

COMPREHENSIVE ASSESSMENT OF

CUBA'S PORT SYSTEM

TECHNICAL REPORT



LABOR
RIGHTS



SOCIAL
DIALOGUE



DECENT AND
SAFE WORK



ENVIRONMENTAL
SUSTAINABILITY



INCLUSIVE ECONOMIC
DEVELOPMENT

Comprehensive Assessment of Cuba's Port System

Technical baseline for a National Port Modernization and Transformation Project.

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About the Observatory

ODLS is an initiative dedicated to monitoring, documenting, and analyzing the situation of labor, trade-union, and social rights in Cuba. Through research, technical reports, and specialized studies, the Observatory seeks to generate independent evidence that contributes to understanding the national reality, strengthens public debate, and supports researchers, civil society organizations, and international bodies.

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Methodological Note on Review and Scope

This document constitutes a technical draft of the diagnosis of the Cuban port system and a preliminary basis for the formulation of a potential National Port Modernization and Transformation Project.

Its scope encompasses technical, logistical, economic, institutional, environmental, and labor dimensions in order to provide a systemic view of the sector's main challenges and opportunities.

The report does not make categorical claims about future events or presume the automatic applicability in Cuba of foreign institutional models or labor instruments. International references are used for comparative purposes and to inform the exploration of alternatives in modernization, regulation, port management, and labor relations in a potential scenario of democratic transition, economic opening, and institutional reconstruction.

Executive Summary

This executive summary synthesizes the main findings of the assessment and provides a strategic overview of the report. Its purpose is to explain, in terms accessible to decision-makers, why the port system could become critical infrastructure for Cuba's economic reconstruction and, at the same time, why such a transformation requires robust institutional, labor, environmental, and logistical frameworks.

Cuba has a privileged maritime location between the Gulf of Mexico, the Straits of Florida, the western Caribbean, and the routes connecting North America, Central America, Europe, and the Panama Canal. That geographic advantage, however, does not currently translate into a competitive port system. The available evidence shows a substantial gap between the island's strategic potential and the actual performance of its logistics infrastructure.

The Cuban port system includes commercial, industrial, oil, fishing, tourism, and military ports, as well as marinas, shipyards, coastal shipping terminals, and associated maritime services. Outside Mariel, several assets are characterized by obsolete infrastructure, limited technological development, dredging constraints, deteriorated wharves, inadequate land access, and limited multimodal integration.

Mariel is the most important port asset for a modernization strategy. Its potential, however, does not depend solely on physical capacity. For it to function as a regional logistics hub, Cuba would need legal certainty, reliable rail and road connections, efficient customs procedures, value-added services, private investment, contractual transparency, digitalization,

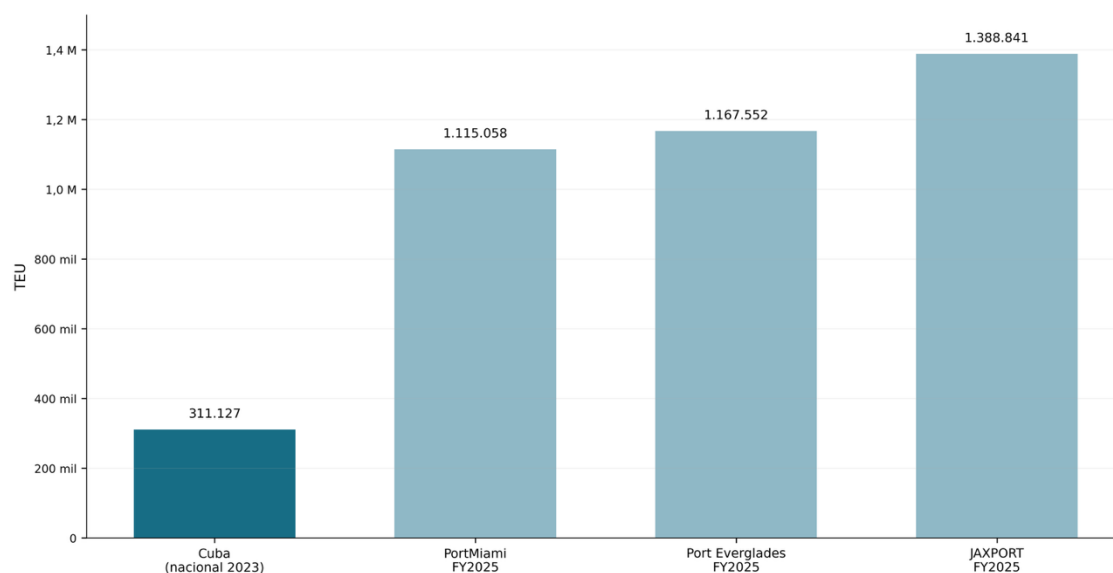
and a recovery in foreign trade.

The comparison with Florida shows that competitive ports are more than berthing infrastructure. PortMiami, Port Everglades, Port Canaveral, JAX-PORT, and Port Tampa Bay integrate cargo, cruises, energy, logistics zones, technology, public governance, private investment, and performance reporting. Cuba can draw on these practices as reference points but should not replicate these models without adapting them to its institutional, labor, and financial conditions.

The central conclusion is that Cuba needs a 25-year National Port Master Plan. This plan should combine institutional reform, a landlord model, transparent concessions, customs digitalization, wharf rehabilitation, selective dredging, rail and road corridors, cruise and ferry terminals, logistics zones, coastal protection, ISPS security, workforce training, and social dialogue.

The report incorporates an additional labor component: the possibility of using agreements developed by the International Longshoremen's Association (ILA) and the United States Maritime Alliance (USMX) as comparative references for developing a Cuban port labor regime. This reference does not imply automatic applicability, but it does provide useful criteria regarding sectoral collective bargaining, decent wages, occupational safety and health, training, welfare, supplementary pensions, and a just technological transition.

Figure 1. Container throughput in Cuba compared with selected Florida ports.



Sources: CEIC/UNCTAD for Cuba. Miami-Dade, Port Everglades, and JAXPORT port authorities.

The figure illustrates the scale gap between the Cuban system and Florida's leading ports. The difference should not be interpreted as an immediate volume target, but rather as evidence that port competitiveness depends on trade, connectivity, institutions, shipping services, financing, and business confidence.

