

## ECCENTRIC - Enhancing Circularity in the Adriatic Area

Promotes sustainable economic development in maritime and coastal sectors in the Adriatic region.

**How: Collaboration between SMEs and research institutions.** We support the "twin transition," combining digital and green innovation to develop new market and society oriented solutions.

**Goal:** the shift toward circular economy by enhancing the competitiveness of SMEs and fostering technological and entrepreneurial solutions that address both environmental and market challenges.

**Key outcome: 3 Strategic Roadmaps (one map per each thematic sector)** as tools to shared vision for the future development of each sector:

Marine Energy

Safety and Surveillance

Infrastructure

**Infrastructure roadmap:** To assess current trends in the infrastructure we surveyed 75 SMEs, industry associations, agencies, research bodies, and policymakers that are actively involved in the **Infrastructure sector**. Based on their feedback we have developed the roadmap.

1

Interviews with SMEs and stakeholders aimed at identifying needs and barriers to development

2

Analysis of technological and economic trends conducted through a review of emerging technologies

3

Organization of seminars and workshops designed to validate preliminary findings and co-design future actions

### ECCENTRIC participants:

#### Italian Stakeholders



- Companies
- Universities / Research Centers
- Public bodies and agencies
- Associations / Chambers of Commerce
- NGOs / Foundations / Non-Profit
- Incubators / Clusters / Hubs
- Technical training and ITS

#### Croatian Stakeholders



Interreg



Co-funded by the European Union

Italy – Croatia

ECCENTRIC



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## BLUE INFRASTRUCTURE ROADMAP



Technologies,



Business Models,



Investments

# INFRASTRUCTURES Strategic Development Roadmap



- Recycled plastic materials quality and durability improvement
- Coastal erosion devices efficiency improvement
- Enhancing public services implementing intelligent transportation systems
- IOT introduction with real time data tracking and exchange
- Shore power systems development for vessels
- Development of digital platforms to connect SME and Public Domains
- Ports fiber communication expansion
- Enable electronic data exchange between port systems, including sensor data for monitoring port areas and cargo operations
- Reduction of bureaucratic barriers to simplify on-site operations for SMEs.
- Increase the resilience of seaports to cyberattacks
- Rollout of low-impact technologies (cold ironing, hydrogen-powered vehicles)
- Improving port design and operations with comprehensive and fully integrated digital twins (AI, Simulation and monitoring for port operations planning)
- Introduction of full automation to simplify and increase the efficiency of port operations
- Development of Easily accessible and widely shared hubs for the exchange of knowledge and technology with the aim of supporting the development of ports
- Establishment of streamline procedures and programs with a facilitated process for SMEs who want to bring innovation into their sectors

## Technologies

Subsector	Technologies	Short/Mid term trends	Future Vision
<b>Pears and Port (Smart Marinas)</b>	Internet of Things (IoT). Big Data. Artificial Intelligence (AI). Digital Platforms.	IoT technologies port operations; Smart Marinas. Renewable energy systems, waste management solutions, and smart customer service platforms. IoT-based platforms for efficient port operations in the Adriatic. Sustainable sediment management and environmental protection in port infrastructure.	Introduction of AI-driven systems for cargo flow optimization and automated smart marinas. Environmental drones for inspections and security monitoring.
<b>Shipbuilding and Repair (Autonomous Vehicles – Future ships)</b>	Hydrogen and other renewable energy ships. Autonomous ships. Composite materials.	Underwater robots and multimodal sensors for critical infrastructure. Hybrid-electric military ships and autonomous systems testing. Advancing modular ship repair and smart vessel construction technologies.	Fully operational autonomous ships on specific Adriatic routes, with hybrid or hydrogen propulsion systems. Robotic platforms for at-sea repairs.
<b>Alternative Energy Platforms Subsea Cables and Pipelines</b>	Offshore wind energy. Solar and photovoltaic panels. Fuel cells. Energy storage systems. Positioning and tracking technology. Advanced materials. Robotic installation systems. Advanced subsea cables with higher efficiency and lower technical losses.	Expansion of offshore wind and floating solar infrastructures; focus on circular economy. Growing integration of renewable hydrogen with offshore wind energy production. Combining offshore wind and solar energy platforms. Growing focus on energy resilience and submarine security. Resilience of subsea pipelines and integration with renewable energy. Use of modular designs for enhancing the robustness of subsea cable networks.	Creation of combined offshore energy hubs integrating wind, floating solar, and green hydrogen production with enhanced storage capacity. AI-based monitoring systems for real-time fault prevention and anomaly detection in subsea cables and pipelines. Energy harvesting technologies for powering sensors.
<b>Pleasure Facilities</b>	Electric docks and moorings. Sustainable refuelling systems. Intelligent safety systems. Apps and digital platforms.	Automation and sustainability in tourist ports. Eco-friendly marinas leveraging digital platforms for sustainable operations. Interconnected marinas with blockchain-based transparent service management.	Fully digitalized marinas offering AI-based personalized services such as automated bookings, predictive boat maintenance, and renewable energy management.
<b>Desalination Plants</b>	Reverse osmosis. Solar distillation. Low energy desalination. Hybrid technologies. Recycled wastewater technologies.	Solar-powered technologies for desalination systems. Decentralized potable water systems powered by renewable sources. Solar-powered desalination and recycled wastewater to alleviate environmental impact	Autonomous desalination systems powered by renewable energy with AI for efficiency optimization and waste reduction. Modular systems for rapid deployment in tourist hotspots.

## Business Models

**Key Partners:** public or academic, including regional governments, universities, or EU programs.

**Key activities:** infrastructure management, technological innovation, and sustainability-driven R&D. All prioritize efficiency, quality, and ecological responsibility, even though their outputs differ.

**Value Propositions:** sustainability, ensures resilient water supply, zero-emission electric mobility. All aim to mitigate environmental risks and comply with high standards.

**Customer Relationships:** Focused on long-term trust-based relationships, through public contracts and direct contact, and awareness-raising on sustainability. The use of education and transparency as tools to strengthen customer engagement.

**Customer Segments:** public institutions and sustainability-conscious users.

**Key Resources:** Advanced infrastructure, technological innovation, and skilled personnel. EU and public funds are a cross-cutting enabler across all models, especially for scaling up operations.

**Channels:** Multi-channel communication strategies: institutional networks and public authorities, digital platforms, events, and PR.

## Investments

Public – EU	Public – National/Regional	Private
<ul style="list-style-type: none"> <li>EMFAF</li> <li>Horizon Europe</li> <li>Bluelinvest</li> <li>EIC</li> </ul> <p>These instruments support innovation in areas such as blue renewable energy, ocean monitoring, and low-emission maritime transport. Between 2018 and 2023, blue economy investments tripled, surpassing €13 billion, with most deals within the EU. A significant portion of capital also comes from non-EU investors, showing the global appeal of EU-backed marine innovation.</p>	<p>At the national and regional level, countries like Italy and Croatia support the blue economy through grants, co-investment schemes, and infrastructure for innovation (e.g., incubators and pilot hubs). These initiatives focus on sectors like sustainable fisheries and coastal tourism. However, stronger alignment with EU strategies and greater integration with private capital are needed to scale impact and foster sustainable growth.</p>	<p>Private investments are limited, especially for early-stage SMEs. To address this, a growing network of private investors—venture capital, business angels, and private equity—supports startups through funding rounds and strategic guidance. Most deals involve mergers and acquisitions (38%), followed by early-stage equity (34%) and growth equity (11%), while late-stage investments remain scarce, indicating a young market. The interest is rising in marine robotics, sustainable aquaculture, and clean maritime transport.</p>