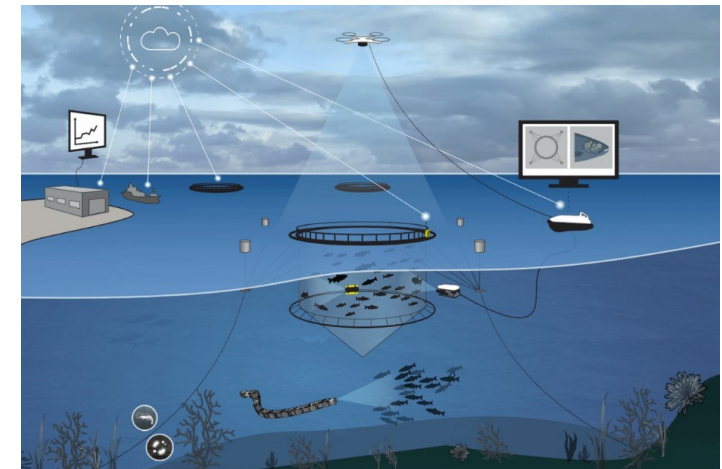
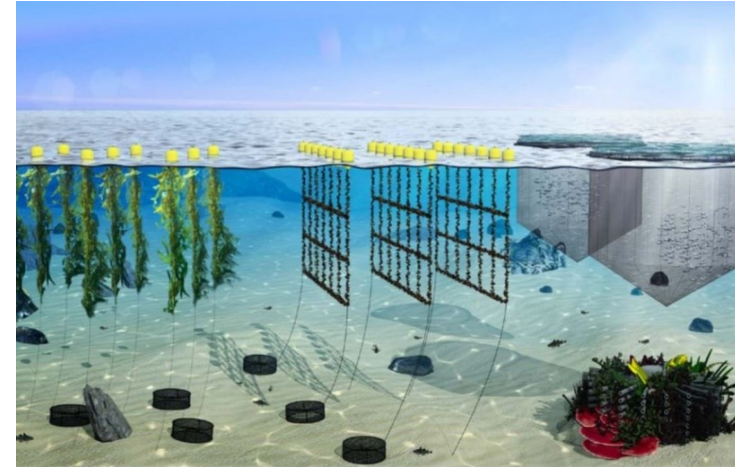


	actions	MS 2030	actions	MS 2030
Tourism	Government promotes the introduction of digital innovations	Implementation of sustainable tourism principles in practice	Implementation of the principles of sustainable tourism in practice	There are diversified tourist services
	starting to implement energy-efficient technologies/systems in tourism	Implementation of energy-efficient systems in practice	Planning and implementation of cruise routes	There are a variety of travel services: Eco-friendly (clean) transport; Establishment of diverse tourist services (fishing, diving)
Fishery/Aquaculture	Sustainable Fisheries Management	Technical assistance: support for equipping farms with modern systems, production of cheap feeding pellets for farming	Fish diseases control	establishment of research laboratory of fish diseases
	Innovative Aquaculture	Training/strengthening of Georgian fishermen/farmers	Sustainable Fishery/Aquaculture principles in practice	Development of aquaculture by introducing sustainable environmental technologies
Environmental protection and environmental education	Ocean-related literate community at a primary, secondary, and higher level		Modern environmental monitoring systems	Modern environmental monitoring systems have been introduced
	The government is intensively lobbied to promote the introduction of the principles of the blue economy.		Legislation corresponding to the principles of the blue economy	programs and training courses relevant to the blue economy in professional and higher education.
Maritime transport	Green and blue ports are implemented	Georgia has acceded to Annex VI of the MARPOL 73/78 Convention.	Smart technologies are integrated into maritime transport	Legislation corresponding to the principles of the blue economy has been adopted and is applying
	Development of Air pollution control aquaculture farms (mariculture)	Ocean Literate community associated at the elementary, intermediate and high levels	Electronic and information systems implemented in the port (smart harbor) are protected from cyber attacks	Technologies for early prediction of environmental disasters have been introduced
				Low emission marine transport

# TRANSFORMING THE AQUACULTURE SECTOR

## Main targets:

- **Build a skilled workforce**
  - **Develop necessary infrastructure**
  - **Adopt innovative technologies,**
  - **Farm a diverse range of products**
- 
- **Innovative technologies:** smart disease control, smart underwater monitoring systems, and Multi-Trophic Aquaculture systems
- 
- Specialized education and training programs, awareness-raising campaigns, and financial incentive schemes.