Introduction and Methodology

This section presents the analytical approach, the sources used, and the main limitations of the assessment. The report is a technical draft intended to establish a preliminary basis for analyzing the Cuban port system and for the potential formulation of public policies, investments, and institutional reforms in a hypothetical scenario of democratic transition.

The methodology combines document review, comparative analysis, functional characterization of ports, identification of bottlenecks, preliminary investment prioritization, risk assessment, and the formulation of indicators. Where verifiable data exist, they are presented as documented facts. Where

available information is incomplete, the report uses reasonable inferences and scenarios conditioned on explicit assumptions.

The main limitation of the assessment is the limited availability of up-to-date public data on productivity, tariffs, clearance times, the structural condition of wharves, logistics costs, occupational accident rates, environmental performance, and investment plans by port in Cuba. For this reason, the report avoids assigning precision to information that cannot be sufficiently documented and uses preliminary order-of-magnitude ranges solely as a reference to guide decisions and subsequent studies.

Table 1. Methodological Classification of the Evidence Used

TYPE OF INFORMATION	DEFINITION	TREATMENT IN THE REPORT
Documented fact	Data reported by an official source, international organization, port authority, or identifiable technical document.	Used as the factual basis of the diagnosis.
Secondary technical evidence	Conclusion drawn from international cooperation studies, sector reports, or aggregated databases.	Cross-checked against other sources and presented cautiously.
Reasonable inference	Conclusion derived from the relationship between available data and recognized technical principles.	Identified as an inference, not as an official fact.
Hypothetical scenario	Projection conditioned on reforms, investment, trade opening, and institutional changes.	Presented as a possibility, not a prediction.

This table establishes a rule of analytical transparency: not all statements have the same degree of certainty. Distinguishing among facts, inferences, and scenarios is essential if the document is to serve as a technical input rather than an opinion piece.

Geographic, Economic, and Institutional Context

The context helps explain why Cuban ports have greater strategic value than their current utilization levels might suggest. Cuba’s location is a structural advantage, but port competitiveness requires institutions, energy, trade, infrastructure, technology, and confidence.

Cuba occupies a strategically significant maritime position, close to Florida, the western Caribbean, the Gulf of Mexico, and shipping routes linked to the Panama Canal. Its natural bays offer opportunities for container, bulk, energy, and tourism terminals, as well as coastal shipping and maritime services.

The structural problem is that favorable geography

does not automatically translate into logistical capacity. A competitive port requires active supply chains, specialized operators, reliable contractual rules, efficient land transportation, stable energy, predictable customs, and interoperable digital services.

In a transition process, the port system could absorb much of the demand associated with national reconstruction: food, medicines, fuels, machinery, construction materials, energy equipment, agricultural inputs, and capital goods. In parallel, it could serve as a platform for maritime tourism, ferry services, domestic coastal shipping, and trade with the Cuban diaspora.

Inventory and Characterization of the Cuban Port System

Characterizing the port system makes it possible to move from a fragmented view of individual ports to a national network perspective. The relevant question is not only which ports exist, but what function each should perform within an integrated system of foreign trade, tourism, energy, coastal shipping, and regional development.

Table 2. Preliminary Functional Characterization of Priority Cuban Ports

PORT	PROPOSED STRATEGIC ROLE	FUTURE FUNCTIONS	CRITICAL LIMITATION
Maríel	National hub for containers, international logistics, and the special development zone.	Containers, logistics zones, value-added services, light manufacturing.	Develop effective demand, improve land connectivity and shipping services, and ensure legal certainty.
Havana	Urban and tourism port.	Cruises, ferries, marinas, nautical services, and waterfront redevelopment.	Reduce heavy cargo and control urban and environmental impacts.
Matanzas	Energy and industrial port.	Liquid bulk, fuels, energy support, and industrial safety.	Environmental risk and need for contingency protocols.
Cienfuegos	Multipurpose node in the south.	Bulk cargo, agro-industry, energy, coastal shipping, and selective cruises.	Infrastructure rehabilitation and improved road and rail connectivity.
Santiago de Cuba	Logistics gateway to eastern Cuba.	Regional containers, general cargo, cruises, and coastal shipping.	Dredging, wharf modernization, and equipment.
Nuevitas	Industrial port for central-eastern Cuba.	Bulk cargo, energy, construction materials, and coastal shipping.	Obsolescence, equipment, and connectivity.
Moa/Nícaro	Specialized industrial port.	Mining, nickel, industrial services, and associated repair.	Enhanced environmental management and sector dependence.
Casilda/Trinidad	Tourism and regional port.	Maritime tourism, marinas, small cruise vessels, and fishing.	Limited scale and heritage and environmental protection requirements.

The table proposes functional specialization aimed at avoiding duplication of investments, reducing inefficient competition among national ports, and facilitating resource allocation according to the economic, territorial, and logistical role of each facility.

Technical Assessment

The technical assessment examines the system's physical and operational capacity. Modernization cannot be limited to purchasing cranes or expanding yards: it requires reviewing structures, dredging, access, energy, water, telecommunications, operational safety, and maintenance.

The main technical weakness is the cumulative deterioration and obsolescence of existing infrastructure. Outside Maríel, several ports require structural audits, wharf rehabilitation, fender upgrades, selective dredging, yard paving, drainage, lighting, access-control systems, and predictive maintenance plans.

Table 3. Technical Bottlenecks and Response Actions

COMPONENT	PROBABLE PROBLEM	PRIORITY ACTION
Wharves and berths	Structural deterioration, aging fenders, and load limitations.	Structural audit, prioritized rehabilitation, and preventive closure of unsafe areas.
Dredging and channels	Draft and maneuverability limitations at specific ports.	Bathymetric studies, selective dredging, and environmental sediment management.
Yards and warehouses	Insufficient paving, drainage, cold logistics, and storage.	Modernize yards, cold chain, sanitary warehouses, and traceability.
Energy	High vulnerability due to the national electricity crisis.	Port microgrids, renewable-energy backup, energy efficiency, and redundancy.
Equipment	Insufficient cranes, spare parts, and maintenance outside modern terminals.	A demand-based renewal plan and maintenance contracts.
Telecommunications	Low digital integration and interoperability.	PCS, Maritime Single Window, and cargo traceability.
Operational safety	Risks associated with dangerous cargo, bulk cargo, and night work.	Protocols, certification, inspection, and safety committees.

The table shows that physical and digital infrastructure must advance in parallel. A structurally rehabilitated port will remain inefficient if it lacks stable energy, maintenance, access control, and digital coordination systems.

Figure 2. Cuba's National Container Throughput: Available Documented Data Points.



Note: Only documented data points cited in the source consulted are shown. Intermediate years are not interpolated.

The figure shows that Cuba's container throughput remains low relative to its geographic potential. The available documented data points should be interpreted cautiously because of information limitations, but they illustrate that modernization must focus on generating logistics demand, not merely expanding infrastructure.

Economic and Financial Assessment

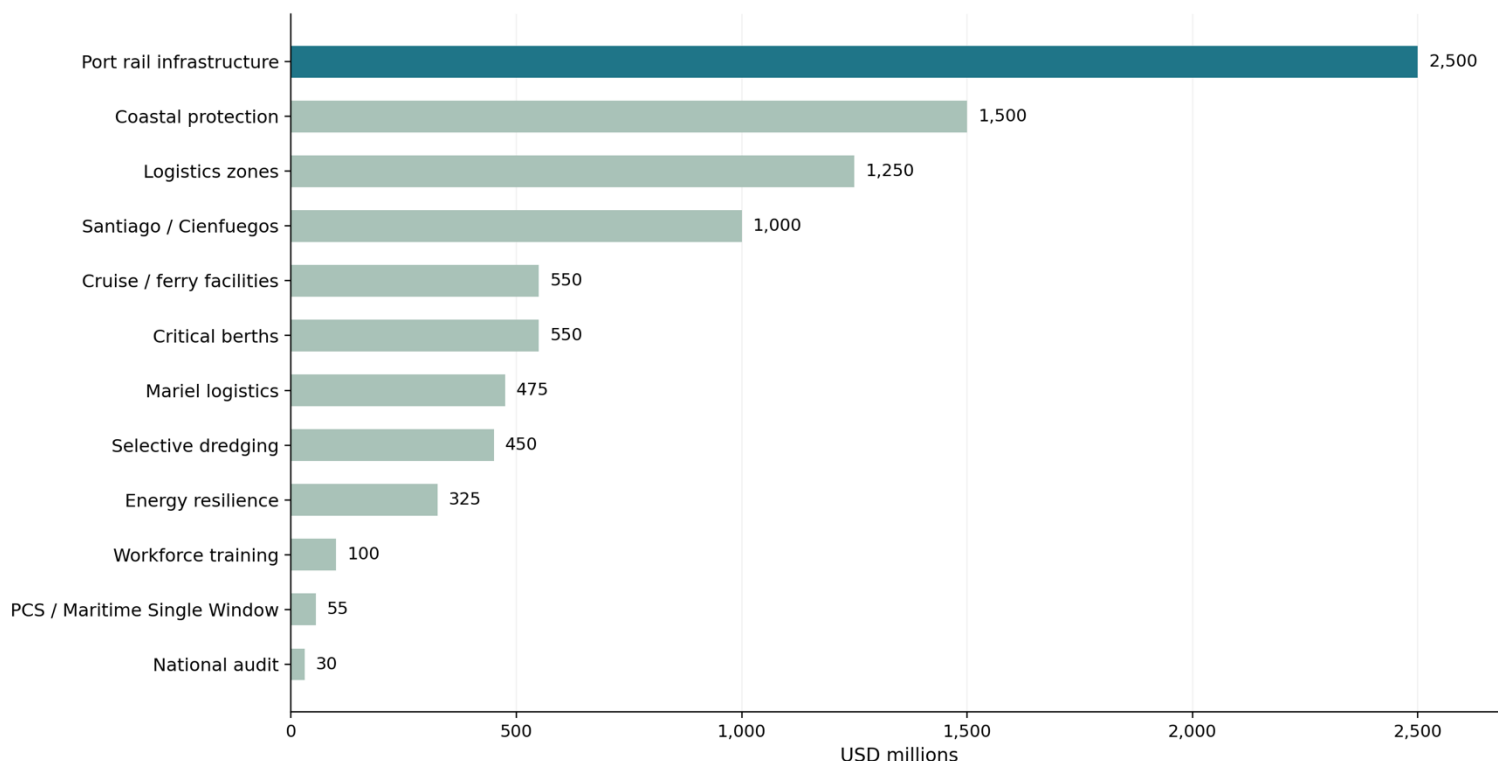
The economic analysis identifies which segments can generate revenue, which investments can be recovered through tariffs, and which will require public support or concessional financing. In Cuba, the challenge is to build cargo volume and commercial confidence before developing infrastructure beyond demonstrated demand.

In a transition scenario, initial demand would be dominated by imports required for national reconstruction and to meet needs in food, energy, infrastructure, health, transportation, and housing. Exports would grow more slowly, conditioned by a recovery in domestic production, agro-industry, mining, services, biotechnology, and light manufacturing.

Table 4. Priority Economic Segments of the Cuban Port System

SEGMENT	POTENTIAL	CRITICAL CONDITION
Containers	High potential at Mariel if trade expands and logistics zones and shipping services are developed.	Do not undertake massive expansion without demonstrated demand.
Liquid bulk	Relevant to energy, fuels, and industry.	Requires strict industrial safety and environmental controls.
Dry bulk	Needed for food, fertilizers, cement, and reconstruction.	Requires silos, warehouses, conveyors, and sanitary controls.
Cruises	Potential in Havana, Santiago, and Cienfuegos.	Avoid a model characterized by low local spending and high urban impact.
Ferries	Cuba-Florida potential conditioned on political and regulatory agreements.	Requires immigration, customs, health, and security infrastructure.
Coastal shipping	Can reduce pressure on road networks and support regional development.	Requires fleet, smaller terminals, and tariff rules.
Marinas	Higher-value nautical tourism.	Must respect coastal ecosystems and communities.

The table distinguishes segments with different return and risk profiles. Containers, cruises, ferries, and marinas may offer opportunities for private investment, while other components necessary for their development—such as dredging, access, security, coastal-shipping infrastructure, and climate resilience—will likely require public participation and international cooperation.

Figure 3. Prioritized Investment Ranges by Modernization Package.

Warning: These are not engineering budgets; they are preliminary ranges for prefeasibility purposes.