# DRIVING THE TOURISM SECTOR TOWARDS SUSTAINABILITY



- Energy-efficient systems and smart eco-friendly infrastructures
- A particular focus on waste management and transport



- Alternative and sustainable tourism activity:  
Enhancing cultural heritage  
Use of digital tools (VR)

- Education programs and trainings
- Strengthening environmental regulations



# DEVELOPING BLUE RENEWABLE ENERGY TO ACHIEVE CARBON NEUTRALITY

- Legal and governance frameworks
- Research and development programs & public-private partnerships
- A skilled and highly specialized workforce



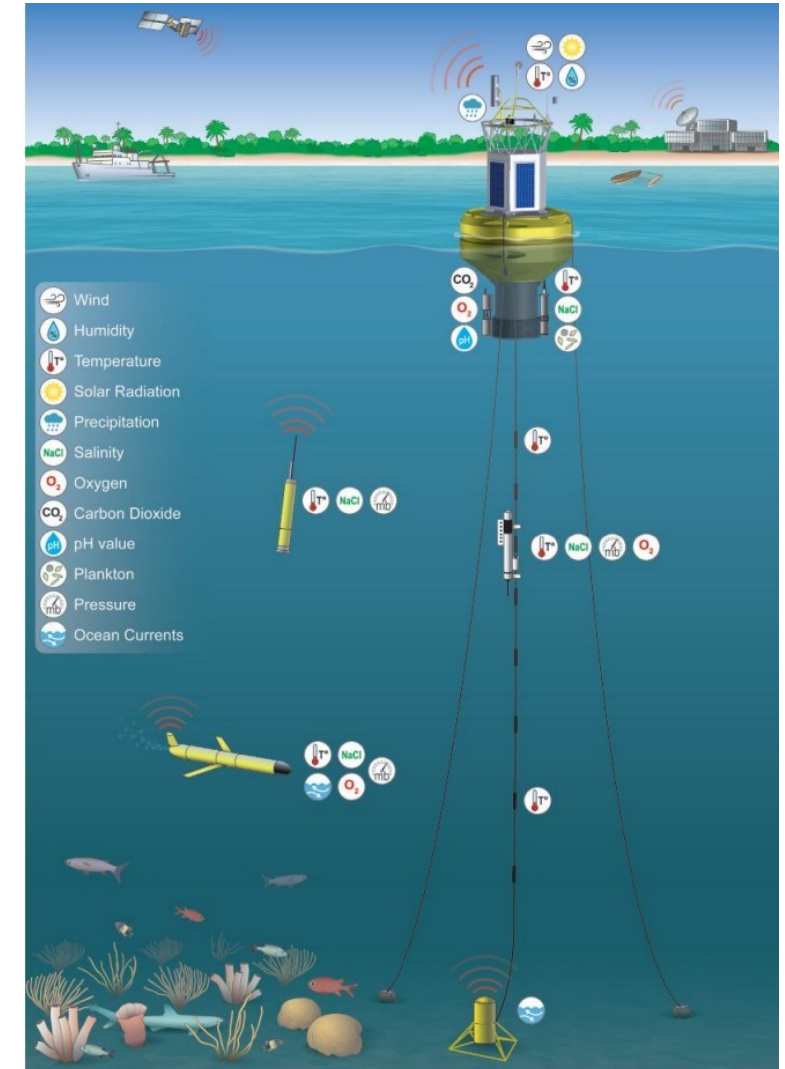
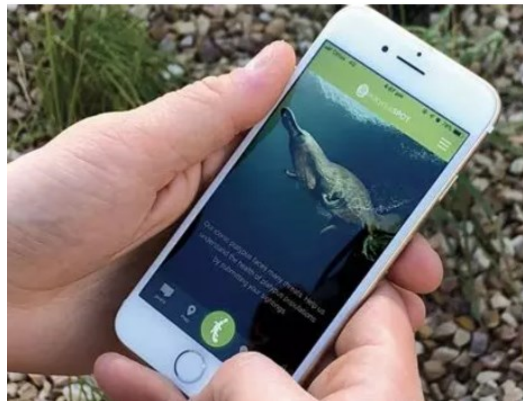
- Automated systems and artificial intelligence to optimize the work processes and management of offshore wind farms
- New materials and structures for offshore wind turbines to reduce ecological footprint and minimize impacts
- Development of more efficient and sustainable battery technologies for energy storage





## Target: A restored, well-functioning, and well-protected Black Sea marine biodiversity

- Strengthening and expanding a network MPAs including participatory and EBM approach
- Developing advanced underwater monitoring systems  
Use of drones, autonomous vessels and other technologies for environmental monitoring
- Smart monitoring based on citizen science and DTO for fast responses to environmental threats





# TRANSITIONING TOWARDS A SUSTAINABLE FISHERY SECTOR

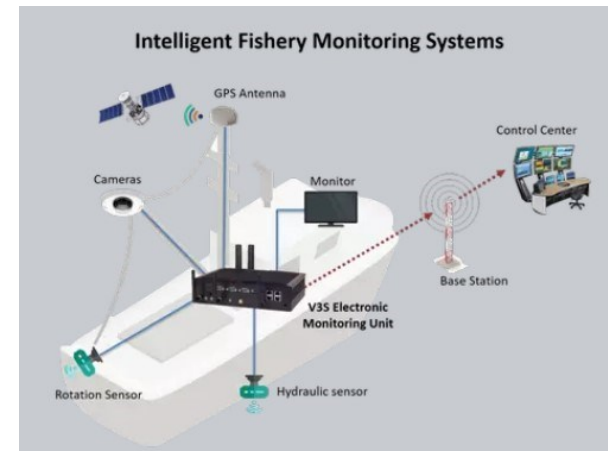
## Key targets:

- Enhancing knowledge and monitoring of fish stocks for sustainable management.
- Promoting the use of sustainable fishing techniques.
- Implementing upskilling and reskilling programs to adapt the workforce to new standards and facilitate the adoption of new practices
- Strengthening collaboration between scientists and fishermen & international cooperation.
- Strengthening law enforcement.



## A mix of social and technological innovations, along with management measures

- Advancing fishing selectivity techniques and zero-emission vessels
- Automated fisheries monitoring and management systems to track and regulate fishing activities
- Advanced processing and preservation technologies to reducing waste production
- Improve traceability within the seafood supply chain i.e. use of blockchain technologies
- Educational programs, awareness campaigns, professional trainings
- Ecolabels, certifications, and reward systems





# GREENING THE PORT AND SHIPPING SECTOR



**Targets: Integrating low-emission and renewable energy sources, as well as improving the management of solid and liquid waste at sea and in port facilities**

- Developing and implementing low-emission technologies for vessels and port operations to reduce air pollution and fuel consumption.
- Digitalizing port operations and logistics through the use of AI, IoT, and drones.
- Automating monitoring systems for pollution control and enhancing incident response.
- Ensuring the implementation of international regulations in Black Sea ports



**SHIPPING**

# ADDITIONAL COMPONENTS OF THE TPs

	actions			MS 2030	actions			MS 2030
Tourism	Government promotes the introduction of digital innovations			Implementation of sustainable tourism principles in practice	Implementation of the principles of sustainable tourism in practice	There are diversified tourist services	An Innovation Centre for Blue Tourism has been created	Establishment of Blue economy the tourism practice
	starting to implement energy-efficient technologies/systems in tourism			Implementation of energy-efficient systems in practice	Planning and implementation of cruise routes	There are a variety of travel services: Eco-friendly (clean) transport; Establishment of diverse tourist services (fishing, diving)		Application of energy-efficient systems in the tourism practice
Fishery/Aquaculture	Sustainable Fisheries Management	Technical assistance-support for equipping farms with modern systems, production of cheap feeding pellets for farming	Organization of market	Fish diseases control	establishment of research laboratory of fish diseases	International Cooperation for Conservation Fisheries	Management based on an ecosystem approach	Emergency/mobile service for fish diseases and water quality control
	Innovative Aquaculture	Training/strengthening of Georgian fishermen/farmers		Sustainable Fishery/Aquaculture principles in practice	Development of aquaculture by introducing sustainable environmental technologies	Fishery managed based on an ecosystem approach	International Cooperation for Conservation Fisheries	Sharing sustainable Fishery/Aquaculture modern practice
Environmental protection and environmental education	Ocean-related literate community at a primary, secondary, and higher level			Modern environmental monitoring systems	Modern environmental monitoring systems have been introduced			Environmental quality indicators
	The government is intensively lobbied to promote the introduction of the principles of the blue economy.			Legislation corresponding to the principles of the blue economy	programs and training courses relevant to the blue economy in professional and higher education.	Legislation corresponding to the principles of the blue economy has been adopted and is applying		Technologies for early prediction of environmental disasters have been introduced
Marine transport	Green and blue ports are implemented	Application of artificial intelligence and machine learning techniques to observe and monitor marine and coastal processes to support knowledge-based marine management.	Georgia has acceded to Annex VI of the MARPOL 73/78 Convention.	Smart technologies are integrated into maritime transport				Low emission marine transport
	Development of Air pollution control aquaculture farms (mariculture)	Ocean Literate community associated at the elementary, intermediate and high levels.		Electronic and information systems implemented in the port (smart harbor) are protected from cyber attacks				



Lead organizations



Barriers and enablers



Technological and social innovations



Resilience analysis



Financial instruments



# WHAT'S NEXT?

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				International Cooperation for Conservation Fisheries
				Environmental quality indicators
				Technologies for early prediction of environmental disasters have been introduced
				Low emission marine transport

Available in a dedicated user-friendly report

Widely communicated to end-users

Available in a summary for policy maker format in the BRIDGE-Black Sea Blue Economy Observatory platform





# THANK YOU!

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**STAY TUNED!**

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