The figure presents order-of-magnitude ranges rather than definitive budgets. Its purpose is to guide the sequencing of prefeasibility studies, prioritize critical packages, and avoid decisions based solely on political aspirations or infrastructure announcements.

Logistics Assessment

Modern port logistics depend on coordination among the port, customs, shipping lines, carriers, maritime agents, railways, roads, logistics zones, banks, insurers, and health authorities. Even a port with adequate infrastructure can underperform if its logistics ecosystem is slow, discretionary, or non-interoperable.

Cuba must move from isolated ports to a national logistics network. To achieve this, the PCS and the Maritime Single Window should be among the first projects implemented. Cargo traceability, customs risk management, truck appointment scheduling, document digitalization, and interoperability among terminals can reduce costs without waiting for major civil works.

Table 5. Logistics Gaps and Modernization Measures

AREA	GAP	RECOMMENDED MEASURE
Customs	Slow or unpredictable processes.	Single Window, risk management, and non-intrusive inspection.
Land transport	Limited road and rail connectivity.	Logistics corridors and selective railway rehabilitation.
Traceability	Insufficient cargo tracking.	PCS, unique codes, terminal-customs-carrier integration.
Cold chain	Insufficient for food, pharmaceuticals, and perishables.	Refrigerated warehouses and sanitary protocols.
Shipping services	Low frequency and limited competition.	Incentives for shipping lines, operational reliability, and transparent tariffs.
Coastal shipping	Underuse of domestic maritime transport.	Public-service rules, fleet development, and secondary terminals.

The table shows that significant improvements in logistics performance and efficiency can be achieved before undertaking megaprojects. Digitalization, customs coordination, and traceability can have a significant impact at a lower relative cost than building new terminals.

Institutional and Regulatory Assessment

Institutions are the foundation of any sustainable port investment. Without clear rules on ownership, concessions, tariffs, competition, arbitration, transparency, security, and the environment, private and multilateral capital will assume greater risks or demand more costly terms.

A transition toward a landlord port model is recommended. Under this model, the State retains planning and regulatory functions, as well as ownership of land and basic infrastructure, while specialized operators manage terminals through concessions, leases, or PPPs. This model requires a clear separation of functions and independent oversight mechanisms to avoid conflicts of interest.

Table 6. Priority Institutional Reforms

REFORM	PURPOSE	TIME HORIZON
General Ports Law	Define principles, powers, concessions, tariffs, security, environmental management, and labor participation.	Years 1–2
National Port Authority	Planning, statistics, technical standards, coordination, and oversight.	Years 1–2
Regional port authorities	Asset management, port-city relations, and local implementation.	Years 2–4
Economic regulator	Control tariffs, competition, access to infrastructure, and contractual disputes.	Years 2–4
Port PPP regime	Structure concessions and risk allocation.	Years 2–5
Maritime Single Window	Reduce discretion and processing times.	Years 1–5
Freedom-of-association guarantees	Ensure collective bargaining and autonomous worker representation.	Immediate and permanent

The table shows that institutional reform should begin before or simultaneously with physical investment. Comparative experience indicates that port projects can fail when infrastructure is developed without adequate governance, clear contractual rules, and sufficient regulatory capacity already in place.

Environmental and Climate Assessment

The environmental dimension must be cross-cutting rather than a later stage of the project. Cuban ports are exposed to hurricanes, storm surges, flooding, coastal erosion, extreme heat, sea-level rise, and pollution risks in enclosed bays and industrial areas.

Energy and industrial ports, especially Matanzas, Cienfuegos, Nuevitas, and Moa/Nícaro, require contingency plans, waste management, water monitoring, control of contaminated sediments, and spill-response protocols. Tourism ports, meanwhile, must balance cruises, marinas, heritage, communities, and ecosystems.

Table 7. Priority Environmental and Climate Risks

RISK	EFFECT	RECOMMENDED MEASURE
Hurricanes and storm surges	Physical damage and operational closure.	Resilient design, continuity plans, and insurance.
Sea-level rise	Progressive flooding of yards and access routes.	Design elevations, coastal protection, and selective relocation.
Spills and dangerous cargo	Bay pollution and health risks.	MARPOL-compliant protocols, response equipment, and drills.
Contaminated sediments	Risk during dredging and disposal.	Prior characterization and safe disposal.
Emissions	Impacts from vessels, equipment, and trucks.	Electrification, energy efficiency, and cleaner fuels.
Cruise and ferry waste	Pressure on cities and bays.	Port reception facilities, sanitary control, and environmental fees.

The table underscores that climate adaptation is not optional. Port assets have long useful lives; therefore, every investment should be designed with climate-change scenarios and resilience criteria in mind from the prefeasibility stage.

Social and Human Capital Assessment

Port modernization has a decisive labor dimension. Port workers, customs personnel, railway workers, carriers, maintenance technicians, tourism operators, and coastal communities are central actors in

the transformation. Without training, collective bargaining, and social protection, modernization can produce conflict, precarious employment, or loss of legitimacy.

The future Port Master Plan should include a National Decent Work in Ports Program. This program should integrate technical certification, occupational safety and health, work-based and classroom training, workforce transition, protection in the face of automation, community participation, social dialogue, and effective freedom of association.

Sectoral Labor Regime for Port Workers

Cuba’s port modernization should not be limited to infrastructure, dredging, cranes, yards, digitalization, and logistics connectivity. A modern port system also requires a sectoral labor regime capable of ensuring productivity, safety, operational stability, and collective rights.

In this regard, the labor dimension is sometimes relegated to a secondary role in port modernization processes, based on the assumption that efficiency is achieved by reducing labor rights or weakening worker representation. Comparative experience shows the opposite: competitive ports require skilled workers, clear rules, institutionalized collective bargaining, and mechanisms for early dispute resolution.

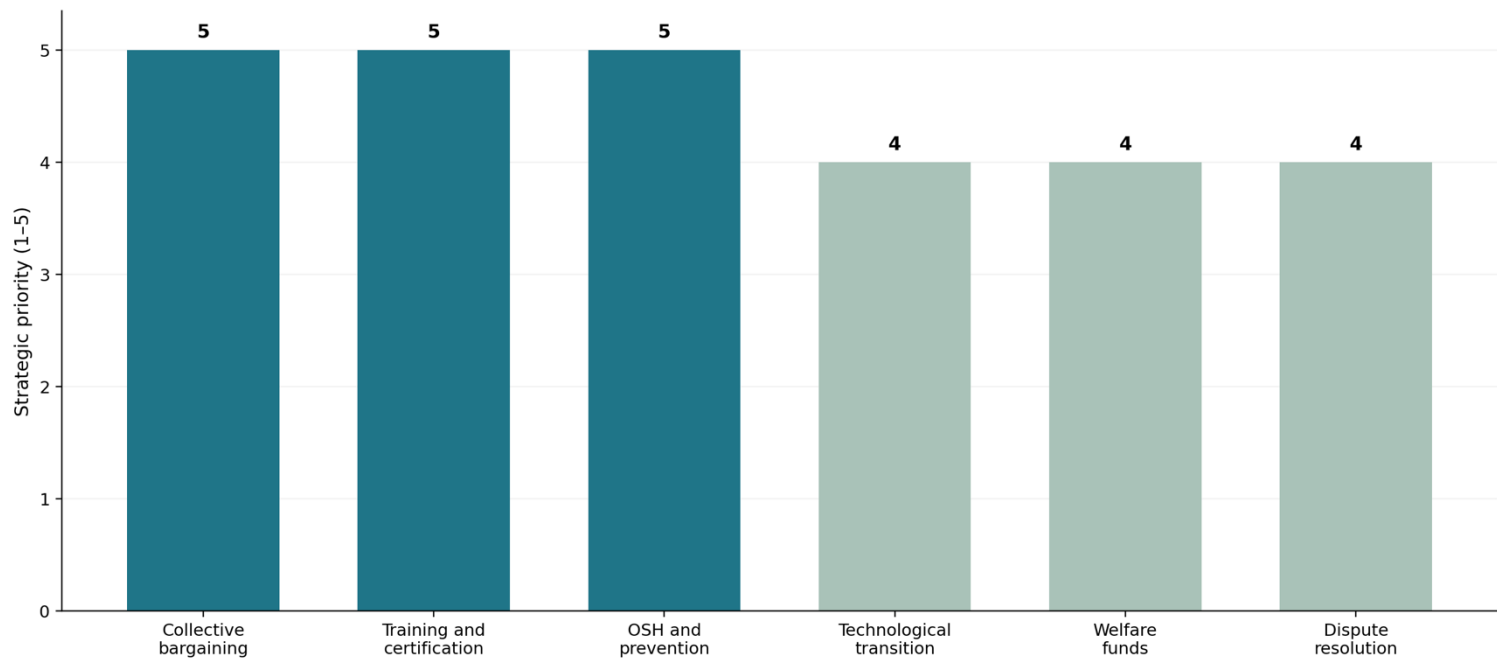
The ILA-USMX agreements should be understood as a comparative reference, not as rules directly applicable to Cuba. Their usefulness lies in providing criteria for designing a Cuban sectoral bargaining regime that includes wages, productivity, automation, safety, training, welfare funds, and dispute resolution.

Table 8. Proposed Adaptation of ILA-USMX References to the Cuban Context

REFERENCE ELEMENT	PROPOSED ADAPTATION FOR CUBA
Sectoral collective bargaining	National forum with free trade unions, operators, port authority, and the State.
Transparent wage scales	Tables by occupation, certification, risk, experience, productivity, and operational responsibility.
Protection in the face of automation	Labor-impact studies, consultation, training, reassignment, and just transition.
Welfare funds	Health, training, supplementary pensions, family support, and workforce transition.
Occupational safety and health	Protocols for cranes, dangerous cargo, extreme heat, night work, hurricanes, and fatigue.
Dispute resolution	Mediation, sectoral labor arbitration, and joint committees.
Negotiated productivity	Verifiable indicators linked to quality, safety, and operational continuity.

This table avoids a mechanical reading of U.S. agreements. The opportunity for Cuba is not to import wage figures, but to incorporate principles: genuine collective bargaining, just transition, negotiated productivity, occupational safety and health, and social benefits compatible with a competitive port system.

Figure 4. Components of the Decent Work in Ports Pillar.



Note: Priority scale from 1 to 5 developed as a preliminary technical assessment; 5 represents the highest priority.

The figure shows that the labor component should be treated as a strategic pillar of modernization rather than an ancillary policy. Training, safety, and collective bargaining have the highest priority because they condition productivity, labor peace, and the project’s social sustainability.

International Comparative Analysis with Emphasis on Florida

The comparison with Florida is justified by geographic proximity, climate, maritime routes, cruise tourism, ties to the Caribbean, and the potential relationship with the Cuban diaspora. However, the comparison must be made cautiously: Florida operates under a different institutional, financial, and commercial framework, with a high degree of legal certainty and a considerably larger scale of demand.

The experience of Florida ports shows that competitiveness emerges from the integration of port authorities, operators, customs, land infrastructure, urban planning, cruises, financing, and transparency. For Cuba, the main lesson is institutional: building terminals is not enough if rules, data, and confidence are absent.

Table 9. Florida Ports and Lessons Adaptable to Cuba

PORT	PROFILE	ADAPTABLE LESSON
PortMiami	Cruises, containers, and a major gateway connecting with Latin America and the Caribbean.	Integration of cargo, tourism, and the urban environment; international positioning.
Port Everglades	Containers, cruises, petroleum, and perishables.	Functional specialization and value-added logistics.
Port Canaveral	Cruises, cargo, and support for high-value sectors.	Passenger management, modern terminals, and investment planning.
JAXPORT	Containers, Ro-Ro, automobiles, and inland logistics.	Intermodal connection, concessions, and cargo specialization.
Port Tampa Bay	Bulk cargo, energy, containers, and cruises.	Multipurpose industrial model with strong regional linkages.
Port of Key West	Tourism and cruises at an urban scale.	Need to manage limits, community concerns, and environmental impacts.

The table identifies useful practices but also warns that their application requires appropriate conditions. Cuba must adapt Florida's lessons to its institutional, fiscal, labor, environmental, and connectivity realities.

The observed difference in scale should also be understood as a signal of conditional opportunity: Cuba could improve its regional role, but only if it achieves greater logistical reliability, expands shipping services, advances digitalization, strengthens legal certainty, and improves its connection to markets.

SWOT Analysis

The SWOT matrix synthesizes the internal and external factors that condition port modernization. Among the opportunities identified is the use of international port collective-bargaining standards, particularly the ILA-USMX agreements, as a reference for a Cuban decent-work model.

Table 10. Revised SWOT Matrix of Cuba's Port System

INTERNAL <i>Internal capabilities and limitations</i>	STRENGTHS <i>Favorable internal factors</i>	WEAKNESSES <i>Unfavorable internal factors</i>
	• Strategic geographic location. • Deep natural harbors. • Mariel as a modern asset. • World-class tourism potential. • Proximity to Florida. • Workforce learning capacity.	• Obsolete infrastructure outside Mariel. • Limited statistical transparency. • Low export volumes. • Energy crisis. • Weak road and rail connectivity.

EXTERNAL <i>Environment and conditions outside the system</i>	OPPORTUNITIES <i>Favorable external factors</i>	THREATS <i>Unfavorable external factors</i>
	• Potential opening of Cuba–Florida trade. Ferries, cruises, and marinas. • PPPs and concessions. • Logistics and free-trade zones. Domestic cabotage. • Multilateral cooperation. • Blue economy. • Adoption of international port labor standards, drawing on ILA–USMX agreements to strengthen collective bargaining, training, a just technological transition, and the protection of labor rights.	• Persistence of sanctions and restrictions. • Hurricanes and climate change. • Corruption or institutional capture. • Regional competition. • Prolonged economic deterioration. • Labor conflict if modernization is imposed without social dialogue.

The inclusion of the labor dimension reflects its strategic importance for port modernization. In a sector intensive in coordination, safety, and operational continuity, collective bargaining can become a tool for productivity, training, conflict prevention, and social legitimacy.

Prospective Scenarios

The scenarios are not predictions. They represent possible trajectories conditioned on critical variables: institutional reform, investment, relations with the United States, productive recovery, tourism, legal certainty, digitalization, energy, and administrative capacity. Their purpose is to help prioritize decisions under conditions of uncertainty.

Table 11. Prospective Scenarios by Time Horizon

HORIZON	CONSERVATIVE	INTERMEDIATE	ACCELERATED
5 years	Critical repairs and incomplete reforms.	Port law, audits, PCS pilot, and first concessions.	Logistics reopening, pilot ferries, and significant initial investment.
10 years	Functional but limited system.	Mariel consolidated; Santiago and Cienfuegos rehabilitated.	Greater integration of Cuba into maritime routes between the Caribbean and Florida.
20 years	Partial modernization without a relevant regional position.	National coastal-shipping network and consolidated logistics zones.	Competitive positioning as a selective regional platform.
25 years	Improved ports but not fully integrated.	Integrated, sustainable, and competitive port system.	Highly connected Caribbean-Gulf-Florida node.

The table shows that the accelerated scenario depends on deep reforms, trade opening, investment, and governance. The intermediate scenario appears more prudent as a reference for public planning, while the conservative scenario highlights the cost of partial reforms.

National Port Modernization Project

The national project should organize investments, reforms, and capacities over 25 years. Its objective is not to maximize construction, but to build an integrated, safe, digital, environmentally resilient, labor-fair port system connected to the supply chains of the Caribbean, Florida, and the Gulf of Mexico.

The project incorporates a specific pillar for decent work, collective bargaining, and just technological transition. This pillar seeks to prevent port opening from leading to precarious employment or disorderly technological displacement. Productivity should be negotiated, measured, and accompanied by training and social protection.

Table 12. Pillars of the National Port Modernization Project

PILLAR	MAIN CONTENT
Institutional	Port law, national authority, regional authorities, regulator, and PPP regime.
Infrastructure	Wharves, dredging, yards, access, energy, water, telecommunications, and maintenance.
Digitalization	PCS, Maritime Single Window, traceability, cybersecurity, and interoperability.
Logistics	Free zones, cold chain, logistics parks, coastal shipping, and shipping services.
Multimodality	Rail and road corridors connected to Mariel, Cienfuegos, and Santiago.
Maritime tourism	Cruises, ferries, marinas, urban waterfronts, and passenger services.
Environment and climate	Coastal protection, waste, emissions, shore power, and resilience.
Decent work in ports	Sectoral collective bargaining, training, OSH, welfare funds, and just transition in the face of automation.
Security	ISPS, access control, dangerous goods management, and operational continuity.

The table summarizes the architecture of the project. Port modernization should be approached as systemic reform: lagging performance in any of these pillars affects the competitiveness, resilience, or legitimacy of the system as a whole.

Decent Work, Collective Bargaining, and Just Technological Transition

The “Decent Work in Ports and Just Technological Transition” pillar is intended to ensure that modernization generates formal, skilled, safe, and productive employment, while preventing precarious employment, abusive subcontracting, and abrupt job losses as a consequence of automation.

Table 13. Components of the Decent Work in Ports Pillar

COMPONENT	DESCRIPTION
National Port Labor Forum	Tripartite, sectoral body with free trade unions, operators, the port authority, logistics companies, and labor authorities.
Port Labor Statute	Regulation of categories, certifications, working hours, shifts, rest, safety, hiring halls, promotions, subcontracting, and joint liability.
Sectoral collective bargaining	Agreements by port-sector branch inspired by references such as ILA-USMX and adapted to the Cuban framework.
Just transition in the face of automation	Labor-impact studies, prior consultation, training, reassignment, voluntary retirement, and income protection.
National Port Training School	Certification of longshore workers, crane operators, supervisors, technicians, inspectors, customs personnel, and tourism personnel.
Port Sector Welfare Fund	Financing for occupational health, training, supplementary pensions, family assistance, and workforce transition.
National Port Safety and Health Committee	Protocols for cargo, cranes, heat, hurricanes, fatigue, hazardous substances, and maritime emergencies.

This table translates the labor approach into concrete instruments. The key is that technological modernization should not be imposed unilaterally, but managed through negotiation, labor-impact studies, and guarantees of training and reassignment.

Roadmap by Phase

The roadmap organizes implementation over time. A responsible port transition should avoid two extremes: limiting action to minimal repairs that perpetuate obsolescence, or launching megaprojects without secured demand, governance, or financing.

Table 14. Port Plan Implementation Phases

PHASE	PRIORITIES
0–5 years	Audits, port law, national authority, PCS pilot, critical rehabilitation, ISPS, resilient energy, and initial training.
5–10 years	Transparent concessions, rehabilitation of Santiago and Cienfuegos, logistics zones, digital customs, conditional cruise and ferry services, and coastal shipping.
10–20 years	National coastal-shipping network, green ports, demand-driven expansion, Caribbean-Florida integration, and maritime cluster.
20–25 years	Consolidation as a Caribbean-Gulf-Florida node, partial automation, blue economy, and advanced climate resilience.

The table shows that initial decisions should focus on institutions, security, data, and critical rehabilitation. Large-scale physical expansion should be conditioned on demonstrated demand rather than unfunded political targets.

Prioritized Investment Plan

The investment plan presents preliminary order-of-magnitude ranges. It does not replace engineering, market, environmental-impact, or financial-structuring studies. Its purpose is to guide priorities, identify critical packages, and separate emergency investments from expansion projects conditioned on demand.

Table 15. Prioritized Investments by Order of Magnitude

PACKAGE	PRELIMINARY RANGE	URGENCY	HORIZON
National technical, legal, and environmental audit	USD 20–40 million	Very high	Immediate
PCS and Maritime Single Window	USD 30–80 million	High	0–5 years
Critical wharf rehabilitation	USD 300–800 million	Very high	0–10 years
Selective dredging	USD 200–700 million	High	0–10 years
Resilient energy at ports	USD 150–500 million	Very high	0–10 years
Mariel logistics modernization	USD 250–700 million	High	5–10 years
Multipurpose Santiago and Cienfuegos	USD 500–1,500 million	High	5–15 years
Cruise and ferry terminals	USD 200–900 million	Medium-high	Conditional
Logistics and free-trade zones	USD 500–2,000 million	High	5–20 years
Coastal protection and climate adaptation	USD 500–2,500 million	Very high	Permanent

The ranges are indicative and should be validated through specific studies. The recommended sequence prioritizes the investments needed to create the initial conditions for modernization—auditing, digitalization, security, energy, and critical rehabilitation—before undertaking major expansions.

Risks and Mitigation

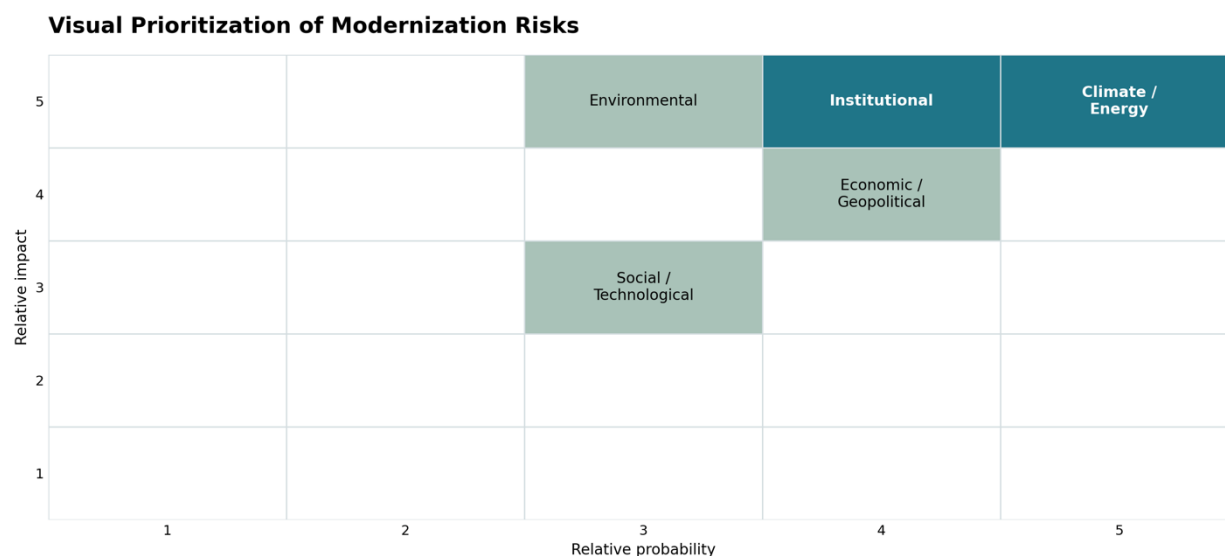
The risk matrix identifies factors that could prevent or undermine modernization. The analysis incorporates the labor dimension because port reform without social dialogue, freedom of association, or a just transition can produce conflict, loss of productivity, and community opposition.

Table 16. Critical Risks and Mitigation Measures

RISK	IMPACT	MITIGATION
Institutional capture or corruption	Very high	International tenders, independent audits, open data, and external oversight.
Lack of legal certainty	High	Port law, contractual stability, arbitration, and an independent regulator.
Infrastructure oversizing	High	Demand-conditioned investment, phased implementation, and rigorous prefeasibility studies.
Energy crisis	High	Microgrids, renewable backup, energy efficiency, and redundancy.
Automation without worker protection	High	Just-transition clauses, training, reassignment, and union consultation.
Concessions with precarious labor conditions	High	Labor obligations in PPP contracts and inspection mechanisms.
Lack of free trade unions	Very high	Guarantees of freedom of association, collective bargaining, and non-retaliation.
Technical skills deficit	High	National Port Training School and certification.
Hurricanes and climate change	Very high	Resilient design, coastal protection, insurance, and operational continuity.
Port cybersecurity	Medium-high	Protocols, penetration testing, redundancy, and data governance.

The matrix shows that institutional, labor, and climate risks are as relevant as engineering risks. Modernization without governance and social legitimacy can paralyze operations even if physical infrastructure improves.

Figure 5. Visual Prioritization of Modernization Risks



Scale 1–5 developed as a preliminary expert judgment for prioritization; technical validation is required.

The figure identifies which risks require early treatment. Prevention and mitigation measures for governance, energy, climate, and labor risks should be incorporated from the design stage of the project and its contractual instruments, not only when problems or conflicts arise.

Indicator and Monitoring System

The indicator system turns the plan into a verifiable tool. Without public metrics, modernization could be reduced to construction announcements. Indicators should measure productivity, efficiency, sustainability, safety, connectivity, digitalization, resilience, and decent work.

Table 17. Indicators for Monitoring the Port Master Plan

DIMENSION	PROPOSED INDICATORS
Productivity	Moves per crane/hour; tons per meter of wharf; yard utilization.
Efficiency	Vessel turnaround time; container dwell time; customs clearance time.
Digitalization	Percentage of procedures handled through the Maritime Single Window; percentage of traceable cargo; PCS interoperability.
Connectivity	Regular shipping services; weekly frequency; coastal-shipping routes.
Finance	Private investment mobilized; port revenues; compliance with capital plans.
Sustainability	Emissions per ton; renewable energy; waste managed; environmental incidents.
Resilience	Days closed due to climate events; recovery time after hurricanes.
Safety and security	Occupational accidents; security incidents; cybersecurity failures.
Collective bargaining	Percentage of workers covered by sectoral collective agreements.
Training	Number of workers certified by port occupation.
Just automation	Percentage of technology projects with a prior labor-impact study.
Social protection	Coverage of health, pensions, and supplementary funds.

The table expands traditional cargo and productivity indicators to include labor rights, training, just automation, and social protection.

Strategic Conclusions

The conclusions integrate the technical assessment with the institutional, social, and labor perspective. Port modernization should not be understood as an infrastructure-only agenda, but as a long-term economic, territorial, environmental, and labor reform.

ORGANIZE BEFORE EXPANDING: Cuba has significant geographic and maritime potential, but its use is constrained by obsolete infrastructure, low commercial scale, logistics weaknesses, the energy crisis, a deficit of public data, and institutional limitations. The priority is not to build more ports, but to organize roles, rehabilitate critical assets, and create reliable rules.

BUILD A SPECIALIZED PORT NETWORK: Mariel should be the hub for containers and international logistics; its expansion should respond to demand. Havana should be reoriented toward maritime tourism: ferries, cruises, marinas, and the urban waterfront. Matanzas should focus on energy/industry, with high environmental standards. Cienfuegos and Santiago should consolidate as regional multipurpose nodes.

ADAPT FLORIDA'S LESSONS: Florida's experience offers useful references, but their application in Cuba requires adaptation. Florida ports demonstrate the importance of professional port authorities, public reporting, private investment, urban planning, intermodal logistics, cruises, security, financing, and data. Cuba would need to build those conditions gradually.

MODERNIZE WITH RELIABLE RULES AND INSTITUTIONS: Cuba's port transformation must also be a sectoral labor reform. The experience of the ILA and its agreements with USMX shows that a high-performing port system can coexist with robust collective bargaining, social benefits, protection in the face of automation, training, and clear productivity rules. For Cuba, the opportunity is to adapt those principles to a national decent-work regime for the port sector.

INVEST IN PHASES AND ACCORDING TO PRIORITY CRITERIA: Modernization should be implemented in phases. During the first five years, priorities should include audits, port legislation, a national authority, PCS, the Maritime Single Window, critical rehabilitation, resilient energy, ISPS security, and workforce training. During the following decade, transparent concessions, logistics zones, coastal shipping, conditional ferry services, and the rehabilitation of Santiago and Cienfuegos should be structured. In the long term, Cuba could consolidate as a Caribbean-Florida-Gulf node if deep reforms and institutional stability are achieved.

PUT WORKERS AT THE CENTER OF MODERNIZATION: Port workers should be treated as strategic actors. Without freedom of association, collective bargaining, training, and occupational safety and health, modernization can generate conflict, precarious employment, and loss of legitimacy. With social dialogue and a just transition, by contrast, it can become an engine of formal employment, productivity, regional development, and democratic reconstruction.

As a final vision, a modernized port system could play a decisive role in Cuba's economic, commercial, and tourism reconstruction. It could connect the island to global supply chains, facilitate the arrival of essential goods, promote logistics zones, reactivate coastal shipping, attract cruises and ferries, strengthen coastal communities, and open opportunities for skilled workers. That vision, however, depends on demanding assumptions: institutional transition, legal certainty, trade opening, financing, transparency, environmental protection, and effective respect for labor and trade-union rights.

Glossary of Acronyms and Technical Terms

The assessment uses acronyms and technical terms specific to port infrastructure, maritime trade, and labor relations. This glossary presents the concepts most relevant to understanding the assessment and its proposals for non-specialist audiences, workers, communities, authorities, and international partners, while maintaining the precision necessary for sectoral analysis.

PPP

Public-Private Partnership. A contractual mechanism through which the private sector finances, builds, operates, or maintains public infrastructure under risk-allocation rules.

ASIC

Independent Trade Union Association of Cuba (Asociación Sindical Independiente de Cuba). An organization supporting this draft from a labor and trade-union rights perspective.

SWOT

Strengths, Weaknesses, Opportunities, and Threats matrix. A strategic analysis tool.

EBITDA

Earnings before interest, taxes, depreciation, and amortization; a financial indicator used to measure operating performance.

ILA

International Longshoremen's Association. A labor organization representing maritime workers across the United States, Canada, Puerto Rico, and parts of the Caribbean.

ISPS Code

International Ship and Port Facility Security Code. International security code for ships and port facilities under the SOLAS Convention.

Landlord port

A management model in which the public sector retains ownership of land and basic infrastructure, while private operators manage terminals under concessions or leases.

MARPOL

International Convention for the Prevention of Pollution from Ships. International framework for preventing and controlling various forms of pollution from ships.

PCS

Port Community System. A digital platform integrating terminals, shipping lines, customs, maritime agents, carriers, and authorities.

Ro-Ro

Roll-on/Roll-off. Maritime transport mode for wheeled cargo that enters and leaves the vessel via ramps.

Shore power

Electric power supplied from shore to vessels while they are berthed, reducing the need to keep auxiliary engines running.

OSH

Occupational Safety and Health. Measures intended to prevent accidents, injuries, and health risks associated with work.

TEU

Twenty-foot Equivalent Unit. Standard unit equivalent to one 20-foot container, used to measure container capacity or throughput.

USMX

United States Maritime Alliance. Association of maritime employers and operators that negotiates collective bargaining agreements with the ILA.

MSW

Maritime Single Window. An integrated system for submitting, processing, and validating information on vessels, cargo, crews, customs, immigration, and port health requirements.

Sources

References are included to facilitate traceability of the assessment. Some sources are used as factual support, while others serve as methodological or comparative references. At a later stage of the project, this bibliography should be expanded with engineering studies, official port-level data, technical interviews, and field surveys.

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